CENTRE FOR HEALTH ECONOMICS

UNIVERSITY
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HEALTH STATUS, RESOURCE ALLOCATION and SOCIO-ECONOMIC CONDITIONS

(Interim Report of Health Needs Research Study)

by

Roy A. Carr-Hill

Senior Research Fellow

Centre for Health Economics
University of York
Heslington
YORK YO1 5DD

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Interim Report of
Health Needs Research Study
for Wolverhampton Borough Council and
Wolverhampton District Health Authority

Revised Version

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Roy A Carr-Hill

Centre for Health Economics
University of York
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Summary Report

This report is about the allocation of resources for health services. It has been prepared by the Centre for Health Economics in response to a request from the Wolverhampton Health Authority. This brief was:

> "To indicate the comparative health needs of Wolverhampton in relation to the Metropolitan Districts of the Region and others in England and Wales. To highlight the health and social indicators which might lead to a change in the resources available to the Local Authority and the Health Authority".

There are many factors which affect the allocation of resources between Districts within a Region but the detailed analysis in the attached report concentrate on the adjustment for differences in the population's need for health care and specifically on three issues.

* what are the health indicators which can be used, taking into account the data available, to monitor health status relative to other areas?

* is the RAWP formula in practice an appropriate basis for adjusting for "need" specifically between districts within a Region?

* how should relative need for health care be assessed and how should it be taken into account in any modified formula?

Whilst the focus of the report is on the distribution of health care resources, it should not be forgotten that the original and outstanding objective of the National Health Service was to improve health. In many

respects, this has happened. People live longer (e.g. life expectancy for females at age 1 was 76.1 in 1981 as compared to 72.1 in 1951); death rates for infectious diseases have dropped dramatically (e.g. deaths from tuberculosis are running at 5% of the 1951 level); and perinatal mortality has dropped to a quarter of its immediate post-War level.

It is still important, however, to emphasise that health <u>is</u> the issue, as there appears to be no diminution in the inequalities between groups in our society. The latest Occupational Mortality Supplement shows that the SMRs for RG Social Classes I and II have dropped, whilst those for RG Social Classes IV and V have increased (New Society, 20 July 1986).

It has yet to be convincingly established that health care resources can play a significant part in reducing such inequalities, in a situation where early deaths have been reduced to a small fraction of all deaths. But if 'need' is to be one of the criteria for resource allocation, then it is natural, in the first instance, to compare (ill-) health status.

Chapter 2 of the report concludes that :

(i) it is not easy to compare death rates classified in terms of strictly medical diagnoses, and there is merit in searching for other breakdowns of deaths.

(ii) the approach proposed by Charlton et al (1983) to concentrate on deaths which are, in principle, avoidable with appropriate medicalcare, is also difficult to interpret, but there is considerable merit in the Scottish approach of using Under-65 SMRs in combination with perinatal mortality.

(iii) there is considerable difficulty in obtaining systematic measures of morbidity but good data is available for low birth weight and the sickness absence data from the Census should not be ignored.

(iv) the DHSS have almost cornered the market in 'Performance Indicators' of almost anything that moves in the health services but they provide little useful information without data on initial health status and outcome.

The second 'review' chapter in the report examines the appropriateness and validity of the RAWP formula. After detailing a number of specific technical criticisms - for which adjustment could probably be made - it concentrates on the central issue of whether mortality rates are a sufficiently good proxy for morbidity.

The detailed analysis of the relationship between morbidity and mortality shows that :

* whilst mortality and morbidity are highly correlated, across areas, their relationship is by no means one to one;

* there are also strong correlations between measures of socio-economic disadvantage and measures of morbidity;

* the socio-demographic factors are related to morbidity <u>over and above</u> the statistical associations of mortality with morbidity.

Mortality cannot therefore be taken as the only indicator of morbidity; furthermore, it cannot be used in the formula as if there were a direct proportional relation.

This same analysis also implies that socio-economic conditions should be taken into account in assessing need as measured by morbidity (as is argued by many other commentators and practised by some Regional Health Authorities). The problem is how this should be done.

The final 'theoretical' chapter concentrates on this problem of adjusting for relative need. A detailed review of the literature on indices of (or weights of) social deprivation that have been proposed is contained in Annex III to the report. On this basis, Chapter 4 argues that apparently sophisticated adjustments often mask an already complex situation and that, to be useful for policy, an index

- should be based on routinely collected data, and that at least part of the formula should be based on <u>current</u> data.
- must be transparent in its operation, however methodologically sophisticated the original derivation and justification.

The chapter concludes by recommending that when deciding upon the allocation of revenue resources according to relative need, data such as numbers of owner-occupiers, numbers of supplementary benefit claimants and unemployment rates should be taken into account as well as SMRs under 65.

Chapter 5 presents comparative data for Wolverhampton and West Midlands and shows that:

- in terms of 'efficiency' as measured by "Performance Indicators" there is no systematic difference between Wolverhampton DHA and the average for the Region.

- in terms of health status, Wolverhampton is below the average for West Midlands RHA in most indices and that the West Midlands RHA is below the average for England and Wales for each of them (and not just for the SMRs).

- in terms of socio-economic conditions, Wolverhampton is worse off than any other local authority within the West Midlands Standard Region who, in turn, are below the average for England and Wales.

The chapter concludes by showing the relative position of Wolverhampton in West Midlands calculated on the basis of these data.

The report therefore recommends that :

* health status of the districts should be monitored in terms of infant mortality, perinatal mortality and SMRs-under-65 as well as SMRs for all ages;

* allocation of resources within the West Midlands RHA should be adjusted not only by SMRs under 65 but also according to current socio-economic data from the Census and current data.

* the formula used to adjust for need in the allocation of resources should be transparent in its operation

* West Midlands RHA press for the adoption of a similar formula in the national resource allocation process.

Chapter 1. Introduction

1.1 The purpose of this report is to examine the process of allocation of resources for health services as between areas [1] in England concentrating on the adjustment appropriate for differences in the population's need for health care. The central issue is whether the actual practice of allocating resources adequately reflects the objectives of the DHSS Resources Allocation Working Party (RAWP) "to reduce . . . the disparities between the different parts of the country in terms of the opportunity for access to health care of people at equal risk" (DHSS, 1975).

1.2 The process of resource allocation is, of course, presently being re-examined on a national level to "take account of previous criticism of the formula, for example, morbidity, social deprivation, and the special problems of inner cities ... The measurement of the population need is at the heart of the problem" (Currie, 4/12/86). The basic problem is, in fact two fold: how do we measure risk; and how do we adjust for relative risk. The 1976 Working Party took it as axiomatic that risk should be measured by morbidity and then argued that, because of the difficulty of collecting reliable morbidity data on a routine basis, standardised mortality ratios were a sufficiently good proxy.

1.3 Applying such a formula to the process of allocating resources within a region has always proved difficult; so that, the West Midlands RHA has not only had to set up more or less a permanent Working Party to discuss Capital and Revenue Targets, this Working Party itself has had to delegate extra detailed work to a Technical Support Group. The interim report of the NHS Management Board on the future of the RAWP formula seems to recognise this complexity: in a Parliamentary answer, Social Services Secretary, Norman Fowler said "The main areas where there is scope for improvement have a much greater impact on relative need between districts in a region than between regions".

1.4 The process of sub-Regional allocation also involves distinguishing carefully between the resident population of an area and the catchment or managed populations of health care services located in that area. Obviously the allocation of resources should depend mainly on the size of the population to whom the health care services are being directed. Therein lies the problem: for whilst there is little ambiguity over the size of the resident population of any area, it is not easy to determine the catchment or management populations for each service in each area (or, alternatively, to calculate the cross-boundary flows for each service)

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1. Throughout this report 'areas' will be used to cover both District and Regional Health Authorities and Local Districts, Metropolitan Counties and Standard Regions. The more specific terms will be used where appropriate.

1.5 The differences between catchment and resident populations are not marginal: for example the Wolverhampton District Health Authority works to a managed population which is 50% larger than the resident population. Neither are they simple. Obviously the catchment populations (or cross-boundary flows) will vary as new units are made operational or old units close down and the consequent adjustments will be very local and specific to each and every change. But the issue is made much more complicated by the interaction between the provision of health care services and the provision of health care related services by the local authorities or other agencies. For example, if a Social Services Department provides extensive facilities for geriatric care in the community in one area, this will obviously affect the level of client demand on the corresponding District Health Authority; but it may also affect the demand on neighbouring Social Service Departments and their corresponding DHAs.

1.6 These adjustments can only be determined on a case-by-case basis and by negotiation between the various units involved and so they are not an appropriate matter for detailed consideration in this report which concentrates on the general criteria which should influence the allocation of resources to DHAs.

1.7 The intricacy of these discussions over catchment or managed vs resident populations or over the Revenue Consequences of Capital Spending makes it easy to forget that the original - and unchanged - objective of the National Health Service was to improve health. The assessment of health status must, therefore, be an important component of any argument about the appropriate formula for the allocation of resources.

1.8 Chapter 2, therefore, discusses the variety of approaches to the measurement of health status. It examines the accuracy of mortality data, the viability of preventable mortality indices, problems with measuring morbidity, and the difficulty of developing useful indicators from both routine health service data and available data on population risk factors. The problem of what is the appropriate level of analysis is dealt with in Annex I and a brief overview of health surveys is included as Annex II.

1.9 The argument then turns, in Chapter 3 to the RAWP methodology. After a brief discussion of the procedures for capital allocations, the chapter concentrates on the formulae used for the distribution of current resources. The basis logic of the approach of the 1976 Working Party is examined together with a number of technical criticisms before focussing on the central issue of whether standardised mortality ratios can be used to reflect relative morbidity. The argument in that chapter is supported by an Annex which reports an analysis of the relationship between age-specific mortality and sickness at the district level based on 1981 Census material.

1.10 Chapter 4 is concerned with "the heart of the problem" (Currie, 4/12/86), the measurement of population need. After discussing the overlaps between the resources and services actually and potentially provided by the Local Authorities and by other agencies, the chapter focusses on the problem of incorporating social factors into the resource allocation formulae. The argument of this chapter is supported by an Annex which examines the variety of indices and measures of social deprivation which have been proposed or could be used .

1.11 The analysis in Chapter 5 then applies the conclusions of Chapters 2 to 4 to the comparison between Wolverhampton and West Midlands. It includes comparative material on :

* performance indicators.
* health status
* socio-economic conditions

This chapter concludes with a very brief discussion of the likely effect of introducing adjustments for social factors on the share of Wolverhampton in the overall allocation for West Midlands RHA. The final chapter reviews the analysis of the report and emphasises the more general applicability of the analysis to inter-Regional comparisons.

Chapter 2. Comparing Health Status between Areas

2.1 Introduction

2.1 The purpose of this chapter is to set out the problems of measuring health status in the context of discussing the allocation of resources both between the Regional Health Authorities inEngland [2] and between the District Health Authorities within a Region. Because it is a general problem, where it is necessary to include comparative statistical material to illustrate a point, the data relate to the 14 Regional Health Authorities in England: the specific case of the Health Authorities within West Midlands is considered in Chapter 4.

2.2 The review makes no claim to be exhaustive of the health indicator literature. In particular, given the specific focus on the problem of allocating resources between areas, many of the "interesting" health status measures which have been proposed simply cannot be used in practice. For the relatively novel or sophisticated data they require are not available even for comparisons between Regions let alone between Health Authorities within a Region; and whilst, it is, of course, in principle, possible to devise instruments to collect the appropriate data, this is not a short-term prospect.

2.3 This focus on the health district as the unit of analysis, whilst entirely "natural" in the context of this Report, may seem unusual given the focus of other recent studies. Thus, most other studies in this field (Hume and Womersley, 1985; Leavey and Wood, 1985; Scott-Samuel, 1984; Townsend, Simpson and Tibbs, 1984) have carried out most of the bulk of their analysis at the electoral ward level. Their, often implicit argument has been that Health Districts (or Local Authorities) are heterogenous because they are too large. It is true that, for analytic purposes, it is usually (although not always) better to work with smaller units but that is not a sufficiently convincing argument in favour of analysis at electoral ward level as the previous studies have argued (see Annex I).

2.4 The conclusion of Annex I is that, for the practical and policy related purposes of this report, whilst there may often be little sociological coherence to a Health District or Local Authority, they are an appropriate level of comparison and description. Moreover, as is shown in Annex IV very few data are available below the level of the Health District or Local Authority.

2.1.1 Measuring Health

2.5 The health indicator field has generated an extensive literature. The first problem is that different authors adopt different conceptual

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2. There are separate forulae for England, Wales, Scotland and Northern Ireland.

frameworks. Culyer et al, (1981) in fact, distinguish three approaches: health as absence of disease (the "medical model"), health as the absence of illness (the "sociological model"), and health as an ideal (the approach adopted by the World Health Organisation (WHO)).

2.6 The former leads to an over-concentration on the International Classification of Diseases (ICD). This classification has been very valuable for epidemiological studies of the causes of death over space and time; and it is often useful to have counts of specified diseases in order to monitor the effect of preventive activities such as immunisation and sanitation, whether or not the individuals so identified are aware of their disease, or not. But, unless a special study has been commissioned, this is only possible for the "notifiable" (mostly easily communicable) diseases. Moreover, in the context of a shift in disease patterns from acute, fatal and communicable disease entities to chronic, degenerative, multi-causal disease and disability, it is often difficult to see the aetiological or policy relevance of analysis based on the ICD (see below).

2.7 The "sociological" approach to illness shows how people's experience of disease varies according to: duration; prognosis (i.e. the extent and possibility of cure); severity (i.e. the degree of discomfort, incapacity and disability); and stigmatisation (Fabrega and Manning, 1972). It is these kinds of factors plus the social framework of theories of disease causation that are likely to be used to differentiate similar signs and symptoms by the "sufferer" and which leads to significant action such as going to the doctor, taking sick leave, adopting the sick role (e.g. Parsons, 1951; Strong, 1980). It is, of course, these latter events which are recorded in health service statistics; and so trends over time or variations between areas in this type of data need to be interpreted against this sociological framework.

2.8 Finally, the WHO definition of health is as a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity. The definition is very broad: including perceptions about lifestyle - abstinence, exercise and fibre - as well as self-perceived healthfulness. As Culyer (1981) comments: "(it is doubtful) whether such a state can actually be described in a non-relativist fashion (let alone measured)". Even among a restricted group of middle-aged and middle-class respondents, Herzlich (1973) found three concepts of health. First, "health in a vacuum", a state of <u>being</u>, involving absence of illness. Second, the notion of a "reserve of health", a state of <u>having</u>, involving robustness and strength. Third, there was "health as equilibrum" seen as a state of <u>doing</u>, involving physical well-being and social relationships. Williams (1983) found three rather similar ideas among a sample of middle and working class elderly in Aberdeen.

2.1.3 Kinds of Health Indicators

2.9 Three sorts of health indicators can be distinguished :

(a) indicators of the <u>health status</u> of the individuals
(b) indicators of the work, scope or efficiency of the

health care services in a community;

(c) indicators of the health status of a community, expressed as risks to the individual or as community level measures.

It is important to be aware of the purpose for which the indicator is being used. For example, the indicator "rate of industrial injury" is a characteristic of societies not of individuals, but at the same time a component of the health status of some individuals and (since these are identified and treated events) that rate also reflects the work of the health service. Moreover, there are several indicators - such as consultancy rates - which are systematically ambiguous as between a measure of the perceived need for health consultation by individuals and a measure of the availability and accessibility of doctors.

2.2 Mortality Statistics

2.10 Traditionally, the most commonly used - and useful - indicators have been those based on death, such as life expectancy at a given age, infant or perinatal mortality and age - or disease-specific mortality rates. Even though their usefulness is decreasing in developed countries as the era of marked improvement in the health status of the population closes and mortality rates level off, these statistics are less ambiguous and more readily available than other measures.

2.11 Although overall or disease-specific rates are frequently used indicators of a society's health, they are not unproblematic (e.g. Moriyama, 1968; Cassell, 1973; Knox, 1978). Simply in terms of their aetiological interpretation it becomes more and more difficult to unequivocally diagnose cause of death.

2.12 Ambiguities (as well as transcription errors) can arise at any stage of the chain from diagnosis by the clinician to completion of the death certificate to transcription onto the death notification to classification of underlying cause of death; and the vagaries of data processing take their toll thereafter. This is not just a problem for a centralised coding apparatus. Where the original diagnosis is clinician based, differences will arise. Several studies have shown how up to 30% of diagnoses are idiosyncratic (e.g. Alderson, 1973; Prior, 1985).

2.13 The relative decline in commonly fatal communicable diseases, and the recognition that whether one contracts a specific disease on exposure and whether you die or recover are affected by a whole host offactors, means that disease-specific death rates become less and less useful as indicators of health. Furthermore, thresholds of acceptable illness or disability change such that the severity with which a particular statistic of ill-health is regarded might increase while the rate of the statistic is falling.

2.14 Infant and perinatal mortality provide excellent examples of the publicity of each death rising as the rate falls (Alderson and Dowie, 1979; Carr-Hill and Blaxter 1982). Data for the rates of both infant and

perinatal mortality are presented in Table 2.1. They show that the rates for infant mortality are now so low that there is little systematic variation between areas. On the other hand, although the rates for perinatal mortality are declining relatively rapidly, the differential - between, for example, South West Thames and West Midlands - remains substantial. Indeed, there is now extensive evidence to support the use of perinatal mortality or infant mortality (from whichever specific cause) as indicators of not only foetal distress but also of maternal health status (Jazairi, 1976) and the impact of the social environment in general upon health status (SAREC, 1978).

Table 2.1 : Infant and Perinatal Mortality Rates per thousand in Regional Health Authorities, 1974-1984

	Infant Mortality (excluding 1st week deaths)				Perinatal Mortality			
	1974	1980	1982	1984	1974	1980	1982	1984
Northern	7.2	5.6	5.3	4.7	23	15.0	11.8	11.0
Yorkshire	9.1	6.2	6.2	5.8	22	14.9	12.5	11.6
Trent	6.6	4.8	5.4	3.5	21	13.0	11.2	9.8
East Anglia	6.4	5.1	5.0	4.9	17	11.3	10.4	8.9
N.W. Thames	6.2	5.0	6.2	4.4	18	11.0	9.7	9.0
N.E. Thames	7.0	6.0	5.6	5.3	19	13.8	11.6	9.7
S.E. Thames	6.4	6.6	5.7	5.1	19	12.9	10.0	10.5
S.W. Thames	5.3	5.8	5.7	5.1	18	10.8	10.6	8.6
Wessex	7.2	6.5	6.0	5.7	18	11.7	10.0	8.6
Oxford	5.8	5.1	5.1	4.5	16	12.6	9.9	8.7
South Western	5.9	5.6	6.3	4.7	19	12.6	9.1	9.3
West Midlands	**6.6**	**6.2**	**5.6**	**5.1**	**22**	**15.1**	**13.8**	**12.3**
Mersey	7.5	6.3	6.8	4.7	24	13.7	10.9	9.0
North Western	8.5	5.7	5.5	5.6	23	15.3	12.5	10.3
England	6.9	5.8	5.8	5.0	20	13.4	11.2	10.0

Source: OPCS **Local Authority Vital Statistics,** Series VS No. 1, 7, 9, 11.

2.15 It might, however, be argued that perinatal mortality rates will also begin to even up - and so be less useful as a measure of the relative impact of social environment upon (maternal) health status. But the point about the inverse relation between publicity and the rate can be made about "unexpected" deaths in general. Table 2.2 shows how all-cause mortality among children and youths has declined dramatically over the last fifty years. But, although death rates from accidents and violence have only dropped a little, there has been a seven-fold decrease in deaths from disease or illness. The prevention of deaths of the former category is mostly outside the competence of health authorities - although the corresponding behaviour is the subject of educational and information campaigns - so they would not be useful indicators of health status from the point of view of comparing between health authorities. On the other hand, the prevention of deaths from non-violent causes and from disease is probably seen as the main function of the health care services.

Table 2.2 : Death at ages 5-24, by sex, annual averages 1931-5 and 1971-4, per 100,000 and per cent.

	1931-5				1971-4			
	Male	%	Female	%	Male	%	Female	%
All causes	233	100	212	100	65	100	33	100
Accidents and Violence	47	20	15	7	38	58	12	36
All other causes	187	80	197	93	27	42	20	64

Source: OPCS (1978). **Trends in Mortality, 1951-1975,** Series DH1 No. 3.

2.16 It is in this context that there have recently been suggestions that an index of "avoidable deaths" should be constructed. Thus Rutstein et al (1976) argued that, given the context of changing patterns of disease and increased longevity, the performance of our health care system can only be evaluated in terms of those deaths which health services could, in principle, prevent either through care or through treatment. They proposed selecting a series of diseases from which most deaths were avoidable through (adequate and appropriate) medical intervention and concentrating resources on those cases.

2.17 It is obviously sensible, in principle, to extend the system of confidential enquiries to include deaths which, on the basis of the initial classification, ought to have been preventable; but, in the UK, Charlton et al (1983) went further. On the basis of a study of geographical variations in deaths from these diseases, they concluded that deaths from avoidable diseases were more influenced by variations in health care resources than were all deaths. Hence, it has been suggested that such measures should be used as indicators of the effectiveness of health care resources.

2.18 In fact, their analysis in the original article was flawed, such deaths are, in general, more related [3] to variations in social conditions than are all deaths. Table 2.3 (taken from Carr-Hill, Hardman and Russell, 1987) illustrates the point. The unemployment rate is consistently positively correlated with each of the 'preventable' mortalities and the correlations between unemployment and perinatal mortality or cervical cancer are always higher than the correlation with the overall death rate. So, it is more likely that such indicators point to areas of social deprivation rather than to deficiencies in health care resources.

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3. It is not being claimed that variations in social conditions are therefore a more important causal factor: disentangling correlation and cause in this field is not easy - a point that Charlton et. al. (1983) do not appear to recognise.

Table 2.3 : Minimum and Maximum Values of the Correlation Coefficients Between the Unemployment Rate and Various Mortality Rates among the Regional Health Authorities since 1976.

	Perinatal Mortality ICD	Hypertensive Death Rate ICD	Cervical Cancer ICD	Pneumonia & Bronchitis ICD	Overall Death Rate
Minimum	0.569	0.201	0.620	0.348	0.426
Year	1982	1983	1982	1980	1981
Maximum	0.775	0.562	0.887	0.760	0.555
Year	1981	1981	1983	1978	1982

Source: Carr-Hill, Hardman and Russell, 1987.

Note: With 15 observations, correlations of 0.497 are significant at the 5% level, 0.623 at the 1% level.

2.19 Indeed, the original idea of avoidable deaths can be used in a less problematic way: simply by viewing all deaths under 65 as potentially avoidable - in the sense that they should not happen.

2.20 It is not a novel suggestion: the allocation of resources between areas in Scotland is based not on overall (all-age) Standardised Mortality Ratios (SMRs) but on SMRs under 65 (SHHD, 1977, para 3.14). The comparison between all-age SMRs, and SMRs under 65 for the 14 Regional Health Authorities in England, is given in Table 2.4. It can be seen that whilst the rank orders are very similar, that there is a much wider disparity in under 65 SMRs.

2.21 The concept of avoidable death is a useful one for assessing inequalities in mortality risks in the context of discussing the allocation of health care resources to different areas. The evidence presented above suggests that, whilst the traditional perinatal mortality measure is still a good indicator of socio-economic deprivation, this can usefully be supplemented by standardised mortality ratios under 65.

2.3 Morbidity Data

2.22 The measurement of health failure - less catastrophic than death - poses more problems. First, unlike mortality, which only happens once, morbidity is repeatable, and lasts. In principle, therefore, we would like both (i) incidence data relating to the events of illness that people suffer; and (ii) prevalence data attempting to determine the number of people who are, at any one time, impaired either physically or mentally, and either permanently or temporarily. Both these kinds of indicators can be derived, in principle, either from statistics generated from within the health care system or from (sample) surveys of the general population.

Table 2.4 : Standardised Mortality Rates in Regional Health Authorities: Overall and Under 65, 1980 - 1982 - 1984

	Overall 'SMR'[a]			SMR under 65		
	1980	1982	1984	1980	1982	1984
England	99	99	99	98	99	99
Northern	111	109	112	119	115	116
Yorkshire	103	106	106	105	108	107
Trent	101	101	101	100	101	100
East Anglia	95	91	92	83	82	87
N.W. Thames	88	93	91	90	90	88
N.E. Thames	93	97	96	93	97	96
S.E. Thames	96	92	92	95	95	93
S.W. Thames	94	92	92	86	86	87
Wessex	93	91	89	88	87	88
Oxford	87	92	92	85	84	83
S. Western	95	93	94	90	91	92
W. Midlands	**102**	**104**	**104**	**102**	**103**	**104**
Mersey	107	111	108	110	116	111
N. Western	110	111	111	114	117	115
WOLVERHAMPTON	102[b]	-	101	115[b]	-	104

a Overall SMRs are not the same as those published in OPCS Series DH1 as those are calculated with ten year age groups; the above figures are based on the age group index 1, 1-14, 15-44, 45-66, 65-74, 75+ which have been used for comparison with the Under 65 SMRs

b Standard District population data used.

c Missing value (because population data unavailable) denoted by -

Source: OPCS. **Mortality Statisticians** Series DH5, No. 7, 9 and 11, Table 1.

2.3.1 Offical Data Sources

2.23 Extensive data are routinely collected in the UK by governments, hospitals, practitioners etc (see Alderson and Dowie, 1979; and Radical Statistics, 1979). In principle, these could be used as health indicators, if problems of confidentiality and data protection could be overcome (see Korner Committee, 1981).

2.24 There is also the annual Hospital in-Patient Enquiry based upon a 10 per cent sample of patients in hospital where a considerable amount of administrative statisticsare collected and presented. The data are, however, almost universally acknowledged to be unsatisfactory. Obtaining good hospital data would require a special and expensive enquiry such as that conducted by Ashley in two authorities at the same time as the 1981 Census (OPCS, 1983). There is considerably less data available on General Practice. Apart from the, more or less, decennial surveys of general practice (Logan and Cushion, 1960; OPCS, 1955-6; OPCS, 1971-2) there have been a number of locally specific research studies (e.g. DHSS, 1982)

2.25 The problem with using any of these data as a measure of morbidity is that the registration of particular notifiable diseases or conditions depends on the illness behaviour of sufferers or of their families (e.g. whether people with cancer or venereal disease attend for diagnosis). In turn, illness behaviour depends on the extent to which the condition is stigmatised, the level of service provision available, the accuracy and certainty of diagnosis, and social and administrative processes encourage or discourage notification.

2.26 Before there can be notification, however, the patient has to make contact with the health service. Rates of contact with the health services (i.e. out-patient or in-patient attendances) are a product not only of need for services but also of supply of services, admission or referral policies of doctors, and demand for services (see for example, Airth and Newell, 1962).

2.27 Whilst no precise estimate can be made, an indication of how much has potentially been "hidden" in this way can be derived from a comparison of notifiable childhood diseases from the three longitudinal studies based on birth cohorts in Great Britain since World War II.[4] Comparative results are presented in Stewart-Brown, Hashum and Butler (1983), Taylor, Wadsworth and Peckham (1984), and Wadsworth (1985); they are summarised in Table 2.5. It can be seen that the incidence of asthma requiring medical treatment, of medically treated eczma by age 6 and of juvenile diabetes by age 10-11 have all increased substantially over the quarter-century. It seems unlikely that the underlying incidence of these conditions has changed substantially; the inference must be that a given condition of similar clinical severity is now more likely to be discovered than previously.

2.3.2 Health Surveys

2.28 A number of survey instruments have been developed and tested for morbidity surveys. These vary between those which: (a) emphasise the incidence of symptoms or complaints; (b) concentrate on the functional impact of morbidity; and (c) assess perception of more general dimensions of health. There is an enormous literature in this are (for a very brief synopsis, see Annex II). The only data which is available on a regular, routine basis are the responses to the General Household Survey questions on (limiting) long-standing illness and restricted activity days. Whilst there is sufficient data for inter-Regional comparisons (see Table 2.7 below), there would only be about one hundred respondents in the typical District Health Authority. As the standard errors of the sample estimates will be too large for these data to be used between Districts, they are not germane to our discussions.

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4. The 1946 cohort was based on all births in one week of March of whom 5362 were selected for follow-up (the National Survey of Health and Development); the 1958 cohort comprises all children born in one week of March (the National Child Development Study); and the 1970 cohort was based on all births in a week of April (the Child Health and Education Study).

Table 2.5 Morbidity and Risk

(A) Among 0-4 year olds of Two Generations. (per thousand)

	Prevalence of Morbidity			Treatment for Injuries	
	First Generation	Second Generation		First Generation	Second Generation
Medically treated eczema	2.2	12.3	All Injuries however treated	216	385
Treatment for asthma	6.2	18.9	All types of hospital treatment	181	233
Obesity relative to age, height and sex	34	74	Admission to hospital for injury	14	27

(B) Comparison of Three Cohorts

	1946 Cohort	1956 Cohort	1970 Cohort
Medically treated eczema by age 6	57	73	122
Juvenile diabetes by age 10-11	2	6	13

2.29 For adults, the only data which is available both on a local and national scale are the records collected by Social Security Offices and sickness data obtained at the time of the Census. The Social Security Offices collect records of those who are claiming benefit for days of incapacity certified by a doctor as due to sickness or invalidity. They are notoriously unreliable and, in any case, only apply even in principle to those who are in regular employment. The Census schedule asked about permanent sickness and temporary sickness of those who were usually economically active. Whilst this also misses out some of the adult population, it is a far broader definition and, inasmuch as self-reports can be relied upon, provides extensive data for all areas. These are the data used in Annex III to the next chapter.

2.30 The only other data which are available on a regular basis concerns perinatal morbidity. The Office of Population, Censuses and Surveys tabulates low birth weight by age of mother, parity, place of birth and RG Social Class (on the basis of the male partner's occupation as recorded at the clinic) on a national basis. But the only systematic data for comparing areas are simply the rates of Low Birth Weight: there are presented in Table 2.6 : whilst West Midlands overall is about average, Wolverhampton had a higher rate in these two years.

Table 2.6 : Rates of Low Birth Weight by Regional Health Authorities, 1983-4

Proportion of All Births under 2500 grms.

	1983	1984
England	7.0	7.0
Northern	6.9	7.1
Yorkshire	7.4	7.6
Trent	7.2	7.1
East Anglia	6.0	6.5
N.W. Thames	7.3	7.2
N.E. Thames	7.4	7.4
S.E. Thames	7.0	7.0
S.W. Thames	6.4	6.2
Wessex	6.4	6.2
Oxford	6.6	6.7
S. Western	6.3	6.2
W. Midlands	**7.2**	**7.3**
Mersey	6.7	6.8
N. Western	7.8	7.8
Wolverhampton		9.0

Source: OPCS, 1984, **Series 1B** No. 11, pp. 1 No. 7, Table 4.2

2.4 Health Care Data

2.31 The problem is to measure the quantity and quality of care delivered.

2.4.1 Quantity and Distribution of Care

2.32 There are, of course, a wide variety of indicators of service availability or service use, both on the local and national level. But, for comparison between areas, measures of service use are only useful as indicators to assess the appropriate allocation of resources in the health care system if they can be compared in some way to need. For example, the Interim report of the DHSS Working Party on the Allocation of Resources used Regional in-patient and out-patient case loads as an indicator of relative need. But in the final report, it was rejected as being too strongly affected by the supply of hospital facilities.

2.33 Yet, within a few years, the DHSS were publishing large sets of "performance indicators" based almost entirely on health service activities. Of course, their expressed purpose is rather different, viz "they are indicators and not measures, as the name states. They provide pointers and signals to areas which appear to merit further investigation. They enable managers to make comparisons between the performance of their services and that of others throughout England. No PI should be used in isolation. No single PI, or group of PIs, will reveal conclusively whether performance is satisfactory or unsatisfactory. Average PI values should not be used as "norms" or "standards". PIs provide a starting point for investigation. Local information knowledge and experience are essential to assess the validity of inferences drawn from PIs." (DHSS (1983). Nevertheless they enable (encourage?) explicit comparisons between districts and regions, and between hospitals and indeed firms within hospitals with very little warning about misinterpretation.

2.34 The temptation to use them to make comparisons about the distribution of care between areas or units has been facilitated by their converman into a form where they can be displayed graphically on a VDU. Indeed, the usual method of presentation is to rank each area relative to a Regional or National average (see, for example, Table 5.1 below). It cannot, however be repeated too often that comparisons of throughput are meaningless without some information about the patients treated and the outcomes.

2.35 There have been attempts to construct need/use indicators. Thus, Brotherston (1976) using data from the General Household Survey (GHS) from 1974/76, divided the number of GP consultations by the number of restricted activity days each in a two week reference period; Forster (1976) calculated similar ratios measuring 'morbidity' by reported rates of sickness absence. The difficulty is that, even though the GHS is very large (some 14000 households interviewed annually), it is still not large enough to provide a sufficiently large sample below the national level except perhaps for Regions. For example, Table 2.7 shows that there were apparently wide variations between the Standard Regions in long standing illness which are related to SMRs. But the standard errors of these percentages are between 1.0 and 1.5, so they provide little scope for differentiating between Regions let alone between Districts. The data have not subsequently been published.

2.36 In any case, such a measure of need would obviously be very crude. The problem is that more detailed classifications in diagnostic categories would not be much more informative. Blaxter (1984) suggests recategorising primary care consultations by (doctor validated) categories such as 'self-limiting', 'life threatening', 'functionally incapacitating', 'painful', 'preventive', 'requiring specialist referral' etc. In this way, it is possible to derive indicators of the nature of the service, provided.

Table 2.7 : Persons Reporting Long Standing Illness (LSI) by Sex and Standard Region Compared to SMRs 1972.

	Males		Females	
	LSI	SMR	LSI	SMR
North	24.9	110	22.7	109
Yorkshire & Humberside	22.8	106	24.9	107
North West	20.4	112	21.5	110
East Midlands	20.6	99	21.6	101
West Midlands	19.3	105	20.8	102
East Anglia	17.8	87	26.3	92
South East	17.3	92	19.6	93
South West	17.8	91	20.4	95

Source: **General Household Survey**, 1972, OPCS, 1973

2.37 On the basis of her re-analysis of the Second Morbidity Survey (Table 2.8), she showed how patients from Social Classes IV + V were more likely to be consulting for the more serious complaints (bottom half of table) and those from Social Classes I + II for prophylactic reasons (top half of table). This is a very useful approach, especially as the Third Morbidity Survey shows an increase in consultations for prophylactic reasons or for ill-defined symptoms (OPCS Monitor MB5, 86/1), but the basic data (consultations broken down by diagnostic category) are simply not available on a current basis.

Table 2.8 Standardised Patient Consulting Ratios and Column Percentage of all Patients Consulting

	Men aged 15-64				Married women age			
Social Classes	I + II		IV + V		I + II		IV + V	
Categories of Diagnosis	SPCR	Col %	SPCR	Col %	SPCR	Col %	SPCR	Col %
Prophylactic Procedures	107	7	88	5	105	14	95	11
Conditions which could be self-treated	90	32	109	32	95	23	104	24
Symptoms not clearly diagnosed	89	15	113	14	87	12	108	14
	89	15	113	14	87	12	108	14
Functionally incapacitating or painful conditions	77	21	118	27	88	17	109	19
Conditions requiring urgent treatment	76	13	121	15	91	12	108	13
Life-threatening conditions	84	9	114	10	89	5	112	7

Note: Consulting Rates are standardised for age distribution and Column Percentages are alternatives not components of an overall total.

Source: Blaxter, M. (1984), "Equity and Consultation Rates in General Practice", British Medical Journal, Vol. 298, 30th June, 1984, pp. 1963-7.

2.38 Whilst, therefore, extensive service data are collected routinely, it is not appropriate in the context of this exercise and the indicators that have been proposed require specially designed data collection instruments, which are simply not available.

2.4.2 Quality of Care

2.39 The ideal indicator in the context of the allocation of health care resources would express the gain in healthy life attributable to health care, but this is unlikely to be measurable except for specific selected diseases. There is now a large literature on ways of measuring this "gain" (for a review in this context see Torrance, 1985). The most widely canvassed in the UK is the QALY (Quality-Adjusted Life Year) proposed by Williams (1985) but, like the other instruments, it has not yet been established on an empirical basis.

2.40 In particular, the ranking of treatments varies substantially both with the survivorship curves after specific treatments and with the discounting factor used to calculate the present value of future life years - but these operating characteristics of the instruments have not yet been properly investigated. Whilst, therefore, the comparative quality of the patients life before and after treatment is an important datum, it's importance relative to variations in survivorship and to the patients discount rates is more doubtful.

2.41 A rather different approach is that of Charlton et al (1983) who set out to develop "indicators of the outcome of health care services against which the use of resources can be evaluated" (p.69). Whilst the 14 causes which they investigated, do all respond to curative medical intervention, they would (like many others) also respond to preventive measures; it would be useful to know the extent to which the condition itself (as distinct from the adverse outcome) is preventable. Moreover, their supposition that death rates from these causes are less related to social factors than death rates from all causes is wrong (see Table 2.3 above).

2.42 All disease-specific indicators present the problem, however, that - unless special studies are mounted - death/survival is the only outcome on which data is likely to be available. Rosser et al (1972) have proposed the measurement of suffering or disability before and after care (those which are being used in the QALY assessments). These could, in principle, be applied to those ill health events which are amenable to standardisation (candidates might include specified injuries, or diagnosed cancers of various sorts). But specially designed survey or sampling methods would be necessary for the documentation of sequellae, and these would have to be regularly updated. An awesome task.

2.43 This section is probably the least satisfactory: health service data is produced in vast quantities but they are not, in general, useful in this context. For, whilst it might eventually be useful to compare the efficiency of one area with another or one unit with another this would only provide a possible basis for resource allocation between areas (see Chapter 3) if accurate and adequate data were available on the whole process of health care. The problem is that routine assessments on both the "input" and "output" side - more familiarly, assessments of morbidity status and need, and of the impact of care on those - are not available.

2.5 Risk Factors as Indicators

2.44 All the health status indicators discussed above ultimately rest on the aggregation of information about individuals. A fundamentally different method of providing indicators of the health status of a community depends on the concept of (unacceptable) risks to health. In a sense this is the classical "public health" approach. It differs from the approach based on individual levels of health in that known causes rather than effects are being measured.

2.45 This approach, in principle, offers more helpful indications for policy and priorities. Also, it calls attention to the fact that health service provision is only one factor in the prevention or cure of ill health.

2.46 The trouble is that the favoured approach is to operationalise "changing life styles" in terms of measures and indicators of a number of separate behavioural items. This concentration on single behavioural patterns or health habits in isolation is dangerous both because of the way they interrelate, and they tend to be cumulative in their effect, and because they depend on the socio-environmental context. The result is that the complex issues of modifying lifestyles are boiled down to the oversimplified view that "bad habits" could be changed solely by individually oriented health education and stress on personal responsibility, forgetting the socio-cultural, economic and political context of life style formation (Leppo, 1981).

2.47 It is, therefore, more logical to relate the "life-styles" to the material conditions of development in a community. A typical list would include lack of basic sanitation; prevalence of communicable and parasitic diseases; malnutrition; poor accommodation; unemployment or inadequate labour legislation; bad rehabilitation facilities; smoking; urban overcrowding; lack of, or poor health care (due to geographical, financial or cultural causes) (from Sonis 1979). Whilst national data do exist for some of these, regional data, routinely collected, do not.

2.48 The selection of the most <u>useful</u> indicators, moreover, depends upon quantitative estimates of the risks involved to the health of an individual and this is also the principle on which they can be operationalised and combined. The problem, of course, is that it is almost impossible politically to make an explicit statement that one death is worth more than another. Yet the organisation of the physical and social environment carries with it widely differing implicit valuations. There has been work on the valuation of life by economists (reviewed in Jones-Lee, 1982) but the assumptions required for the mathematical manipulations are rather strong (Broome, 1978a, 1978b) and the weightings of life years between individuals depends on how convinced a utilitarian you are (Linnerooth, 1982). Whilst the attempt to separate out the different kinds of risks and the value basis of their assessment is of considerable value in itself, the use of such valuations for evaluating policy is likely to obscure more than it clarifies.

2.6 Summary and Recommendations

2.49 This chapter has reviewed a wide range of measures of health status. The importance of the basic theoretical framework within which indices are elaborated was emphasised and has been a recurring theme throughout the chapter. For example, the review of mortality measures shows how the intuitively plausible suggestion by Charlton et al to use "deaths which could have been prevented" as a measure of the efficacy of health care resources is not, in fact, easy to interpret; and the superficially attractive proposals to develop QALY measures makes rather too many assumptions to be used consistently.

2.50 It is also clear that there are major difficulties in using some of the 'popular' health status measures for the purposes of comparing between areas, partly because data is not available but also because of variations in recording practices between areas. In the present state of development only three measures are considered sufficiently robust and useful for comparison between areas:

- perinatal mortality
- standardised mortality ratios (under 65)
- low birth weight

Chapter 3

RAWP and Social Deprivation

3.1 Background

3.1 The existing process of allocation of resources from the Region to the districts has been subject to detailed consideration by the Capital and Revenue Targets (CART) Working Party based in the Regional Health Authority. Together with their Technical Support Group, they have produced a series of detailed reports about the applicability of the RAWP formulae for allocating revenue, and the appropriate mechanisms for allocating capital.

3.2 This report cannot pretend to address all the issues involved. In particular the factors determining capital allocations are difficult to disentangle solely on the basis of documentary evidence. There have, for example, been suggestions of vote-butying behaviour by the NHS (Lindsay et al 1979); and whilst that might be an exaggerated claim, there is no doubt that the negotiations involved in any new investment decision are complex and protracted and cannot be easily related to any characteristics of the area or it's population.

3.3 This can be illustrated in the context of the West Midlands RHA. Thus, the CART Working Party argued that, at least part of the capital allocations should be used to ensure that the existing stocks of buildings and equipment were maintained and, where possible, improved; and that for these purposes, it would be inappropriate to use an "arbitrary formula (e.g. population)" (CART Working Party, Seventh Report, para 16). Apart from that basic amount of capital, CART's principal recommendation about capital allocations to Areas (later Districts) was that "The Planning System should generate capital allocations so that each AHA's allocation is determined by the degree of compatibility of capital proposals with agreed planning priorities". Whilst this is laudable in intent, it suggests that it has, not unnaturally, been very difficult to reach agreement on specific capital targets.

3.4 It is, therefore, even more difficult for this author to carry out any analysis of the differential allocation of capital resources as between Districts. At the same time, it is clear that capital investment affects future revenue and the possibility of investment affects current planning and policies both with variable time lags. But apart from drawing attention to this omission and recognising that the allocation of a substantial proportion of revenue is affected by these factors, the issue cannot be considered further in the report.

3.5 Instead we concentrate on the formula used to adjust revenue allocations according to need. These formulae were first introduced by the Resource Allocation Working Party who reported ten years ago (DHSS, 1976). There are, of course, many other detailed issues about particular services which are specific to the West Midlands and which affect the revenue allocations between the districts in the Region (see Chapter 5); indeed much of the negotiation in any concrete situation is about such detailed issues (see, for example, the Technical Reports of CART). But their impact depends upon, and can only be properly understood in the context of the

basic logic of the RAWP formula itself. It is, therefore, necessary to examine the appropriateness of these formulae for determining allocations at a sub-Regional level especially as they are currently being re-examined at the national level.

3.6 The next section examines the internal logic of these formulae and whether they are equally appropriate today as in 1976 and then changes that have been proposed to the basis of the formulae.

3.2 The Logic of RAWP

3.7 The RAWP interpreted its terms of reference as "to reduce progressively, and as far as is feasible, the disparities between the different parts of the country in terms of the opportunity for access to health care of people at equal risk". (DHSS, 1975). The emphasis and methodology of the report is on the reduction of disparities so that the objective is to ensure equity of misery between Regions (Doyal, 1979) rather than to consider what overall level of resources are appropriate at the national level. In part, this is also true at the sub-Regional level so that the issue is the disparities between the districts in the Region rather than the overall level of resources available to the Region.

3.8 But only in part: it is also open to argue that the sub-Regional allocation is inadequate because the overall allocation to the Region is inadequate - for this reason, whilst much of the analysis in this report will be at the sub-Regional level, analyses comparing districts within West Midlands to elsewhere will also be drawn on where appropriate.

3.9 There is usually little dispute over the broad objective "to reduce disparities". But the particular definition of equity adopted by RAWP, that is "equal access to health care for people at equal risk", is more frequently questioned.

3.10 Mooney (1982) in commenting upon RAWP - and more particularly SHARE - outlined seven different possible meanings of equity :

* equality of expenditure per capita
* equality of inputs (resources) per capita
* equality of input for equal need
* equality of (opportunity of) access for equal need
* equality of utilisation for equal need
* equality of marginal met need
* equality of health.

3.11 The present RAWP formula goes beyond the first two definitions of equity and operates with something like the third definition (although the verbiage sounds like the fourth). Cash resources are adjusted for the age/sex structure of the population and a proxy (mortality) is included for need; adjustments are made for differential prices at least as between the four London Regions and the rest. No explicit account is taken of varying costs to the patient in different areas which the fourth definition

requires although the arguments over cross-boundary flows are a partial consequence of those differential costs. The RAWP and most commentators claim not to be adjusting resources so as to equalise utilisation rates - for assumed equal need - although many of the incentives within the system tend that way.

3.12 There remains the cogent view that resources should be distributed according to their marginal effectiveness so that an extra £ spent would have the same impact everywhere (the sixth definition). Whilst economically rational there are two problems.

3.13 First, our knowledge about the effectiveness of medical intervention is not systematically available across the whole range of medical interventions and, even if it were, there remain a whole series of questions about the generalisability of such findings across different mixes of capital, labour and technology. In other words, such a resource allocation procedure could not, in fact, be applied because the data is not available.

3.14 Second, there are considerable political constraints on which rules of allocation could feasibly be applied (Rawls 1972). For example we would all have to agree on the rankings of outcomes both involving ourselves and others.

3.15 However, despite considerable efforts by some (e.g. Williams 1985), there is still only scattered comparative material available on the lifetime effectiveness of treatments, let alone of the whole range of possible medical interventions. In the absence of systematic data of this sortmany concur with RAWP that "resources should be allocated on the basis of need" (of the population) without taking effectiveness into account explicitly (it is, of course, implicitly in "decisions" to let people die, etc.).

3.16 The problem posed by RAWP was how to measure need. They took as a starting point the average national rate of expenditure for each of seven service categories. These were: non psychiatric in-patients, all types of day and out-patients, community health, ambulance services, mental illness in-patients, mental handicap in-patients, FPC administration (the latter was dropped after 1985). The exclusion of general practitioners and of health care-related local authority social services - in fact, the bulk of primary care - is taken up in Chapter 4 below. Here we follow the logic of the formula.

3.17 The Working Party then adjusted each of the rates so as to reflect the relative needs of populations in different areas. RAWP argued for two main adjustments:

* the first, for the age and sex composition of the population because the health care needs of different age-sex groups vary;

* the second, for the standardised mortality rates (the excess of deaths in the area over that which would be expected on the basis of

the age- sex composition of the population) except for mental illness, mental handicap, FPC administration and for conditions associated with pregnancy.

3.18 Three other factors which are taken systematically into account are :

* fertility rates for conditions associated with pregnancy;
* marital status for mental illness patients;
* cross boundary flows of patients.

3.19 These adjustments are not considered here as they only affect specific services or have an impact only at the margin. The focus here is on the use of standardised mortality ratios (SMRs).

3.20 The RAWP report itself implied that relative need referred to relative morbidity and that mortality was a good proxy measure of morbidity. But, if the initial statement is taken seriously, then the SMRs are actually included as a proxy for the relative risk of contracting a condition or needing health care in one area rather than another. This emphasises that the need must be assessed "objectively" and not as being expressed through demand.

3.21 This was clearly recognised by the Working Party in their earlier, Interim Report (DHSS, 1975): they used Regional in-patient and out-patient case loads as an indicator of relative need for hospital services to supplement the age-sex adjustment. But the overwhelming disadvantage of this measure was - and still is - that it is strongly influenced by the supply of hospital facilities.

3.22 This mistake is still made: Butts (1986), whilst recognising that the provision of services affects demand, still advocates adjusting the allocation of resources for demand.

3.23 The Working Party also considered and rejected the use of two possible morbidity indicators :

- sickness absence statistics, because of their limited coverage, their dependence upon industrial structure, and their relatively limited relevance to hospital services.

- self-reported sickness data from the General Household Survey (GHS) because of the sample size at District level and their "contamination" by the respondent's perception of need.

3.24 The wide variety of morbidity measures that have been proposed, theoretically, have been reviewed in Chapter 2: they are of little practical use for the purposes of resource allocation.

3.25 There were and still are important advantages of the standardised mortality ratio as data which can be and has been used on a regular basis for the allocation process. First there is the simple practical question

that the data elements are comprehensive and regularly available at all levels of the NHS. Second, there is no dispute over the fact of death, and whilst there are considerable doubts over the assignment of deaths to a particular chapter (group classification) of the ICD (Alderson, 1973; Prior, 1985) the relative rates of death by conditions between areas are rarely disputed even if they should be. Moreover, if interpreted as reflecting relative morbidity they have the extra advantage of being independent of supply. Given, therefore, that the rates can be compiled by place of residence and separated according to diagnostic conditions by age and sex, it is perhaps not surprising that they were interpreted as reflecting morbidity.

3.26 It is clear that two issues need to be considered in assessing the appropriateness of using RAWP at a Sub-Regional level. First, the suitability of equating morbidity with mortality; and second the proposition that rates of morbidity (or mortality) actually do reflect relative need or risk.

3.3 Criticisms of RAWP

3.27 There have been several criticisms of the use of SMRs to reflect relative need on different levels. Thus, SMRs are open to at least four technical criticisms:

1. The ICD chapter headings are not homogeneous so that diseases with very different contributions to mortality are grouped together. Correlational analysis by West (1978) and Goldacre and Harris (1980) suggests that there are statistically significant correlations between areas in respect of the different disease categories within many of the ICD chapters.

2. At sub-Regional level, SMRs vary quite widely from year to year. Whether or not the SMRs averaged over several years reflect need for health care, it seems very unlikely that these annual variations should be treated as significant. At the national level, Palmer et. al. (1980) have argued that non-significant SMRs should be omitted. A similar issue was considered in the first Technical Report of CART (1977) and the final report recommends the use of 5 year SMRs partly for this reason (CART, 1983).

3. SMRs are not the most sensitive weightings. Thus, variations in SMRs are dominated by deaths among elderly but, as the DHSS themselves pointed out, although the use (and presumed need for) use of in-patient services is skewed towards the elderly, it is not skewed as much as deaths are. The use of other services is not skewed to the elderly at all so that - again assuming that use reflects need - it would be more appropriate to reflect a greater emphasis on deaths in the young, by using another mortality measure (Palmer et al, 1979; Dearden 1985).

Those authors are obviously correct if one accepts both that use reflects need and that mortality among a certain age-sex group reflects morbidity/need for health care among that same age-sex group. But both those premises have been frequently challenged and it seems unlikely that the substitution of another mortality measure for the standardised mortality ratio is an appropriate response to the dissatisfaction currently expressed with the RAWP formula.

4. For out-patient, day patient and Community health services, it is argued that SMRs are inappropriate as proxies for morbidity as these services are provided to treat conditions which only very rarely result in death. The issue, of course, is whether the morbidity rates for these conditions are in fact highly correlated or not with the death rates. In the absence of data, it is difficult to conclude a priori, that SMRs are inappropriate.

3.28 Another set of objections to the use of the RAWP formula depend on the supposed effectiveness of medical intervention. First, the assumption that a 10% difference in SMRs should attract 10% higher funding is obviously questionable (e.g. Buxton and Klein, 1978). But given our overall ignorance of input-output relationships in the provision of health care, it is equally easy to refute any other suggestions. Second, an authority where the pattern of treatment led to a reduction in mortality would have its resources reduced. Assuming one could establish a connection between the treatment protocols and reduced material resources, this would imply a rather perverse incentive structure. But the impact of both of these objections depend, once again, upon systematic information about the effectiveness of medical care which is simply not available.

3.29 There remains the fundamental question of whether mortality rates, however adjusted to take account of these criticisms, are the appropriate proxy measure for the health care needs of people at equal risk. This will be considered in two ways. First on the assumption that the allocation of health care resources should, at least in part, vary with morbidity, we examine whether mortality actually is a good proxy for rates of morbidity. This is, mostly, an empirical question. The second question is more difficult but essential for this exercise: what is the appropriate basis for measuring relative needs?

3.4 From Mortality to Morbidity

3.30 The importance of the first issue is well illustrated by SHARE, the Scottish equivalent of RAWP. Their formula excludes the over 65s from calculations of the SMRs. The argument is that the needs of the elderly for health service resources is determined by those who survive rather than those who die. Varly (1982) argues that this applies in particular to in-patient, acute, day patients, ambulance services and community health services for the elderly.

3.31 RAWP however, argued on the basis of rather limited evidence, that "Regional differences in morbidity explain the greater part of [differential Regional mortality] and that statistics of relative differences in Regional morbidity, if they existed, would exhibit the same pattern as those for mortality" (DHSS, 1976, para 2.8).

3.32 There have been a number of studies to test that claim: thus Forster (1978) examined the correlation between age/sex standardised mortality rates and morbidity rates from the General Household Survey (GHS) and found a significant correlation between mortality and chronic sickness but not between mortality and "absence from work or school". Brennan and Clare

(1980) argued on the basis of a linear regression using Census-based data to measure morbidity that mortality was a good measure of morbidity (see below). But Palmer (1978) on the basis of a linear regression analysis using a wide range of morbidity measures (see the discussion in Chapter 2) disagreed; he found that the correlations were quite low although Regional patterns of mortality did seem to reflect morbidity. Similarly, the Mersey RHA showed that there were socio-economic indicators related to health which were reflected in the SMRs.

3.33 An apparently more direct demonstration was carried out by Carstairs (1981). She related SMRs and social indicators to the uptake of health services. Her conclusion, based on small area analysis in Glasgow apparently supported the use of the SMR. In Scotland, however, the resource allocation process is already based on under-65 SMRs so that the relevance of that result to the English situation is not clear. However, Holland et al (1980) after a major methodological review concluded rather lamely that the use of mortality - and particulary overall SMRs - was perhaps not quite so perverse as some claimed.

3.34 A similar analysis was included in the Second Annual Report of the Technical Support Group to the CART Working Party (November 1978). Data was collected for 1971 for each county borough except the City of London (N=111), for each county aggregate of metropolitan boroughs and urban districts (N=45), and for each county aggregate of rural districts (N=45). Information on numbers sick and out of employment and numbers permanently sick, and the numbers in each age-sex group were collected from the 1971 Census; data on the total number of deaths for the age groups 15-44; 45-64 and 65 plus were obtained from the OPCS. They used linear regression and found highly significant correlations for each age group in each data set between mortality and the sickness indicators (see Tables 17.1, 17.2, 17.3 in Second Annual Report of the Technical Support Group, paragraph 17, pp13-17).

3.35 It should be noted that all these analyses are prone to the ecological fallacy [5]. But although this problem of inference can be avoided by analysis at the level of the individual - if that kind of data were available - the basic problem with all of these studies is that they have simply missed the point. The issue is not whether the relation between mortality and morbidity can reasonably be said to be greater than zero in a statistically significant sense, but whether the relationship is sufficiently strong so as not to make it necessary to look for other factors. In other words, the correct test is whether the correlation coefficients are significantly different from 1 (one) - and they all are. Put another way, in the study conducted by the Technical Support Group, the statistical association between either measure of morbidity and mortality never accounts for more than 54% of the joint variation and, for the age groups 15-44, the joint covariation between being permanently sick and mortality is less than 10% in four out of seven cases. One cannot conclude that "a sufficiently strong relationship ... is demonstrated" (ibid, p14).

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5. Note that the fundamental problem is not the level of analysis (area and not individual) but the lack of a theoretical model linking morbidity to socio-economic conditions and/or to prior health status and/or to availability of medical care (see Carr-Hill, Hardman and Russell, 1987).

3.36 This is particularly serious if other identifiable factors can be shown to be related to morbidity. Given the importance of the issue, a separate analysis has been carried out of the relation between mortality and the same two measures of morbidity from the 1981 Census, examining at the same time whether socio-economic conditions have any impact. This is reported for districts within the West Midlands and Yorkshire and Humberside, in Annex III. The findings of the study are :

* the correlations between mortality and either of the measures of morbidity are positive and greater than zero in the statistically significant sense but their joint covariation is never more than 58%;

* there are strong positive correlations between measures of socio-economic disadvantage and the two measures of morbidity; and

* in a linear regression analysis the socio-demographic factors are related to morbidity over and above the statistical associations of mortality with morbidity.

3.37 The overall conclusion from this analysis is that mortality ratios cannot be taken as a sufficiently good proxy of morbidity.

3.38 This conclusion is, of course, based on the rather restrictive measures of morbidity available in the Census data. The recent analysis of the Regional Statistician of the West Midlands which related hospital discharge rates to socio-economic variables from the Census Small Area Statistics and SMRs at electoral ward level was conducted in two stages. First, they showed "that, within Birmingham, differences in hospital discharge rates between electoral wards can be largely explained by differences in the socio-economic characteristics of the wards. On the other hand, only a weak association was found between discharge rates and SMRs" (Johnson and Ganley, 1986, p.8) and this was confirmed when then extended the analysis to the Regional level.

3.39 The mass of the evidence now available suggests that mortality rates are not a good proxy for morbidity and they should not be the only factor taken into account in sharing resources out between districts in a Region. There is now also considerable evidence to support the use of some index or set of socio-economic data as part of a resource allocation formula.

3.5 Summary and Implications

3.40 Overall therefore, while the analyses in Annex III would support the use of SMRs as one element which should be taken into account in sharing resources out between districts in a Region, it also provides considerable backing for the use of some index or set of socio-economic data.

3.41 The Scottish Home and Health Department - who reported after RAWP - "considered at some length the possibility of making use of differential bed utilisation by the various social class groups . . . as a factor in adjusting the weighted population" (SHHD, 1977, para 3.10). They were not satisfied that "the effect of social class gradient in . . . an urban area with a significant degree of multiple deprivation was the same as the

effectof a social class gradient in a rural area"; and, in any case, an adjustment would have made relatively little difference to the population weightings already introduced.

3.42 This latter argument is obviously important in the practical situation of trying to devise a resource allocation formula; and the preliminary analysis Annex III also found that the use of social class by itself had little extra effect. But that exercise further showed that, taken together, social conditions do provide added predictive power in accounting for variations in morbidity between areas.

3.43 Two questions then arise: what factors should be included in a resource allocation formula; and how should they be taken into account. This is the subject of the next chapter.

Chapter 4. Measurement of Relative Need

4.1 Defining Need for Health Care

4.1 The problem for this report is to decide upon the appropriate criteria for allocating resources for health care services between areas. The argument of the previous chapter has established that variations in mortality between (small areas are not a very good proxy for corresponding variations in morbidity (however measured) - and therefore not a good proxy for relative need for health care. but to determine what would be a good proxy we have to be clear as to what should count as "need for health care".

4.2 There have, of course, been extensive discussions in the literature, about the measurement of need: here we simply state that, in order to be acceptable, any index will have to be based on easily available 'objective' data. This immediately rules out any subjective assessment of felt need not because of doubts over the validity of such data but because of the impracticability of routinely incorporating such assessments into a formula. The choice is therefore between 'objective' criteria for need as assessed by a variety of experts and 'need' as expressed by the population's use of services.

4.3 The RAWP view (DHSS, 1976 para 2.6) was to reject the latter not in this case because of the lack of suitable data but because it was too dependent on the availability and provision of health services; this is still true (see, for example, Birch, 1986). It is more usual, therefore, for 'need' to be assessedm 'objectively' and that is the approach adopted here. However, it needs to be emphasised that there are clearly dangers in allowing assessment/evaluation of need to be carried out soley by experts officials and their experts. We return to this point in section 3.

4.4 One approach is to argue that the most reliable measures are the incidence and prevalence of disease. But, without extensive and expensive epidermiological monitoring, the data available for analysis is very limited so that some kind of proxy would be required and in that case the findings of Annex III would be equally applicable. One other possibility is to argue that specific and targetted (minority) groups are more at risk than others, and so require more resources. This obviously makes sense in the field where health care resources are usually directed to specific individuals or groups (resources for prevention are the obvious exception, but they are few and far between). It is less clear that it is appropriate to use the presence of a disadvantaged group in an area, who might be numerically small, as a signal that increased resources are required for that area. Apart from the jaundiced remark that any increase in grant will not necessarily find its way to the intended recipients, a statistical adjustment (along the lines of RAWP) is unlikely to correspond to the level of resoruces required.

4.5 This argument leads to the conclusion that it is better to search for indicators of the characteristics of the population in an area as a whole to reflect need rather than of the presence/absence of disadvantaged

groups. The issue of the appropriate level at which indicators should be designed and used in analysis is a complex one (Coleman, 1985; SCPR, 1986). It does not mean that an indicator must summarise some aspect or feature of every person or household in the area; rather the point is that the indicator should reflect some characteristic of the area which will correlate at the level of the area with the corresponding criterion.

4.6 In this case the criterion is the (relative) need for health care services. The RAWP approached the problem by notionally splitting up the resources into seven service categories before adjusting for "need". Of those service categories - non-psychaitric in patients, mental illness in-patients, mental handicap in-patients, out-patients, community health, ambulance services , and FPC Administration - all except the last still remain the responsibility of the Health Authorities. But whilst this last component was always very small (about 0.5% of the whole allocation) the establishment on 1st April 1985 of a formally separate institution (Health Services Bill) signifies an important shift in the policy environment within which Health Authorities operate. For the shift to what is usually called "community care", also involves the recognition that the resources of other agencies are providing health-care related services and are therefore implicated in responding to the need for health care. It is, therefore, important to identify the possible overlaps in their functions and responsibilities.

4.2 Interactions with Family Practitioner Services and Local Authorities

4.2.1 Primary Care and Need

4.7 The original RAWP calculations in fact, included the costs of administration of the Family Practitioner Committees, but they left out family practitioner services. They did, however, recognise that "many of the services provided by family practitioners have an important impact on those provided by the Health Authorities and vice versa. It is also self-evident that they should both respond, each in their own way, to the same criteria of need" (para 6.19). They concluded by recommending "a review of the interaction between the two services from a financial viewpoint" (para 6.21).

4.8 There has been no such review and the distribution of General Practitioners (GPs) still varies widely (see Table 4.1). It is true that the Government is showing considerable interest in the performance of the

Table 4.1 : General Practitioners: Percent Medical Practitioners, large list sizes and persons per dentist

	% Medical Practitioners with large list sizes		Persons per Dentist (thousands)	
	1981 (3000+)	1983 (2000+)	1981	1983
Northern	6	62	5.1	4.6
Yorkshire	7	56	4.1	3.8
Trent	10	66	4.8	4.6
East Anglia	2	54	4.0	3.9
North West Thames	9	58	2.4	2.1
North East Thames	11	61	3.4	2.9
South East Thames	7	59	3.2	3.0
South West Thames	6	65	2.6	2.5
Wessex	1	56	3.5	3.4
Oxford	7	61	3.6	3.3
South Western	2	44	3.1	3.0
West Midlands	**9**	**60**	**4.4**	**4.1**
Mersey	6	58	4.0	3.8
North Western	8	62	4.2	3.9
England	7	59	3.6	3.4

Source: CSO **Regional Trends 19,** (1984 Edition) and **20** (1985 Edition).

Family Practitioner Service (FPS) and is proposing that these services become more consumer orientated and more efficient. this goal is to be pursued with the use of "good practice allowances" which would enable good quality care when identified to be rewarded. It is not, however, very clear whether this is really a concern with the efficiency of use of health care resources or simply another way of controlling health care expenditure budgets.

4.9 The interactions of the RAWPed and cash-limited HCHS budget with the non-cash limited - because determined by demand and use - FPS expenditure, have increased with the accelerated development of community care for the elderly, the mentally ill and the mentally handicapped. Clearly, these developments lead to an increased burden on the FPS and so it is important to take the distribution of these resources into account. Table 4.2 taken from Birch and Maynard (1986), shows how expenditure on Family Practitioner Services would be affected if the total budget were distributed according to a RAWP-type formula. It can be seen that the West Midlands would gain substantially from such a reallocation.

Table 4.2 : RAWPing FPS resources : Needs based on 'expected expenditure', allocation of expenditure by region.

Region	Target (%)	Actual (%)	Amount of gain or loss in terms of % of nat exp	% of act exp	£m
Northern	7.29	6.71	+0.58	+8.63	+16.08
Yorkshire	8.12	7.70	+0.42	+5.45	+11.64
Trent	10.06	9.30	+0.76	+8.17	+21.07
East Anglia	3.74	4.20	-0.46	-10.95	-12.75
North West Thames	6.78	7.68	-0.90	-11.71	-24.95
North East Thames	7.65	7.74	-0.09	-1.16	-2.49
South East Thames	7.33	7.72	-0.39	-5.05	-10.81
South West Thames	5.87	6.25	-0.38	-6.02	-10.53
Wessex	5.51	5.93	-0.42	-7.08	-11.64
Oxford	4.56	4.88	-0.32	-6.56	-8.87
South West	6.31	7.19	-0.88	-12.24	-24.40
West Midlands	11.47	10.71	+0.76	+7.09	+21.07
Merseyside	5.58	5.17	+0.41	+7.93	+11.37
North West	9.72	8.80	+0.92	+10.46	+25.50

Source: Birch and Maynard, 1986, Table 1.

4.10 The problem, of course, is that the Family Practitioner Services are not subject to planning. The GPs are independent contractors whose remuneration and recommended list sizes are fixed by negotiation, even though the administrative costs of their quartermasters (the FPCs) have been taken into account in the resource allocation process (until last year). But the relative provision of primary care needs to be considered when discussing the allocation of resources to health authorities.

4.2.2 Personal Social Services and Need

4.11 The RAWP also completely ignored any health-care related activities of the Local Authorites (LAs). This is a serious omission especially as there are not only wide variations in the levels of per capita spending of LAs on Personal Social Services but these levels are changing at widely divergent rates. (see Table 4.3). Thus the Social Services Committee presented data showing that in the four years from 1981 to 1985, of the 108 local authorities, 3 decreased their real spending and 19 increased by more than 20% (HC387-I Table F). These variations should clearly be taken into account in apportioning resources in the corresponding areas covered jointly by the health authority and the local authority (child care, mental handicap, mental illness and residential accommodation for the elderly). The volume of resources required jointly by the health authority and the local authority.

4.12 Obviously, these variations will have a variable impact in child care, mental handicap, mental illness and residential accommodation for the elderly according to the particular circumstances and policies of the Local Authorities Social Services Departments (the specific case of Wolverhampton is considered in Chapter 5. For example, the Audit Inspectorate of the Department of the Environment examined the care for mentally handicapped provided by the Local Authority Social Service Departments (DoE, 1983) and commissioned a detailed study in 8 local authorities. they found considerable variation in local authority expenditure dedicated to mentally handicapped services (+ 50% nationally, and +35% or approximately £2.50 to £5.00 per annum per head of total population in the eight authorities studies) and on the numbers of mentally handicapped people ... cared for by the eight local authorities. they concluded: "The variation ... must ... be due to the combined effects of differences in services by other bodies, differences in SSD policies, differences in SSD efficiencies..." (p.52). In particular, they showed wide variation in NHS and LA provision between the eight authorities studies (Table 4.3).

4.13 Overall, these omissions have the effect of sidelining the bulk of primary care and a substantial proportion of nursing and rehabilitation from the process of resource allocation. There is little justification for this - and none is provided. It is, furthermore, important to note that the use of primary care services (both general practitioners and the relevant bits of local authority social services) are strongly related to societal conditions (Foster, 1976; Blaxter 1984;) no-one has claimed any association with death rates.

Table 4.3 : Variations in National Health Service and Local Authority Provision for Mental Handicap.

ADULTS

Authority	% of MH adults receiving accommodation in: NHS Hospital or Hospital Hostel %	LA residential home %	Other %
A	44	3	53
B	25	8	67
D	30	13	57
H	N.A.	N.A.	N.A.
K	31	6	63
L	33	9	58
M	42	10	48
N	29	12	59

CHILDREN

Authority	% of MH children receiving accommodation in: NHS Hospital or Hospital Hostel %	LA residential home %	Other %
A	7	1	92
B	10	2	88
D	23	4	73
H	14	15	71
K	6	4	90
L	3	13	83
M	5	5	90
N	8	4	88

Source: Audit Inspectorate (1983)

Notes:
1. "LA residential home" includes LA hostels, group homes.
2. "Other" includes family home, voluntary home, private home, registered home/boarding house, fostering.
3. Figures based on data for actual numbers of persons obtained from authority visits and the assumptions in Note 5 below.
4. n.a. = not available at the time of our visit.
5. Assumes average total prevalence of 300 MH per 100,000 total population and the same proportional division between MH adults (16+) and MH children as for the population as a whole.

4.14 The assessment of the need for health care is never easy: in the case of assessing the relative risk between areas, the task is made more complicated because other agencies are involved in providing services related to health care. The availability and use made of these other services cannot, however, be ignored.

4.3 How to Adjust for Social Factors

4.15 The RAWP formula started from the average national rate of expenditure for each of the seven service categories and then adjusted these rates; first, for the age-sex composition of the population because the health care needs of different age-sex groups vary; and second, for the standardised mortality rates. The particular way in which SMRs were incorporated into the resources allocation formula assumes not only a close linear relationship but direct proportionality (see DHSS, 1976, para 2.29). Not only is the assumption that a 10% difference in SMRs should attract 10% higher funding obviously questionable (Buxton and Klein, 1978), it also implies that if mortality were zero, then need is also zero. In fact, of course, when the formula is applied to large areas like Regional Health Authorities, the SMRs are never very far from 100 (see Table 2.4 supra) because, in the end, of course, everyone dies. In practice, therefore allocations to the RHAs are affected only at the margin.

4.16 However, this assumption of proportionality does cause problems when the formula is used for sub-Regional allocations as there are such wide fluctuations in annual SMRs. These are assumed to be random variations around an underlying mean so the initial - pragmatic - solution is to substitute averages of SMRs in the formulae - for example, in the West Midlands, CART recommended longer and longer periods before settling on 5 year averages (see CART, First Report, Tenth Report). But the problem of direct proportionality is not thereby solved.

4.3.1 The Statistical Solution

4.17 The problem is that this procedure does not correspond with any statistical analysis of the relationship of morbidity (however defined) to mortality. For example, the Technical Support Group to the Capital and Revenue Targets Working Party of the WMRHA carried out an early analysis relating 1971 Census data on sickness to mortality and found a large constant term as did the analysis reported in Annex III and this is confirmed in other studies (e.g. Butts, 1986). This implies that the need in a particular area varies according to local circumstances around a national population average: we are concerned therefore with marginal changes rather than proportional changes.

4.18 The usual solution proposed is to adjust the allocation of resources according to the coefficients in an estimated regression equation including a constant term. The problem then apparently reduces to the choice of an appropriate set of coefficients. For example, the recent analysis by the Regional Statistician of the WMRHA at the electoral ward level of standardised discharge rates (SDRs) across the Region and found that the best equation included

NOCAR - Residents in households with no car, per 1000 respondents

UNEMP - Unemployed persons per 1000 residents

MIGRANT - Residents in households with different address 1 year ago per 1000 residents

DENSITY - Persons per hectare

SMR - Standardised Mortality Ratio (based on two years of actual deaths)

4.19 The report by the Regional Statistician says that "Examinations of the residuals (actual SDR - predicted SDR) for electoral wards within each District shows that it is valid for the regression equation to be used across the Region" (p.8). On the other hand, they also compare this equation (Model 1) with parallel District regressions using the same social factors and estimated coefficients (Model 2) and with separate District regressions using the same factors but allowing the coefficients to vary (Model 3). On the basis of an 'F' test comparing these three models, they argue that statistically the most appropriate model is Model 2 whereby "each District has the same social deprivation factors with the same weighting but with different underlying levels of discharge rates". [6] They then calculate the District Deprivation Indices as a ratio of the predicted SDR using the estimated constant specific to each District to the predicted SDR' using a combined constant for the whole Region.

4.20 It all sounds reasonable, sensible and relatively sophisticated compared to the procedure followed by NE Thames of making apparently arbitrary adjustments more or less by fiat, according to whether the social index is 'low' (when there is no adjustment 'medium' (a 3% additional weighting) 'high' (a 5% additional weighting). But the statistical wizadry can mislead: it should be emphasised that, even in their "best" model, Johnson and Ganley (1986) only accounted for 36% of the variance so that there is still considerable potential for misallocation using this approach.

4.21 There is no way of making a final evaluation of the adequacy - or otherwise - of this kind of statistical adjustment without establishing a preciseassessment of need, which is where it all started. However, the practical difficulties of using a regression adjustment can be illustrated from the history of the allocation of the Rate Support Grant (RSG) from central government to Local Authorities.

4.22 It is also important to note the difference between Wolverhamptona nd other Health Authorities in the analysis conducted by the Regional Statistician. Their estimated regression equation, when originally based just on Birmingham accounted for some 75% of the variance in standardised, discharge rates between electoral wards. But when it was extended to the whole Region, this fell to 22% and they therefore tested to see if there

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6. It is also important to note difference between Wolverhampton and other Health Authorities in the analysis conducted by the Regional Statistician. Their estimated gregression equation, when originally based just on Birmingham accounted for some 75% of the variance in standardised, discharge rates between electoral wards. But when it was extended to the whole Region, this fell to 22% and they therefore tested to see if there was any difference within the Region that would account for this drop in predictive power. Comparing the five countries in the Region, they found that, although different variables were included in the "best" equations estimated separately for the electoral wards in four of the countries, the R2 all varied round the same value (0.21 for Hertfordshire and Worcestershire); but in the analysis for Wolverhampton the value of R2 was 0.56 (and the significant variables included were NOCAR, UNEMP and OWNOCC (residents in owner occupied housing, per 1000 residents).

was any difference within the Region that would account for this drop in predictive power. Comparing the five counties in the Region, they found that, although different variables were included in the "best" equations estimated separately for the electoral wards in four of the counties, the R^2 all varies around the same value (0.21 for Herefordshire and Worcestershire, 0.30 for Shropshire, 0.27 for Staffordshire and 0.35 for Warwickshire); but in the analysis for Wolverhamptom the value of R^2 was 0.56 (and the significant variables included were NOCAR, UNEMP and OWNOCC (residents in owner occupied housing, per 1000 residents).

4.3.3 Adjusting the Rate Support Grant

4.23 Thus, for many years, the RSG has been distributed on the basis of the comparative needs of local authorities. Before the major expansion of personal social services in the 1970s, fairly strightforward indicators, such as the number of school children and miles of highway were used. Beginning in 1974, a multiple regression analysis, based on variables derived from the national census, was used to assess the "needs" element of the Rate Support Grant. The resulting equation was used to predict the needs of each authority. However, since authorities, who had previously provided relatively high levels of services, also tended to be rather similar in social structure, there was a danger of spurious correlation between the 'independnet' socio-economic variables. In any event there was political interference in deciding which variables should and should not be included in the equation (Jackman and Sellars, 1977). This, in turn, was seen as unsatisafactory and a new method has been used since 1981/82 - the GREA.

4.22 Grant Related Expenditure Assessment (GREA) is divided into several functionally specific components. The GREA "for a particular authority, is an objective assessment of how much it would cost that authority to provide a common standard of service, having regard to its circumstances and responsibilities." (Local Government Finance Grants Working Group, 1985). It is used both for the distribution of the Rate Support Grant and in determining penalties for local authorities which "overspend" (Anon, 1986). The GREA for a particular authority is built up from components which relate to the various functions of the authority, such as the personal social services, which are of most interest in this report.

4.23 The component of GREA relating to personal social services is itself built up from elements corresponding to various client groups. The methodology can best be illustrated for two of the client groups, children under five and the elderly. A definition of what constitutes a person in need has been constructed for each client group. Unfortunately, the definitions depend upon variables which are not available at the level of the social service authorities and so regression equations have been calculated on the basis of surveys relating "whether or not a person is in need" (the dependent variable) to variables available in the national census. These equations are then used predictively to estimate the number of people of each type "in need" in each local authority. The target number of places for each different service (such as day nursery places) is then obtained by distributing the total number of places available for England between the different authorities in proportion to these estimated numbers.

4.24 Separate estimates are made of the unit cost for an authority of providing each service. These estimates are also obtained from regression equations relating data on unit costs (after correction for the higher

costs in or near London) to the social index of deprivation used by the Department of the Environment. The contribution to GREA corresponding to a particular service is obtained by multiplying the estimated number of places which an authority requires by the estimated unit cost of that service in their authority. Adjustments are made so that the total cost for the whole country corresponds to a level of expenditure previously determined by central government. The GREA with respect to Personal Social Services is obtained by adding up the various elements corresponding to the different services for each of the client groups.

4.26 The article referred to above (Anon, 1986) comments that there are considerable problems with their methods: first, linear regression analysis provides a poor statistical model for the prediction of binary variable such as whether or not a person is in need; second, in the estimating equations for unit costs, the use of a composite social index produces equations with poor explanatory power. The combined effects of these inadequacies is not random: they result in biases towards the mean, so that need is under-estimated where it is high and over-estimated where it is low.

4.27 An example of this effect is provided by the case of children under 5. The table shows the actual numbers of children under 5 meeting the definition of need in three groups of regions (extracted from Bone, 1977) and the numbers of children estimated to be 'in need' according to the prediction equation used in the 1983/84 version of GREA (Local Government Finance Grant Working Group, 1983).

Table 4.4 Actual and Predicted Need for Day Care

	Numbers of Children under 5 'in need'	
	Actual	Predicted
- South East Remainder of England	19	24.7
- Not urban (less than half population in metropolitan counties)	19	19.7
- Urban (more than half population in metropolitan counties)	31	26.1
England - Total	69	70.5

It is clear that there are wide discrepancies between the actual and estimated numbers "in need".

4.3.3 Fair or Fancy

4.28 First, whichever allocation procedure is adopted, it is clear that no "final" targets could be adopted as patterns of morbidity might change and it is important to take into account the most recent data (see Annex IV). It would therefore be sensible to set a ceiling, not only on the annual shifts of resources (as does the present Resource Allocation process), but also for the overall target shifts in proposed resource allocation as compared to a simple per capita share.

4.29 The basic logic of a RAWP-type exercise implies that the basis for allocation should be rates of morbidity. In the absence of any direct measurement of morbidity, some kind of statistical adjustment looks the fairest. But the illustration provided above suggests that, whilst apparently technically sophisticated, it is difficult to use with any confidence a statistical prediction formula where there is so much residual variation. Moreover, where there is no agreement on how to directly measure the criterion, morbidity, a regression adjustement based on a proxy dependent variable such as hospital discharge rates only serves to cloud already murky waters.

4.30 The alternative - which is preferred here - is to argue that socio-economic factors should directly replace or supplement SMRs in the existing kind of formulae where direct proportionality is assumed, but where there is a ceiling on the extent to which resources can be redistributed. Obviously, any such ceilings will be arbitrary - as are, to a certain extent, the choice of social indicators (see below) - but the view here is that it is better that the criteria used and their operating characteristics are transparent rather than shrouded in technical mystery.

4.4 Choosing Social Indices

4.31 The wide variety of indices of social deprivation are considered in Annex IV. The argument concludes that the favoured indices of social deprivation (such as ACORN, the Jarman Index) are not adequate. First because they rely soley on Census data, which are becoming progressively out of date: indeed, one of the important advantages of SMRs is that up-to-date data are available (whether or not this year's, or the last five year's data are used). Second, they are statistically rather than theoretically based which means that there is no way of assessing the relevance of the ranking of areas they imply and that they are very sensitive to inaccurate or unreliable data. Third, they are heavily weighted towards the presence/absence of minority groups. Whilst the specific characteristics of the clientele should, of course, be important considerations for a field agency, such an approach might well lead to misallocation at an area level - and the example in section 4.3.3 is an illustation of this process.

4.32 Instead, the argument in Annex IV concludes that any proposed index should:

(i) be, at least in part, based on current data which is routinely collected

(ii) aim to measure need directly

(iii) reflect, as far as possible, characteristics of the areas rather than specific client groups.

4.33 The review in Annex IV concluded that the best approach to measuring needwas to search for indicators of past, present and future income/living standards. Given the limited range of data avilable, which can be disaggregated to the level of the Health District (or Local Authority) the proposals were to compaute data on:

- level of non-owner occupancy
- level of Supplementary Benefit Claimants
- rates of unemployment and long-term unemployment.

The way in which these vary between regions in England and Wales is shown in Tables 4.5 to 4.7

4.34 The proposal is that current data onsocial disadvantage should be used to supplement the age-sex composition (adjusted for SMRs?) as a basis for resource allocation. Districts are ranked on each of the three series (owner occupancy, supplementary benefit elements and unemployment rates) and their combined rank is used as an index to allocate resources within the overall proportion again up to a maximum of say 10% either way.

4.35 An alternative, which might be more acceptable to current thinking would be to me a combination of these current data and one of the statistical indices. This could be accomplished as follows:

a. Either one of the fashionable indices of social disadvantage based on census data should be weighted on a sliding scale, for example, from 75% to 25% according to the recency of the data (in 1983, 75%; 1984, 70%; etc. to 1992, 25%; in 1993 new Census data is available for analysis). Districts are allocated resources within this proportion based on their social disadvantages score up to a maximum of 10% either way.

b. The three current indices of social disadvantage would then be weighted in a complementary fashion from 25% in 1985 to 75% in 1993. Districts are ranked on each of the series and their combined rank is used as an index to allocate resources within the overall proportion again up to a maximum of 10% either way.

Summary

4.36 This chapter has focussed on the measurement of relative need for health care as between areas. The introductory section briefly surveyed the various approaches to the definition of 'need'. There are obvious difficulties in using subjective assessments of 'felt need' and measures of service activity are too dependent on supply to be used as indicators of 'expressed need'. The preference here is therefore for 'need' to be measured 'objectively' using some combination of area and/or population

Table 4.5 : Proportion of Dwellings which are not Owner Occupied

	1971	1976	1981
North	58	55	52
Yorkshire and Humberside	50	47	44
East Midlands	47	44	41
East Anglia	47	44	40
South East	47	45	42
South West	41	38	35
West Midlands	**48**	**45**	**43**
North West	45	42	40
England	47	45	42

Source: CSO **Regional Trends 18,** (1983 Edition).

Table 4.6A : Persons in Receipt of Supplementary Benfit, Thousands, 1978-1981, by Social Security Region

	1978	1981	% Increase
Northern	202	255	26
Yorkshire and Humberside	285	374	31
East Midlands and East Anglia	253	324	28
London - North	274	346	26
London - South	301	364	21
London - West	225	272	21
South Western	216	255	18
West Midlands	**277**	**389**	**40**
North Western - Manchester	210	273	30
Merseyside	220	278	26
All Regions	2,932	3,273	27

Source: **DHSS Social Security Statistics,** 1980 and 1983 Editions.

Table 4.6B : Persons in Receipt of Supplementary Benefit, Thousands, 1982, by (New) Social Security Region

	All	Supp. Pensions	Allowances
North Eastern	692	277	414
London - North	660	299	361
London - South	579	273	305
Wales and S.W.	541	228	313
Midlands	726	301	427
North West	308	129	180
Merseyside	336	124	212
All Regions	3,844	1,621	2,212

Source: DHSS Social Security Statistics, 1984 Edition

Table 4.7 : Unemployment Rate in Standard Regions, 1982-1985, and Increase in Numbers Unemployed, 1983-1985

	Unemployment Rate				Percent Change
	1982	1983	1984	1985	1983-1985
South East	8.5	9.3	9.5	9.9	8.5
East Anglia	9.7	10.3	10.1	10.7	4.9
South West	10.6	11.2	11.4	12.0	8.6
West Midlands	**14.7**	**15.7**	**15.3**	**15.5**	**-1.4**
East Midlands	11.0	11.8	12.2	12.7	7.6
Yorkshire & Humberside	13.2	14.1	14.4	15.1	5.9
North West	14.7	15.8	15.9	16.3	3.4
North	16.6	17.9	18.3	18.9	5.3
GB	11.9	12.7	12.9	13.3	5.4

Source: **DoE Employment Gazette**

characteristics, with the caveat that any indices proposed by 'experts must be open to discussion.

4.37 The second section demonstrated the difficulty of delineating the area of need to which the Health Authority should be responding. Both the Family Practitioner Services and the Local Authority Social Services provide a range of services which complement, interact and sometimes substitute those provided by the corresponding Health Authority. Clearly the relative provision of these services must be taken into account when deciding upon allocation of resources to Health Authorities although it is recognised that this is very difficult in practice.

4.38 The last two sections of the chapter have been concerned with the problem of how to adjust for socio-economic characteristics of the area and/or population served, and precisely which kind of index should be used. The text has argued that, whilst statistically sophisticated methods are available for deriving indices of social deprivation, they are not easily accessible to debate and they do not always perform very well. Moreover, given that resource allocations to other agencies providing health care related resources are also based on adjustements according to socio-economic characteristics, any bias arising from the process of statistical adjustment is liable to be compounded.

4.39 For these reasons, the basic message of the chapter is that relative need should be assessed directly in terms of indicators of past, current and future living standards. The detailed discussion in Annex IV concludes that the best data which is both current and could be made routinely available are the proportion of non-owner occupiers, the numbers of Supplementary Benefit Claimants in the area, and the rates of unemployment and long-term unemployment.

Chapter 5

Wolverhampton and West Midlands

5.1 The purpose of this chapter is to compare Wolverhampton with the whole of West Midlands RHA and also with England in respect of health care resources, health status outcomes and socio-economic conditions. A final section makes an assessment of relative need as between Wolverhampton and West Midlands.

5.2 Where possible, data is presented for the populations served by the Wolverhampton District Health Authority and the West Midlands Regional Health Authority. But for many of the tables, the published data refer to Local Authority areas or Travel-To-Work Areas and these are the data presented. In those cases where the source records have been computerised, the data would, in principle, almost certainly be recomputed without much difficulty so as to correspond to Wolverhampton DHA and the West Midlands RHA. In other cases, the feasibility of matching data is more problematic but would obviously have to be addressed if the suggestions in the previous chapter were taken up.

5.1 Resources for Health Care

5.3 The first step in assessing the appropriate allocation of future health care resources is to compare the present state of resources. the DHSS, of course, publish extensive sets of Performance Indicators (P.I.s)which can be compared between Health Authorities and John Yates of the Health Services Management Centre at Birmingham has produced a similar easily accessible package for use on micros (Inter Authority Comparison Charts).These indicators can be divided into groups according to whether they reflect Activities, Cost, Manpower and Output (see Chart 5.1), and separately for each of Acute Services, Mental Illness, Mentally Handicapped, Support Services, Children's Services, Services for the Elderly, and Manpower.

5.3 The relative standing of Wolverhampton DHA can be compared to other District Health Authorities in the West Midlands Region by ranking the Wolverhampton DHA on each of PIs and computing an average rank for Activites, Cost, Manpower and Output in each of Acute Services, Mental Illness, Mentally Handicapped, Support Services, Children's Services, Services for the Elderly and Manpower. It can be seen that there is no systematic pattern as between Wolverhampton and West Midlands. (Table 5.1)

Acute Services

Activity :
(a) Treatment Intensity Rate-Acute
(b) Treatment Intensity Rate-Mater
(c) Actual Throughput - All Cases
(d) Expected Throughput - All Cases
(e) Standardises Throughput Ratio - All

Cost :
(a) Acute IP Spend/Resident - DHA
(b) Actual Cost/Case - DHA
(c) Expected Cost/Case - DHA
(d) Actual Cost As % of Expect - DHA
(e) Theatres/Avail. Surgical Bed

Mental Illness

Activity :
(a) In DHA Hospisatn. Rate - Under 65
(b) In DHA Hospisatn. Rate - 65 Plus
(c) Standardised Admission Rate

Manpower :
(a) % All MI Nurses - In Hospitals
(b) % All MI Nurses - In Community
(c) CPN & Day Hosp Nur./100,000 Pop
(d) SEN Doctors/Catchment - MI
(e) Consultants/Catchment - MI
(f) % Total Nurses (MI) - Trained
(g) % Total Nurses (MI) - Learner
(h) % Total Nurses (MI) - Auxiliary
(i) Total Nurses (MI) /Occ Bed
(j) Total Nurses (MI)/Avail Bed

Mental Handicapped

Output :
(a) Supported Residents/10,000 Pop : LA
(b) Residents/Staff - LA Homes
(c) ATC Places/10,000 Pop : LA
(d) ATC Places/Staff : Local Authority
(e) Special Care Places/10,000 pop : LA

Support Services

Cost :
(a) Average Cost/WTE - Catering
(b) Total Cost/Available Bed

Childrens Services

Activity :
(a) Number of Home Births
(b) Throughput - SCBU's
(c) Length of Stay - SCBU's
(d) Turnover Interval - SCBU's
(e) Turnover Interval - Paediatrics
(f) Throughput - Paediatrics
(g) % Day Cases - Paediatrics

Manpower :
(a) Reg Nurses in SCBU's/1000 Births
(b) Reg Nurses in SCBU's/SCBU Case
(c) Nurse/Occupied Paed Bed - SRN's
(d) Nurse/Occupied Paed Bed - Other
(e) SEN Docs/Catchment - Hosp Paed
(f) SEN Docs/IP Case - Hosp Paed
(g) SEN Docs/New Op. Att. - Hosp Paed

Output :
(a) SCBU Cases/1000 Live Births
(b) Neonatal Mortality Rate
(c) Early Neonat. Mort. Rate - 2500g
(d) Early Neonat. Mort. Rate - 1500g
(e) Low Birthweight Rate - 2500g
(f) Low Birthweight Rate - 1500g

Elderly

Activity :
(a) Institutional Care Rate - Com'ty : By LA
(b) Institutional Care Rate - Hosp.
(c) District Nurse Contact Rate
(d) Day Pat. Attendance Rate - Geria
(e) First Admission Rate - Eld MI
(f) District Nurse Contact Rate
(g) Day Pat. Attendance Rate - Geria
(h) H. Visitor Contact Rate - 65 + years
(i) % New Geriatirc Day Patients
(j) Geria. Day Hosp. Nurse/1000 pop.
(k) Dist. Nursing WTE/1000 Pop 65+
(l) Dist. Nurs. WTE/100 1st Visits
(m) % Dist. Nursing Staff - D. Nurs.
(n) % Dist. Nursing Staff - Trained
(o) % Dist. Nursing Staff - Auxil.
(p) Avail. Geria. Beds/1000 pop. 75+

Cost :
(a) Chiropody Cost/1000 Pop 75+

Manpower :
(a) Consult. Geria/1000 Pop 75+
(b) % Total Nurses (Geria) - Trained
(c) % Total Nurses (Geria) - Learner
(d) % Total Nurses (Geria) - Auxil.
(e) Total Nurses (Geria)/Occ. Bed
(f) Total Nurses (Geria)/Avail. Bed

Output :
(a) Bed Provn. Rate - Psyc of Old Age
(b) % Geria. Beds in Acute Hosps
(c) Length of Stay - Geriatrics

Manpower

Cost :
(a) Staff Cost as % of Rev. Spend
(b) Average Cost/WTE - Ancillary
(c) % Total Staff Cost - N + M
(d) Average Cost/WTE - N + M

Manpower :
(a) Direct : Indirect Care Staff
(b) Total Non Medical WTE/IP Case
(c) Part Time as % Total Staff WTE
(d) % Non-Med Staff WTE - Ancillary
(e) % Total Staff WTE - N + M

(f) Staff WTE/IP Case Ancillary
(g) % Non-Med Staff WTE - N + M
(h) Staff WTE/IP Case - N + M
(i) Consultants/Catchment - GM
(j) Consultants/Catchment - GM + Geria.
(k) Consultants/Catchment - T + O
(l) Consultants/Catchment - MI
(m) Consultants/Catchment - GYN + OBS
(n) Consultants/Catchment - GS
(o) Consultants Geriat./1000 pop 75+
(p) SEN Doctors/Catchment - GM + GERIA
(q) SEN Doctors/Catchment GM + GERIA
(r) SEN Doctors/Catchment - T + O
(s) SEN Doctors/Catchment - MI
(t) SEN Doctors/Catchment - GYN + OBS.
(u) SEN Doctors/Catchment - GS
(v) SEN Doctors/Catchment - Hosp. Paed.

Table 5.1 Average Rank of Wolverhampton in West Midlands on a Selection of Performance Indicators

	Activity	Cost	Manpower	Output
Acute Services	10.7 (5)	13.5 (5)	-	-
Mental Illness	22.0 (3)	-	11.4 (10)	-
Mentally Handicapped	-	-	-	6.6
Support Services	-	12.2 (2)	-	-
Childrens Services	9.4 (7)	-	9.6 (7)	12.2 (6)
Elderly	11.9 (16)	4 (1)	12.2 (6)	15.2 (3)
Manpower	-	7.1 (4)	9.1 (22)	-

(Bracketed numbers: no. of indicators used in calculating average rank).

5.5 The discussion in the first part of Chapter 4 showed the importance of taking into account the health care related activities of other agencies. The Audit Commission's Profile for 1985/86 compares expenditure in functional categories as between the Wolverhampton Metropolitan Borough Council and other Metropolitan Districts. Spending on Social Services at £66.3 per head is 14% higher than the average for Metropolitan Districts. The detailed breakdown of Social Services spending per capita in Wolverhampton as compared to the average for Metropolitan Districts is given in Table 5.2. It can be seen that the excess is concentrated on residential care and other services for the elderly and on residential care for the Handicapped and Mentally Ill.

5.6 Despite this apparent surplus of Social Service expenditure the comparison between Wolverhampton and the remainder of the West Midlands shows that Wolverhampton is about average in the Region and this position has not changed over the last five years (see Table 5.3). There is, therefore, no basis, in general, for arguing that Wolverhampton is somehow better provided than the rest of the West Midlands in respect of health care related resources because of the activities of other agencies.

5.2 Health Status

5.7 The first section of Chapter 2 dealt with mortality indicators. Whilst, overall Standardised Mortality Ratios should not be ignored, the argument was that other death rates should be included. In particular, areas in terms of their perinatal mortality and Under-65 Standardised Mortality Rates should be compared. Table 5.4 to 5.6 will present the comparison of these data as well as data for infant mortality for Wolverhampton and West Midlands compared to data for England.

5.8 Table 5.4 shows that infant mortality rates have varied substantially over the years but there does not appear to be any systematic difference between Wolverhampton and West Midlands. In contrast, Table 5.5. shows

Table 5.2 PERSONAL SOCIAL SERVICES - SUMMARY 1985-86 Estimates Wolverhampton compared with Met Districts Average

					Cost of difference £000
EXPENDITURE PER HEAD 62.8	55.6				
ELDERLY 24.7	20.1	Residential care	13.45	10.15	840
		Home helps	6.21	7.14	(230)
		Other services	5.06	2.86	560
CHILDREN 12.4	12.6	Residential care	7.69	6.82	220
		Boarding out	1.78	2.12	(90)
		Day nurseries	2.07	2.33	(70)
		Other services	0.86	1.32	(110)
HANDICAPPED & MENTALLY ILL 10.2	7.6	Residential care	5.17	3.73	370
		Training centres	2.72	2.42	70
		Sheltered employment	0.87	0.26	160
		Day care	1.47	0.94	140
		Other services	0.01	0.20	(50)
OTHER 1.1	0.8	Residential care	0.00	0.12	(30)
		Day centres	0.00	0.29	(70)
		Other	1.14	0.43	180
FIELDWORK 8.5	7.1	Social workers per 1000 popn	0.95	1.08	(210)
		Cost per social worker	8,890	6,530	570
ADMINISTRATION 5.8	7.4				(410)
				Total	1,830

	£000	£ per head This LA	£ per head Family Average
Net expenditure	15,990	62.8	55.7
of which:			
Residential care	6,699	26.3	20.8
Day care	2,064	8.1	7.9
Community care	3,245	12.7	11.0
Fieldwork & administration	3,640	14.3	14.5
Grants to voluntary services	342	1.3	0.8
Other services	0	0.0	0.7

Type of expenditure		£ per head This LA	£ per head Family Average
LA's own provision:			
Current		68.9	62.5
Capital		3.7	2.6
Income		12.3	11.3
Other provision		2.5	1.7
Population	254,600		
Staff	1,600		

Table 5.3 Local Authority Personal Social Services Net Current Expenditure
(£ million in 1985-84 cost terms)

Out turn per capita (%)	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85*	% Increases (1979 to 1984)
(Met. dist)							
Birmingham	5.3	5.6	5.5	5.4	5.4	5.6	5.7
Coventry	4.7	4.9	5.5	5.7	6.1	6.3	34.0
Dudley	2.5	2.6	2.8	2.8	2.9	3.1	24.0
Sandwell	3.6	3.6	3.7	3.7	4.0	4.3	19.4
Solihull	2.3	2.5	2.4	2.7	3.0	3.2	39.1
Walsall	3.6	3.8	4.1	4.3	4.2	4.6	27.8
Wolverhampton	3.9	4.4	4.8	4.9	5.2	5.3	35.9
Total England	4.1	4.3	4.3	4.4	4.5	4.6	12.2

[84-85: Budget estimate per capita]

[Source of out turn data: "Sixth report from the Social Services Committee - Session 1984-85: HC339" Table 12.2]

[Population data from "Local Authority Vital Statistics, Series VS, No. 6-11]

that the perinatal mortality rate for Wolverhampton has remained higher than the average for West Midlands throughout the period (which, in turn, is higher than the average for England). Table 5.6 has a more mixed message : overall SMRs show no systematic differences between Wolverhampton and West Midlands but under 65 SMRs - which was argued to be the better indicator - show that the Wolverhampton population is more likely to die earlier.

Table 5.4 : Infant Mortality, Wolverhampton and West Midlands RHA, 1970-1984

	1974	1980	1982	1984
Wolverhampton DHA	6.1	9.5	4.8	4.4
West Midlands RHA	6.6	6.2	5.6	5.1
England	6.9	5.8	5.8	5.0

Table 5.5 : Perinatal Mortality Rates Woverhampton, West Midlands, England, Three Year Moving Averages 1977-1983

	1977	1978	1979	1980	1981	1982	1983
Wolverhampton DHA	21.4	20.0	19.0	17.4	16.5	14.0	13.8
West Midlands RHA	19.0	17.6	16.3	14.9	13.9	13.0	12.8
England	16.7	15.5	14.3	13.2	12.1	11.1	10.5

5.9 Although it was argued (see Section 2.2) that avoidable mortality was not very useful as an indicator, data are now being produced on an annual basis. A representative chart is attached (Chart 5.2). Wolverhampton appears to have a high rate of deaths from four of the eight categories, but all the caveats about classification and recording need to be taken into account.

5.10 The discussion on morbidity in Chapter 2 was inconclusive. The basic first was to use the rate of low birth weight as an indicator of maternal (perinatal) morbidity. Unfortunately, whilst the data has been collected in Wolverhampton for several years, comparable data for the West Midlands were not easily available. The rate for 1984 at 9.0% is higher than the remainder of the RHA. (7.3%) which, in turn is a little higher than the figure for England (7.0%). The only other data which are available systematically across areas are the sickness data in the Census. These values are given in Table 5.7. They have already been analysed in Annex III so no further comment is made here.

5.11 It is clear that the rates of morbidity and of mortality in Wolverhmapton are slightly but not substantially higher than the remainder of the West Midlands

Chart 5.2

AVOIDABLE DEATHS STUDY

1974-83 DISTRICT PROFILE

INDICATOR Range [Deaths]	VALUE FOR **Wolverhampton**	POSITION RELATIVE TO OTHER DISTRICTS (expressed as a percentile) 0...:...20...:...40...:...60...:...80...:.100
Perinatal Mortality Rate 9 - 28 [615]	20	
Hypertensive Disease SMR 62 - 166 [616]	118	
Cervical Cancer SMR 40 - 187 [85]	141	
Asthma SMR 20 - 231 [22]	182	
All Causes SMR (0-14) 77 - 159 [709]	116	
All Causes SMR (15-64) 77 - 141 [7600]	111	
All Causes SMR (all ages) 84 - 128 [29315]	106	
Avoidable Summary Score 9 - 36 [1422]	24	

COMMENTARY

The position on the profile bar shows the districts position relative to all other districts in the sample. Unlike the other packages produced by IACC, we have not marked the extreme 15% differently on the bar. Instead we have tested to see whether the actual SMR or rate is different, statistically speaking, from the expected value of 100.

If the position is marked with a block then the test has shown there to be less than a 1 in 20 chance that this SMR value would have occurred if the district mortality rate was the same as the national rate. Please refer to the appendix in the manual for a fuller description of the statistical techniques used.

For perinatal mortality, the district value is tested for difference from the national rate. No test is undertaken on the summary score indicator values.

NOTES

Profile bars cannot describe the shape of a distribution. Histograms ought also to be used when studying an indicator.

Any values shown and comments made are only as accurate as the initial data that we were given. Remember that data errors can lead to errors in interpretation and therefore you are always advised to check data before jumping to conclusions.

SMR = Standardised Mortality Ratio; All Causes = Deaths from all causes; Deaths = Number of observed deaths.

John Charlton, Azim Lakhani

19 March 1986

(Distributed by IACC)

Table 5.6 : Standardised Mortality Rates: Overall and Under 65 in Woverhampton and West Midlands RHA

	1979	1980	1981	1982	1983	1984
Overall SMRs(a)						
West Midlands	102	102	103	104	103	104
Wolverhampton(b)	-	102	105	-	-	101
SMRs Under 65						
West Midlands	103	102	102	103	103	104
Wolverhampton	-	115	108	-	-	103

Notes: (a) Overall SMRs are not the same as those published in OPCS, DH as those are calculated with finer age groups. The above figures are based on the age groups under 1, 1-14, 15-44, 45-64, 65-74, 75+ which have been used for comparison with the Under 65 SMRs.

(b) Standard District population data used.

(c) Missing value denoted by -.

Sources: For death rates and some of the population data in West Midlands, OPCS, Mortality-Statistics Series DH5, No. 6 ... No. 11, Tables 1 and 2; other population data for West Midlands from OPCS, series PP1, No. 4 ... No. 6, Tables 3, 5 and 6 (superceded by Series VS No. 11, pp1, No. 7).

Table 5.7 : Sickness Measures from the 1981 Census, Wolverhampton and West Midlands, 1980 - 1982 - 1984

		Temporary Sick		Permanently Sick	
		15-44	45-64	15-44	45-64
Wolverhampton	Men	7.8	20.2	7.8	52.2
	Women	4.8	5.9	6.7	21.1
West Midlands	Men	7.1	19.2	8.7	51.7
	Women	4.6	6.1	7.2	21.8

5.3 Socio-Economic Conditions

5.12 The argument in Chapter 3 was that socio-economic conditions should be taken into account in assessing need as

(i) morbidity as measured by rates of permanent and temporary sickness are strongly associated with socio-economic factors.

(ii) that association does not disappear after allowing for the known relationship between mortality and morbidity.

Moreover, although there is no clearly established difference in the rates of use of medical services by the different social classes, there is some evidence to suggest that the poorer groups consult for more serious conditions. (section 2.4.1)

5.13 The question of devising an index for deprivation or measure of poverty was considered in Annex IV. The problem with the various indices that have been proposed is that they are biassed in several ways: for example through their use of out-of-date data, such as the 1981 Census figures on unemployment and their reliance on statistical manipulation rather than any knowledge of relationships between the components of the index and deprivation. Instead it was argued that any adjustment of resources for deprivation and poverty should concentrate on the direct measurement of low living standards in an area.

5.14 On this basis, it was argued in Chapter 4 that three components indicators should be used: one reflecting past income and wealth, another current income and a third the propspects for future income and wealth. Given the availability of data, the variables finally chosen were:

- proportion of non-owner occupers
- numbers of supplementary benefit claimants
- unemployment and/or long-term unemployment rates

5.15 The relevant data is presented in Tables 5.8 to 5.10. It can be seen that Wolverhampton is disadvantaged as compared to the average for West Midlands on each of the three variables. The tables included in Annex V for the alternative measures considered for each of the dimensions of need, also show, in general that Wolverhampton is below average.

Table 5.8

TYPES OF HOUSING LOCALLY, REGIONALLY AND NATIONALLY

Private Households, 1971-1981-1985

	1971			1981			1985		
	OWNER OCCUPIED	COUNCIL RENT	OTHER	OWNER OCCUPIED	COUNCIL RENT	OTHER	OWNER OCCUPIED	COUNCIL RENT	OTHER
WOLVERHAMPTON	41.6	44.5	14.8	44.8	47.1	8.2			
WEST MIDLANDS	44.6	36.5	18.9	53.8	36.7	2.5			

	More than 1 person per room	Lacking or sharing bath	More than 1 person per room	Lacking or sharing bath	More than 1 person per room	Lacking or sharing bath
WOLVERHAMPTON	8.6	6.5	6.9	1.2	4.7	N/A
WEST MIDLANDS	9.1	12.2	6.0	2.4		

Table 5.9

Supplementary Benefit Claimants 1981 to 1986

	MAY '81	MAY '82	MAY '83	MAY '84	MAY '85	MAY '86	INCREASE 1985-86
Rate per 100	Numbers = 100						Percent
Birmingham	113236	122	132	140	144	145	0.3
Coventry	27421	121	127	141	146	145	-0.9
Dudley	20936	120	132	140	145	146	0.6
Sandwell	27819	126	140	150	151	149	-1.3
Walsall	20492	126	140	144	148	146	-1.9
Wolverhampton	23623	129	145	153	161	162	0.4
West Midlands	233527	123	135	143	147	147	-0.2

Table 5.10A

LOCAL REGIONAL AND NATIONAL UNEMPLOYMENT RATES, 1978-1985

	1978	1979	1980	1981	1982	1983	1984	1985	INCREASE 1984-85
WOLVERHAMPTON	6.3	6.4	8.5	15.0	16.6	16.5	16.4	19.0	2.6
WEST MIDLANDS COUNTY	5.5	5.6	7.3	14.2	16.2	16.2	15.5	16.7	1.2
GREAT BRITAIN	6.1	5.7	6.0	10.1	12.4	13.5	13.0	13.4	0.4

Table 5.10B

LONG TERM UNEMPLOYMENT JAN 1980 - JAN 1986

	JAN 1980 NUMBERS = 100	1981	1982	1983	1984	1985	1986	Numbers
INDEX FOR WOLVERHAMPTON TIWA	2545	147	337	445	472	515	514	13078
(AS % OF ALL UNEMPLOYED)	24	21	37	44	49	51	50	
INDEX FOR UK	355300	128	255	312	334	370	380	1351900
(AS % OF ALL UNEMPLOYED)	24	19	30	34	37	39	40	

5.4 The Case for Wolverhampton

5.16 The issue of modifying the formulae for resource allocation is currently being debated at a national level. Given that it is expected that the changes will have most impact on the assessment of relative need between districts in a region (NHS Management Board, 1986) it is difficult to propose precise numerical adjustments [7] in the existing formulae for allocations within the Region without knowing the kind of adjustments that are going to be proposed by central government both on an inter-Regional and intra-Regional basis.

5.17 It is, however, clear that if any adjustment for social factors were to be introduced into the formulae, then those areas which are relatively deprived would benefit. The bulk of the evidence prsented in the previous section suggests that Wolverhampton is disadvantaged relative to the average of other areas in the West Midlands and would correspondingly benefit. Table 5.11 summarises the relative position of Wolverhampton on the various indicators that have been proposed (see also Annex V).

5.18 Finally, it should be noted that if a similar adjustment for socio-economic conditions were to be applied nationwide then, as West Midlands as a whole is relatively disadvantaged it would benefit as a Region compared to other Regions. Table 5.12 summarises the position of WMRHA relative to other Regions.

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7. It must be remembered that these kinds of adjustment only have an effect at the margin. This is especially important when we consider, for example, the very large difference between the catchment population of Wolverhampton DHA (some 380000) compared to the resident population of Wolverhampton Borough Council (some 250000).

Table 5.11 Comparative Position of Wolverhampton in West Midlands on Selected Indicators

	Proportion of non-owner occupiers (1) (1981)	Number of supplementary benefit claimants per head of popn. (2) (May 1984)	Rate of unemployment (% of men aged 16-64) (3) (1981)
Birmingham	102	125	106
Coventry	73	98	106
Dudley	89	78	78
Sandwell	123	108	109
Solihull	71	*	63
Walsall	111	89	97
Wolverhampton	119	113	111
West Midlands	100	100	100

* Supp. Ben. data unavailable/unemployment data unavailable

(1) Source: 1981 Census.

(2) Source: DHSS, Midlands Region, Birmingham.

(3) Source: Employment Gazette Vol. 92, No. 5. TTWA (Travel To Work Areas) are used.

Table 5.12 (a) Comparative Position of West Midlands in England on Selected Indicators (By standard regions)

	Proportion of Non-owner occupiers (1981) (1)	Rates of Unemployment (5 April 1984) (2)
Northern	124	133
Yorkshire and Humberside	105	108
East Midlands	98	91
East Anglia	95	81
South East	100	74
South West	83	88
West Midlands	102	116
North West	95	121
England	100	
U.K.		100

(1) Source: Regional Trends 1983, Table 3.3.

(2) Source: Employment Gazette, Bol. 92, No. 5.

Table 5.12 (b) Persons in Receipt of Supplementary Benefit have to be broken down by Social Security regions:-

	Persons in receipt of supplementary benefit (1981) ['000's]
Northern	255
Yorkshire & Humberside	374
E. Midlands & E. Anglia	324
London-North	346
London-South	364
London-West	272
South Western	255
West Midlands*	389
North Western-Manchester	273
Merseyside	278
All Regions	3723

(Source: DHSS Social Security Statistics 1983)

* Social security region.

Chapter 6 : Conclusion

6.1 This report set out with a specific brief: To indicate the comparative "health needs of Wolverhampton in relation to the Metropolitan Districts of the Region and others in England and Wales. To highlight the health and social indicators which might lead to a change in the reasources available to the Local Authority and the Health Authority". This brief has been interpreted broadly so as to examine ways of comparing health status between areas in general and discuss the appropriate criteria for the allocation of health care resources. This more general reflection was seen as especially pertinent given that the mechanism, which has been used by central government to distribute resources to Regional Health Authorities for a decade (the RAWP formula), is being reviewed.

6.2 There are, of course, many factors to be taken into account other than health needs in assessing the relative need for health care resources as between DHAs within a Region. The existing pattern of services will itself have consequences for revenue requirements as well as for the use of health services; local and specific factors will influence changes in the catchment or managed population as compared to the resident population; and so on. Some of these factors have a substantial impact on the allocation of resources but as they are very local and specific to each situation, this report has focussed almost exclusively on the assessment of health needs as part of the allocative process.

6.3 This focus on the role of health needs in the process of allocating health care resources needs to be emphasised as it tends to be forgotten that the original and unchanged objective of the National Health Service was to improve health. In many respects, this has happened. People live longer (e.g. life expectancy for females at age 1 was 76.1 in 1981 as compared to 72.1 in 1951); death rates for infectious diseases have dropped dramatically (e.g. deaths from tuberculosis are running at 5% of the 1951 level); and perinatal mortality rates have dropped to a quarter of its immediate post-War level.

6.4 But is is still important to emphasise that health status is the important issue when making comparisons of the relative need for improvements in health between areas or between groups. For there appears to be no diminution in the inequalities between groups in our society. For example, the latest Occupational Mortality Supplement shows that the SMRs for RG Social Classes I and II have dropped, whilst those for RG Social Classes IV and V have increased (New Society, 20 July 1986).

6.5 Prima facie such inequalities are obviously crucial in assessing the comparative 'need' for health care. But it has to be admitted that it has yet to be established in a convincing fashion that health care resources can play a significant part in reducing such inequalities, in a situation where early deaths have been reduced to a small fraction of all deaths. It is therfore at least arguable that, in assessing the 'need' for health care resources for the purposes of resource allocation, 'need' should be measured directly rather than via some proxy for morbidity. Hence the dual focus in this report both on the measurement of (ill-)health status and on the assessment of relative need.

6.6 The review of health status measures in Chapter 2 only underlines the difficulty of obtaining regular and reliable data on morbidity. It is for this reason that the search for measures which can be used to guide resource allocation has tended to concentrate on two kinds of proxy: mortality as measures of the final outcome and Performance Indicators as possible measures of efficiency. Whilst this shift of focus is understandable, given the difficulties of measuring morbidity directly, these proxies have to be assessed both in comparison to any morbidity data that does exist and by reference to their effect on the resource allocation process.

6.7 Global mortality data is not very useful: it can be broken down and standardised in several ways. The review in Chapter 2 concluded that, whilst the concept of avoidable death is attractive, the existing proposals are ambiguous in their interpretation. It concluded that the best single measure available was standardised mortality ratios under 65 supplemented by a combination of perinatal and infant mortality.

6.8 In fact, of course, mortality data in the form of overall SMRs are used in the resource allocation formula devised by RAWP as a proxy for morbidity. But, the illustrative analysis of the relationship between morbidity and mortality in Chapter 3 and Annex III shows that:

- Whilst mortality and morbidity are highly correlated, across areas, their relationship is by no means on-to-one;

- there are also strong correlations between measures of socio-economic disadvantage and measures of morbidity;

- the socio-demographic factors are related to morbidity <u>over and above</u> the statistical associations of mortality with morbidity.

The findings of this analysis are similar to those of several other commentators. We conclude that the use of SMRs is inadeuate to reflect need, if this is interpreted in terms of morbidity. The issue therefore become what criteria <u>should</u> be used to measure relative need and how they should be incorporated into a resource allocation formula.

6.9 Chapter 4 and Annex IV show how there have been wide variety of attempts to elaborate indices of social deprivation. The most 'popular' (the ACORN clustering, the Department of Environment Social Index, the Jarman 6, the Jarman 9 & etc.) are based on manipulation of the small area statistics from the 1981 Census. Each-all-are open to two main objections. First any useful index should be based on data which is not only reliable and collected routinely but which is also up-to-date and not one-off every ten years. Second, it is preferable that indices are transparent in their operation, however methodologically sophisticated their original derivation and justification.

6.10 On this basis, the argument in Chapter 4 concludes that it is better to use statistical series such as home tenure, supplementary benefit claimants and unemployment directly rather than in the form of an index which has been derived statistically.

6.11 The Performance Indicators are often referred to in discussions about resource allocation but have not been discussed in any detail in this report because they do not pretend to be measuring the need component. Nevertheless, the efficiency of resource use cannot be ignored in any comparative assessment of an Authority's need for health care.

6.12 The final chapter applies these arguments to the position of Wolverhampton in the West Midlands. first, we show that, on the basis of comparing the activities, costs, manpower and output of different sectors, the Wolverhampton DHA is about average in West Midlands. The resource allocation question therefore turns on relative health status and relative socio-economic conditions.

6.13 In the absence of morbidity measures, the suggested proxies of perinatal mortality and under 65s SMRs show that Wolverhampton is about average for West Midlands. This conclusion is similar to that based on a comparison of OPCS - 4 year SMRs: thus Johnson and Ganley, 1986, Table 9 give values of 103.7 and 105.1 for Wolverhampton DHA and West Midlands RHA respectively.

6.14 The picture is entirely different in terms of socio-economic conditions. Whilst West Midlands as a Region is considerably disadvantaged vis-a-vis the remainder of England and Wales, Wolverhampton's is relatively worse off in the Region. The regression index calculated by Johnson and Banley (1986) had already placed Wolverhampton DHA relatively deprived with an index of 107.95 compared to 100 for West Midlands. The three indicators proposed all locate Wolverhampton as relatively more deprived (indices of 119, 113 and 109 for proportion of non-owner occupier at Census in 1981, number of supplementary benefit claimants per head in May 1984 and unemployment rate in April 1984 respectively). If a crude average was taken of these three indicators Wolverhampton would have the highest (lowest) rank of 114.

Annex I The Appropriate Level of Analysis

A1.1 Many authors of similar studies (Hume and Womersley 1985; Leavey and Wood 1985; Scott-Samuel 1984; Townsend, Simpson and Tibbs 1984; Townsend, Phillimore and Beattie 1986) have carried out most of their analysis at electoral ward level. They argue that, despite the value of Health District or Local Authority level statistics, these administrative areas are too large for scientific exposition and analysis and wide internal variations are concealed. But the choice of the electoral ward as the correct level of analysis is "faute de mieux" (Townsend, Simpson and Tibbs, 1984; Townsend, Phillimore and Beattie 1986) and it is difficult to understand the argument that this choice has practical and policy-related advantages. Electoral wards only become relevant to policy at local election time and their practical relevance depends upon the extent to which they correspond to a "community".

A1.2 Such authors would argue against using Health Districts (or Local Authorities) because they are too large and therefore heterogenous. Whilst they are right to point to the "ecological fallacy" of making causal inferences on the basis of associations at the group level, that can obviously also apply to their choice of electoral wards. This can be illustrated by comparing the range of characteristics in the census enumeration districts of an electoral ward with the range of characteristics in an electoral ward (see Table A1.1).

Table A1.1 Variability Between and Within Wards : Unemployment and Lack of Amenities : 1981 Census

Unemployment				Lacking Amenities			
Wards in Barnsley		EDs in Ward AA		Wards in Barnsley		EDs in Ward AA	
AA	5.5	1	8.7	AA	1.6	1	9.0
AB	6.9	2	5.7	AB	0.2	2	8.6
AC	5.5	3	4.9	AC	1.7	3	3.6
AD	5.6	4	2.3	AD	5.3	4	1.4
AE	5.5	5	2.1	AE	1.4	5	0.0
AF	4.0	6	10.3	AF	5.0	6	0.0
AG	3.1	7	6.3	AG	0.9	7	0.0
AH	5.5	8	9.0	AH	4.9	8	0.2
AJ	6.1	9	6.5	AJ	3.3	9	2.2
AK	3.2	10	4.9	AK	0.9	10	0.0
AL	3.8	11	7.6	AL	2.8	11	1.1
AM	4.0	12	4.7	AM	2.5	12	0.5
AN	6.1	13	4.4	AN	1.0	13	4.7
AP	4.4	14	3.3	AP	1.2	14	0.3
AQ	5.5	15	1.8	AQ	2.4	15	0.0
AR	2.6	16	8.8	AR	3.2	16	2.4
AS	4.5	17	11.5	AS	2.0	17	0.0
AT	3.8	18	5.1	AT	1.4	18	0.8
AV	3.8	19	1.7	AV	1.4	19	2.1
AW	4.6			AW	2.6		
AX	4.2			AX	1.7		
AY	4.6			AY	4.6		

Source: Carr-Hill and Kirby (1986).

A1.3 The correct implication of that argument is that aetiological analysis is best conducted at the level of the individual or the enumeration district. But, however desirable, individual-based data, whether of health status or of living standards, simply is not available on a routine basis; and no data is collected for enumeration districts except at Census time. A "pure" version of the ecological fallacy therefore condemns us to using special studies (for data based on individuals) or out-of-data (for cansus enumeration districts).

A1.4 Of more immediate practical relevance, of course, is that electoral wards are simply not an appropriate level at which to conduct analysis of the distribution of health care resources. People move easily within a health district across electoral ward boundaries to use health care services, so that analysis on the electoral ward level would not provide much useful information for the purposes of allocation

A1.5 The curcial consideration in deriving a data base to inform planning is the availability of routinely collected data which is relevant. On this criterion, whilst by no meants perfect, the only unit of analysis which even partially meets those requirements is the Health District or Local Authority.

Annex II Health Surveys

A2.1 A number of survey instruments have been developed and tested for morbidity surveys. These vary between those which: (a) emphasise the incidence of symptoms or complaints; (b) concentrate on the functional impact of morbidity; and (c) assess perception of more general dimensions of health.

(a) Symptoms and Complaints

A2.2 Information on symptoms experienced by respondents, or on diagnosed complaints, should correspond to specific medical conditions, and hence to the need for particular forms of medical care. However, these data suffer from inaccuracies in diagnoses of conditions, or lack of complete information on symptoms. Furthermore, when making assessments of general morbidity it is difficult to compare different conditions in terms of their relative severity.

A2.3 Instruments to record experience of physical symptoms typically consist of checklists of ailments (see, for example, Wadsworth et al, 1971; CSO, 1979; Hannay, 1978). Respondents may not be able to easily distinguish between acute and chronic illness, and some check lists have also been criticised for combining items relating to symptoms and conditions.

A2.4 Goldberg and Huxley (1980) review studies of prevalence of psychiatric illness in British communities using measures such as the Present State Examination, and the General Health Questionnaire (GHQ). The GHQ is most effective in identifying the existence of mental illness, rather than its severity (Tennant et al, 1977). Other similar measures include Rutter's Malaise inventory, designed to assess anxiety and depression in women from their reported experience of certain symptoms.

A2.5 An alternative approach to recording of medical conditions is to ask more open-ended questions about any illnesses the respondent has experienced as in most of the GHS questionnaires. However, there are difficulties in standardising the responses when a wide range of different illnesses are reported.

A2.6 Whilst techniques of the types described can be used to measure the prevalence of physical and mental morbidity, the problem remains of how to compare illnesses in terms of their severity or impact on the individual. One method that has been suggested is based on assessments by medical practitioners or normative rates of service use (Anderson, 1978) or prognosis, duration, threat to life, degree of disability and discomfort (Wyler et al, 1968) for given illnesses.

(b) Measures of Disability/Incapacity

A2.7 The advantage of measuring 'disability' (i.e. the functional consequences of impairment) is that persons can be characterised by degree of incapacity, rather than simply the absence/presence of disease. Unlike

disease-oriented indicators, disability indicators can encompass a wider view of health, including social and behaviour consequences of illness.

A2.8 At the simplest level, questionnaires may be used to elicit information on prevalence of different types of incapacity categorised by the forms of impairment, disability or handicap (Wood, 1975). Actual measures of disability have to be based on culturally specific assumptions about the 'normal' range of activities that active members of a community are expected to be able to perform, from preserving their independence as regards essential bodily need, to maintaining activity and socio-economic independence through education or work within or outside the home.

A2.9 Most measures of functional incapacity are designed for use with severely disabled or handicapped respondents. Thus, the Activities for Daily Living Measure (Katz et al, 1963) assesses the extent of nursing dependency as does the General Household Survey for elderly respondents. A more comprehensive measure, the Sickness Impact Profile is a 235 item instrument from which can be derived weighted additive scales on 14 dimensions of functional incapacity. The weightings for items were constructed on the basis of panel assessments. An alternative approach to scaling disability has also been applied in Lambeth using Guttman scaling to rank different aspects of physical incapacity for the elderly separately for men and women (see Williams, 1981).

A2.10 The measures discussed so far are not appropriate for general populations. One approach to measuring the general impact of illness is to assess the 'opportunity' or 'economic' costs of morbidity for individuals or society, for example, in terms of disability days, or working days lost. Thus, the General Household Survey enquires into days of acute sickness in the preceding fortnight. Another instrument designed for less specialised use is the Nottingham Health Profile (NHP) - a self-completion questionnaire - intended for use with large survey populations, and validated for a number of different types of respondents (Hunt et al, 1980a, 1980b; Backett et al, 1981). The NHP comprises two sections: one relating to six different dimensions of health and a second schedule of 7 items concerning impact of sickness on particular types of activity. This measure has been applied in surveys of general practice populations in Nottingham (Hunt et al, 1980) and in Manchester (Leavey, 1982).

A2.11 Although the operationalisation of these measures is well developed one must be wary about their interpretation. They are not necessarily related to prognosis, there are differences between ability and performance, and the procedure for assigning weights is not unproblematic (see Chen and Bush, 1979; Williams, 1981). Moreover, a pilot exercise conducted by the author has suggested that surveys which focus on health lead to an over-emphasis on the importance of difficulties with one's health as against difficulties with other aspects of one's life. (see Carr-Hill, 1983).

(c) Questions on Perception of General Health

A2.12 A final group of instruments for morbidity surveys consists of questions designed to elicit overall assessments of state of health and attitudes to health. Techniques for obtaining general health ratings are

reviewed by Ware et al (1978). Many of these are single item semantic differential questions of the type used in the General Household Survey, which inquired: 'Over the last 12 months, would you say that your health has on the whole been good, fairly good, or not good?'

A2.13 Different aspectsof health perception have been studied among particular population groups. In the UK, working class people have been most extensively studied (e.g. by Pill and Stott, 1982; Blaxter and Paterson, 1982; Locker, 1981; Cornwell, 1982) and women have received particular attention. This work has been largely descriptive and while it is revealing and valuable in the context of health education and health promotion, it has not yet produced more sophisticated instruments for the measurement and comparison of health perceptions and attitudes to health.

A2.14 Nearly all of these instruments are lengthy and have been found to be sensitive to differences among specific target groups (e.g. Goldberg, 1978, for the General Health Questionnaire; Hunt and McEwan, 1980 for the Nottingham Health Profile). Little is known about their response pattern among the general population. For example, in the General Household Survey, it is simply a mystery why a substantially increased proportion among the 15-44 and 45-64 age groups now report long standing illness compared to ten years ago (SCPR, 1984); and an apparently versatile instrument such as the Nottingham Health Profile is only of limited utility in a general population because about half the respondents score zero (Kind and Carr-Hill, 1986). Yet, it would obviously be useful for comparative purposes to devise a short, simple instrument which, whilst not suitable for diagnosis, could be used to make an assessment of the level of morbidity in a group.

Annex III

Analysis of Relationship between Morbidity, Mortality and Socio-Demographic Factors

A3.1 An analysis has been carried out based on the 1981 Census at the District level using data for the two Census measures of morbidity (temporary absence from work sick and permanently sick) for each age-sex group, and relating these to socio-demographic factors and the number of deaths in broad age bands. The analyses have been conducted for the fifty-nine districts within West Midlands County Standard Region and Humberside Standard Region.

A3.2 The question for analysis is whether or not mortality rates are a good proxy for morbidity when comparing between areas. A priori, these data suggest not: the correlation coefficients between the death rates and the morbidity rates are low for 25-44 year olds and not very high even for 45-64 year olds (Table A3.1).

A3.3 Correlations between the socio-demographic variables and both the morbidity and mortality variables are quite high. The next question, therefore, is whether the sociodemographic variables are providing any extra/predictive explanatory power. To test this, death rates and the socio-demographic variables have been included together in a regression analysis with the morbidity variables as the dependent variables. Given that the sickness rates are, in general, very low with a maximum value of 5.2% for permanent sickness among 45-64 year old men, simple linear regression is likely to yield biassed results. The results reported in Tables A3.2 and A3.3 therefore are based on a log-log [8] prediction equation.

A3.4 Table A3.2 compares the simple correlations of mortality with morbidity with the multiple correlation of all factors with morbidity and the combined effect of the socio-demographic factors only. In general the addition of the socio-demographic factors considerably increases the predictive power, the exceptions being for permanent sickness rates among 45 to 64 year olds.

A3.5 Table A3.3 shows which of the socio-economic factors are having statistically significant effects. It is interesting to note that the proportion of working class is least often a contributory factor, with the unemployment rate highly significant in predicting temporary sickness rates and the proportion of pensioners living alone more often a contributory factor in predicting permanent sickness.

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8. This involves transforming all the data and using the logarithm of the values. In general, the logarithmic transformation will "smooth" a distribution that has a long tail which is frequently the case with social data. The regression procedure is then exactly the same but the coeffients have to be interpreted as elasticities - that is the relationship between the actual variables is multiplicative rather than additive.

Table A3.1: Correlations Between Morbidity and Mortality areas, 1981 Census (n=59)

(A) Men

	25-44			45-64		
	PS	TS	DR	PS	TS	DR
25-44						
Permanent Sickness	1	.48	.15	.63	.41	.32
Temporary Sickness	.48	1	.23	.63	.89	.64
Death Rate	.15	.23	1	.12	.27	.29
45-64						
Permanent Sickness	.63	.63	.12	1	.57	.53
Temporary Sickness	.41	.89	.27	.57	1	.76
Death Rate	.32	.64	.29	.53	.76	1
Proportion Working Class	.14	.67	.19	.33	.70	.56
Unemployment Rate	.26	.71	.15	.30	.82	.57
Proportion Pensioners Living Alone	.28	.48	.26	.42	.52	.67

(B) Women

	25-44			45-64		
	PS	TS	DR	PS	TS	DR
25-44						
Permanent Sickness	1	.37	.24	.53	.23	.13
Temporary Sickness	.37	1	.01	.55	.82	.44
Death Rate	.24	.01	1	-.04	-.03	-.18
45-64						
Permanent Sickness	.53	.55	-.04	1	.58	.59
Temporary Sickness	.23	.82	-.03	.58	1	.41
Death Rate	.13	.44	-.18	.54	.41	1
Proportion Working Class	.19	.49	.09	.33	.45	.54
Unemployment Rate	.29	.49	.05	.26	.46	.35
Proportion Pensioners Living Alone	.16	.47	.00	.47	.54	.47

Table A3.2A : Correlations of Mortality, All Factors, and Socio-Demographic Factors Only With Permanent Sickness Rate (N=59)

	Permanent Sickness			
	25-44		45-64	
	Men	Women	Men	Women
Simple R with Mortality	.18	.27	.49	.61
Multiple R				
R with Sociodemographic factors only	.42	.38	.50	.65

Table A3.2B : Correlations of Mortality, All Factors, and Socio-Demographic Factors Only With Temporary Sickness Rate (N=59)

	Temporary Sickness			
	25-44		45-64	
	Men	Women	Men	Women
Simple R with Mortality	.29	.10	.77	.39
Multiple R	.83	.66	.91	.68
R with sociodemographic factors only	.83	.66	.91	.68

Table A3.3A : Regression Equations Predicting Permanent Sickness

	Permanent Sickness			
	25-44		45-64	
	Men	Women	Men	Women
Death Rate	.11	.22**	1.29**	.67**
Propn. W.C.	-.46	.04	-.11	-.07
Unemployed	.35*	.26	-.034	.08
Propn. Pensioners	1.43**	.19	.32	.63*
Overall R^2	.18	.15	.25	.42
Overall F	3.0	2.3	4.4	9.7

Table A3.3B : Regression Equations Predicting Temporary Sickness

	Temporary Sickness			
	25-44		45-64	
	Men	Women	Men	Women
	.092	.03	.74**	-.02
		0	.16	.03
Unemployed	.65**	.53**	.52**	.53**
Propn. Pensioners Living Alone	.42	1.04*	-.10	1.79**
R2	.68	.43	.83	.46
Overall F	29.3	10.4	53.7	11.2

Annex IV

Measures of Social Deprivation for Assessing Need for Health Care

A4.1 A wide variety of indices of social deprivation have been proposed in the literature. Edwards (1975) points to "common defects in the use of social indicators to identify areas of social deprivation" for practical and policy-related purposes.

(1) in geographical terms, social indicator studies identify approximately those areas deserving of benefit - social indicators themselves will be only one of a number of inputs into a decision;

(2) some characteristics of an area will have been brought to an area by the inhabitants rather than acquiring them there;

(3) deprived areas tend to carry a connotation of social pathology with the implied assumption that there exists a social consensus about normality, whereas there may well be conflict about priority and quality;

(4) the usual approach is to "identify" deprived areas by statistical correlational techniques rather than by starting with a definition of deprivation with at least some theoretical basis and see the results;

(5) there is a tendency to concentrate on statistical techniques and spurious accuracy where the data are simply not that accurate and the phenomena are not amenable to straightforward measurement.

AIV.I Current Indices

A4.2 Most currently popular indices suffer from these defects and especially the latter two criticisms that they are completely atheoretical.

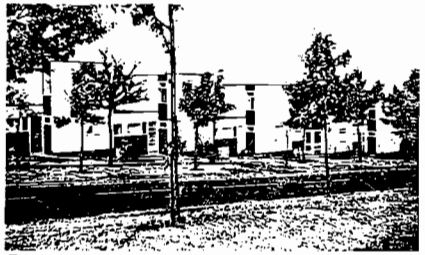
A4.3 First, ACORN (A Classification Of Residential Neighbourhoods) was developed by CACI - a market research organisation. It is derived entirely on the basis of 40 socio-demographic statistics derived from the Census. Originally 37 ACORN "types" of neighbourhood were derived using a statistical cluster analysis of all wards in England and Wales, giving equal weight to each of the following variables. These 37 neighbourhood types were reduced to a standard system of 11 unranked ACORN groups, which are characterised as in Chart I. These ACORN groups have been shown to identify areas with different patterns of consumer behaviour and have been widely used as a marketing tool. However, it is presented as a general classification and has been used by Government, notably in in the second British Crime Survey. It is not, however, used by the OPCS at any stage of their sampling design for either the Family Expenditure Survey (FES) or the General Household Survey (GHS).

A4.4 Morgan (1983) tested the extent to which ACORN also identifies groups which differ in rates of morbidity, mortality and service use. She used data in 5,500 primary school children who had been followed up through the National Survey of Health and Development Longitudinal Study. She concludes:

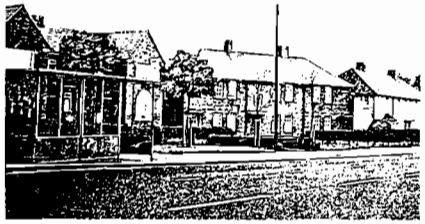
Figure A
ACORN Neighbourhood Groups

A AGRICULTURAL AREAS
1 Agricultural villages
2 Areas of farms and smallholdings
Represents 3.3% of total households in G.B.

B MODERN FAMILY HOUSING, HIGHER INCOMES
3 Cheap modern private housing
4 Recent private housing, young families
5 Modern private housing, older children
6 New detached houses, young families
7 Military bases
Represents 14.8% of total households in G.B.



E BETTER-OFF COUNCIL ESTATES
15 Council estates, well-off older workers
16 Recent council estates
17 Council estates, well-off young workers
18 Small council houses, often Scottish
Represents 12.2% of total households in G.B



F LESS WELL-OFF COUNCIL ESTATES
19 Low rise estates in industrial towns
20 Inter-war council estates, older people
21 Council housing for the elderly
Represents 10.4% of total households in G.B

I HIGH STATUS NON-FAMILY AREAS
30 High status areas, few children
31 Multi-let big old houses and flats
32 Furnished flats, mostly single people
Represents 4.9% of total households in G.B

J AFFLUENT SUBURBAN HOUSING
33 Inter-war semis, white collar workers
34 Spacious inter-war semis, big gardens
35 Villages with wealthy older commuters
36 Detached houses, exclusive suburbs
Represents 15.9% of total households in G.B

C OLDER HOUSING OF INTERMEDIATE STATUS
8 Mixed owner-occupied and council estates
9 Small town centres and flats above shops
10 Villages with non-farm employment
11 Older private housing, skilled workers
Represents 18.7% of total households in G.B.

D POOR QUALITY OLDER TERRACED HOUSING
12 Unimproved terraces with old people
13 Pre-1914 terraces, low income families
14 Tenement flats lacking amenities
Represents 4.6% of total households in G.B.

G POOREST COUNCIL ESTATES
22 New council estates in inner cities
23 Overspill estates, high unemployment
24 Council estates with overcrowding
25 Council estates with worst poverty
Represents 6.8% of total households in G.B.

H MULTI-RACIAL AREAS
26 Multi-occupied terraces, poor Asians
27 Owner-occupied terraces with Asians
28 Multi-let housing with Afro-Caribbeans
29 Better-off multi-ethnic areas
Represents 3.5% of total households in G.B

K BETTER-OFF RETIREMENT AREAS
37 Private houses, well-off elderly
38 Private flats with single pensioners
Represents 4.8% of total households in G.B.

> ... ACORN was shown to differentiate at least as well as social class on the selected outcome measures and to identify small areas with particularly high rates of morbidity. However questions were raised concerning both the extent to which ACORN identifies variations independent of regional variations and the consistency of ranking of ACORN groups on health measures.
>
> (Morgan, 1983)

A4.5 The Jarman Index is a more purposeful classification for health use. It is based on the scores given by the responses from a 1 in 10 sample of general practitioners (N=2584) about the importance of a range of service andsocial factors. Of these, 1802 questionnaires were used in the final analysis, giving a 'response rate' of 70%. Of the social factors for which Census data are available, Jarman chose ten: Under Fives, Unemployment, Poor Housing, Ethnic Groups, Lone Parent Families, Elderly Alone, Overcrowding, Lower Social Classes, Mobility, Fewer Married Families. These were used to construct a weighted index and scores have been devised for all 9,281 wards in England and Wales (Irving and Rice, 1984).

A4.6 There are two doubts about the relevance of this index to the problem of allocating resources to the health services in general. First the method used for deriving the scores is biassed: respondents were asked to score each of the factors from 0 (no problem) to 9 (very problematical) and the average scores were used as weights. But, they obviously overlap so that if, for example there are fewer married families in an area then, as areas with fewer married families will also have more lone-parent families, there will be an element of "double-counting". This is not discussed either in Jarman (1983) or in Irving and Rice (1984): they simply claim that the Borough scores are stable because they are only marginally affected by large changes in the relative weights of the different variables. But that is unsurprising given that there is so much overlap between the variables used.

A4.7 Secondly, assuming that, with appropriate adjustments - and using a wider range of data than is available in the Census - the method can identify factors which tend to increase the workload in primary care, there is no reason to believe that the factors influencing the relative need for community health services and hospital care will be the same. Indeed, they ought to be different as each of the three segments of the National Health Service-community care, hospital care and primary care are intended to respond to different needs.

A4.8 There have been a number of local empirical attempts at classification of areas. Thus, the work by Smith and colleagues at Queen Mary College searches for a statistical clustering of areas within a Regional Health Board area. They took a large number of socio-demographic characteristics and have shown that the sub areas within their Regional Health Authority can be ranked in ways that accord with commonsense gradings of the areas and with use of the health care services.

A4.9 The problem with all of these empirically derived classifications is that - (a) there is no theory to support them; and linked to that (b) another analysis using a slightly different set of variables from the

Census (let alone more up-to-date data) will find differences in the clusters and therefore rank the wards differently.

A4.10 Moreover, there are three other cogent and practical arguments against the sole use of such indices because they are based on 1981 Census data.

(1) Circumstances may have changed since 1981. None of them can be updated as they depend on very specific kinds of data which are only collected at Census. This is acknowledged yet obviously very important. Moreover, it will become an increasing embarrassment over the next seven years until analysis of the 1991 data are available.

(2) Limited choice of variables For a variety of reasons the Census is restricted in the kinds of data it elicits from the population. The obvious restriction which affected the 1981 Census was the ethnic group question (Booth, 1986), but, since the Domesday Book, no national Census has asked a direct question about income or wealth. Moreover, the relative weight attached to different kinds of variables may have been appropriate in 1981 but could be less so in 1986.

(3) Classifications and rankings are idiosyncratic. The index used by the Department of the Environment means that the ten most deprived local authorities are in London (DOE, 1983). Jarman (1985) finds that scores of the ten most deprived (or "underprivileged", in his terminology) health districts of England are also in London. Obviously, there are other - equally plausible - indices of deprivation which would lead to very different rankings; from the point of view of assessing health-related deprivation, it is interesting to note that none of the 25 health districts in England with the highest SMRs are in London (Table A4.1).

A4.11 For all these reasons, the argument here is that it is better to start with a meaningful set of indicators defined a priori, for which current data is routinely collected at each of the administrative levels.

AIV.2 Defining Need

A4.12 There is no unique way of defining need or social deprivation (compare Gough and Doyal, 1985; ILO, 1975; Mach and Lansley 1985; OECD, 1976). On the other hand, the step by step appraoch advocated by the OECD to defining measurable indicators has been shown to be productive. In particular, they argue that it is essential for the concepts being measured to be not only clearly defined but based on the best available theoretical knowledge and that the relationship between the concept and the indicator chosen is, if not transparent, easy to identify.

A4.13 The position taken here is the traditional one that the basic characteristic which influences relative need is command over resources. Despite its history, there is no unique measure. A variety of indicators of income and living standards are considered briefly below, both for the conceptual relevance and availability of data.

A4.14 There is little research evidence on the precise empirical relation between income or living standards and health (Carr-Hill, 1985). The position taken here is that it is important to take into consideration (i) the lack of a permanent and secure income (ii) current (low) income, and (iii) prospects for future income. The first will have affected past health status and therefore current health status, the second will have an immediate effect and the third is liable to generate anticipatory stress.

Table A4.1 : The Twenty Five Health Districts in England with the Highest SMRs (1983).

Health District	Health Region	SMR
North Manchester	North Western	128
Salford	North Western	123
Balckburn, Hyndburn & Ribble Valley	North Western	120
Dewsbury	Yorkshire	120
Halton	Mersey	120
Oldham	North Western	119
Wigan	North Western	119
Wakefield	Yorkshire	119
St. Helens & Knowsley	Mersey	118
Burnley, Pendle & Rossendale	North Western	118
West Cumbria	Northern	118
Gateshead	Northern	117
Tameside & Glossop	North Western	117
Hartlepool	Northern	116
South West Durham	Norhtern	116
Bolton	North Western	116
Central Manchester	North Western	116
North Tees	Northern	115
West Birmingham	West Midlands	115
South Manchester	North Western	115
South Tees	Northern	114
Liverpool	Mersey	114
West Lancashire	North Western	114
South Tyneside	Northern	113
Walsall	West Midlands	113

Source: **OPCS 1983 Vital Statistics Series VS,** No. 10.

A4.15 The major problem is the lack of routinely collected data.

A4.16 The best measure for permanent income is wealth. Given that such data is not available, possible proxies either should reflect ownership of consumer durables or the value of the house. Available data rapidly narrows down the choice to

- car ownership
- rateable value
- tenure status

In other periods, rateable value would have been a good measure within any one rating authority. But with the proposal to change the basis for local taxation, property values have not recently been re-rated so they

are very out-of-date. Levels of car ownership will depend in part on the provision of public transport and this is likely to vary within a Region. The proportion of non-owner-occupier households is, therefore probably the best surrogate.

A4.17 For current income, there is no data available across the whole range of the income distribution. The Department of Employment carry out an annual Earnings Survey but, as with the FES and the GHS, their sample size is too small to be usable for comparison between districts within a Region.

A4.18 There are, however, a wide variety of possible measures for the proportion of people living on low income and data is available for:

- electricity disconnections
- supplementary benefit claimants
- unemployment rates

Whilst the first is attractive, the rate of actual disconnections is still quite small (Table A4.2). The other measure which is available is the number of households who are assisted by the DHSS in paying their electricity bills. This obviously overlaps with the number of Supplementary Benefit Claimants itself and this is therefore preferred.

Table A4.2 Area Board Disconnections

Board	12 months ending 31 March 1985	as % of domestic credit consumers
London	12,515	0.85%
South Eastern	4,169	0.27%
Southern	3,736	0.20%
South Western	2,780	0.31%
Eastern	14,521	0.60%
East Midlands	8,501	0.50%
Midlands	**7,668**	**0.46%**
South Wales	5,265	0.74%
Merseyside & N Wales	7,579	0.73%
Yorkshire	12,058	0.72%
North Eastern	5,965	0.48%
North Western	6,282	0.37%

Source: Electricity Consumers Council, (1985). **Debt Collection, Disconnections and Electricity Consumers: Report on the Operation of the Code of Practice,** London, ECC (DP No. 14).

A4.19 The inclusion of prospects for future income in such an index is perhaps the most problematic. The choice of measures is, however, obvious: either the rate of current unemployment or of long-term unemployment.

A4.20 The final choice, therefore, is:

- lack of permanent and secure income as measured by proportion of non-owner occupiers,
- present low income as measured by numbers of supplementary

benefit claimants,
prospects for future income as measured by unemployment and long-term unemployment rates.

AIV.3 An Index?

A4.21 These variables could be combined statistically into one index. The argument here is that it is preferable to adopt a simpler procedure (such as ranking areas on each variable and averaging the ranks) because it is then transparent what is happening and the effect of including other or different variables is easy to assess.

Annex V : Indices of Urban Deprivation and Other Factors Taken into Account in the Grant Related Expenditure Assessment.

A5.1 The argument in Annex IV and in the text of Chapter 4 was that it is preferable to measure need directly and transparently rather than via a statistical adjustment - especially if this latter analysis relies on out-of-date data. Nevertheless, many commentators do rely on these constructed indices so they are presented here.

A5.2 Chart A5.1 presents the socio-economic district profile of Wolverhampton in relation to the other district in West Midlands. Clearly Wolverhampton tends to be the more disadvantaged in terms of these Census indicators. Table A5.1 compares the indices of urban deprivation elaborated by the Department of the Environment as between Wolverhampton and other Metropolitan Districts; and Table A5.2 presents a comparison of overall scores between Wolverhampton DHA and other Health Authorities in the West Midlands; and Table A5.3 compares Wolverhampton to other Metropolitan Districts in terms of the factors taken into account in the Grant Related Expenditure Assessments.

Chart A5.1

INTER AUTHORITY COMPARISONS 1981

SOCIO-ECONOMIC DISTRICT PROFILE

INDICATOR range [mean]	VALUE FOR **Wolverhampton**	POSITION RELATIVE TO OTHER DISTRICTS (expressed as a percentile) 0...:...20...:...40...:...60...:...80...:..1
% Pensioners alone 3.17 - 10.10 [5.32]	4.78	*
% Residents under 5 3.84 - 9.33 [6.06]	6.24	*
% One parent families 1.35 - 5.11 [2.18]	2.30	*
% Unskilled Workers 1.68 - 10.75 [4.51]	5.45	*
% Unemployed Persons 3.77 - 22.85 [9.54]	16.12	*
% Overcrowding 2.81 - 21.55 [7.29]	13.15	*
% Mobility 6.68 - 21.60 [9.69]	8.29	*
% Ethnic Minorities 0.31 - 33.48 [4.88]	15.51	*

COMMENTARY

The profile bars merely give you a perspective in which all health districts are portray with the lowest value on the left and the highest on the right.
As all the socio-economic indicators chosen tend to suggest there are greater problems f districts towards the right hand side of the diagram (eg. a higher proportion of elderly poor housing etc.). The more indicators there are to the right hand side of the diagram the greater the potential problems for health care.

NOTES

There is a brochure which explains the construction of this diagram and the method of analysis. If this is not available in your authority, please write to John Yates, Health Services Management Centre, 40 Edgbaston Park Road, Birmingham B15.

Profile bars cannot describe the shape of a distribution. Histograms ought also to be used when studying an indicator.

Any values shown and comments made are only as accurate as the initial data that we were given. Remember that data errors can lead to errors in interpretation and therefore you are always advised to check data before jumping to conclusions.

John Yates

Table A5.1 : Indices of Urban Deprivation (z scores)

	This LA	Met District Average
Unemployed as % of economically active	16.1	13.5
Households living at 1 person per room	5.8	4.3
Households with a single parent family	5.8	5.8
Households with a pensioner living alone	13.5	14.8
Households lacking exclusive use of bath and inside WC	7.4	4.2
% of population whose head of household was born in NCWP	15.4	5.0
Basic z score	3.77	1.42
Housing z score	4.55	1.59
Social z score	3.83	1.70
Economic z score	5.59	2.43

Note: z scores are calculated from the six variables listed above with data taken from the 1981 Census. A positive score indicate above average deprivation (the national average is zero). Compared to the basic z-score the other scores give weighting to different subsets of the indicators as follows:

Housing z score - Overcrowding lack of amenities
Social z score - Single parent families, pensioners living alone.
Economic z score- Unemployment.

Table A5.2 : Wolverhampton's Scores on Social Indices as Compared to Other Health Districts in West Midlands.

Ranking	Jarman 10		Jarman 8		Unit 9		Social	
1	West Birmingham	48	West Birmingham	45	West Birmingham	15	West Birmingham	16
2	Central Birmingham	34	Central Birmingham	29	East Birmingham	11	Central Birmingham	11
3	East Birmingham	32	East Birmingham	28	Central Birmingham	9	East Birmingham	11
4	Wolverhampton	18	Wolverhampton	14	Wolverhampton	7	Wolverhampton	8
5	Sandwell	15	Coventry	13	Sandwell	6	Sandwell	7
6	South Birmingham	10	South Birmingham	11	Coventry	4	South Birmingham	6
7	Coventry	8	Sandwell	11	South Birmingham	3	Coventry	6
8	North Staffs.	- 3	Walsall	- 2	Walsall	0	Walsall	1
9	Walsall	- 8	Shropshire	- 6	North Staffs.	0	North Birmingham	0
10	Hereford	- 8	North Staffs.	- 6	Shropshire	- 2	North Staffs.	- 1
11	Shropshire	- 9	Bromsgrove	- 9	Hereford	- 3	Kidderminster	- 3
12	Worcester	-14	South-East Staffs.	-10	Kidderminster	- 3	Shropshire	- 3
13	North Birmingham	-14	North Birmingham	-11	South-East Staffs.	- 3	Hereford	- 4
14	Kidderminster	-17	Worcester	-12	North Warwickshire	- 3	Worcester	- 4
15	South-East Staffs.	-20	Kidderminster	-13	North Birmingham	- 3	Rugby	- 4
16	Rugby	-20	Hereford	-13	Dudley	- 3	North Warwickshire	- 4
17	North Warwickshire	-21	North Warwickshire	-13	Bromsgrove	- 4	Dudley	- 4
18	Bromsgrove	-21	Rugby	-14	Worcester	- 4	South-East Staffs.	- 5
19	Dudley	-21	Dudley	-15	Rugby	- 4	Bromsgrove	- 5
20	South Warwickshire	-22	South Warwickshire	-16	South Warwickshire	- 5	Solihull	- 5
21	Mid Staffs.	-30	Mid Staffs.	-21	Mid Staffs.	- 6	South Warwickshire	- 6
22	Solihull	-38	Solihull	-21	Solihull	- 7	Mid Staffs.	- 7

England Average 0
Below Average Need -
Above Average Need +

Notes:

1. Jarman 8 — Adopted in 1984 by the Underprivileged Areas Sub Committee of the BMA after a validation study.

2. Social — These weights based on groups in a general index of deprivation developed in the Department of Environment.

Table A5.3 : Factors Taken into Account in Grant Related Expenditure Assessment

(A) GRE factors for the Elderly	This LA	Average of Metropolitan Districts
% of over 65s who are	Percentages	
Alone and have mobility problems	6.6	7.3
Over 75s lacking amenities	3.2	2.8
Over 85s living alone	2.4	2.8
Over 75s in private centing	3.3	5.3
On Supplementary Benefit	26.7	26.0
GRE assessment of client numbers		
In severe need	2.2	2.3
In moderate need	12.8	13.6
(B) GRE factors for childen		
% of under 18s in households	Percentages	
Lacking bath or inside WC	8.8	2.6
Living at 1.5 per room	5.8	3.6
Containing lone parent family	13.9	14.3
Total born in NCWP	25.5	8.4
% of 5-17s in households		
With 4 or more under 16	17.8	12.1
Total unskilled, farm worker etc	6.7	7.4
On Supplementary Benefit	23.4	19.9
% of household population not living in self contained accommodation	0.4	0.4
GRE assessment of client number		
% of under 5s at risk	7.3	6.4
Children aged 5-17	Adjustment Factors	
Factor for residential care	0.49	0.43
Factor for fostering care	0.42	0.41
(C) Net expenditure per head on:	Expenditure per head	
Physically handicapped under 65	3.04	1.94
Mentally handicapped children	1.43	0.93
Mentally handicapped adults	5.04	4.05
Mentally Ill	0.73	0.61
Other	0.01	0.05

Source: Audit Commission Profile of Wolverhampton 1986

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