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THE UNAVOIDABLE COSTS OF ETHNICITY: A REVIEW OF EVIDENCE ON HEALTH COSTS

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‘The Unavoidable Costs of Ethnicity’

A review of evidence on health costs

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The Unavoidable Costs of Ethnicity: Executive Summary

This report was commissioned by the Advisory Committee on Resource Allocation (ACRA), and prepared by the Centre for Health Services Studies (CHESS) and the Centre for Research in Ethnic Relations (CRER) at the University of Warwick. The NHS Executive does not necessarily assent to the factual accuracy of the report, nor necessarily share the opinions and recommendations of the authors.

The study reviews the evidence concerning the degree to which the presence of populations of minority ethnic origin was associated with 'unavoidable additional costs' in health service delivery. While local health authorities retain full autonomy in their use of funds allocated to them under the Hospital and Community Health Services formula, the size of that budget is governed by a set of weightings applied to their population, to allow for factors known to influence levels of need, and the costs of providing services.

The study began by considering the definitions used in describing 'ethnicity' and ethnic groups in relevant medical and social policy literature. It is clear that no fixed set of terms can be adopted, and that flexibility is required to respond to social changes. The terms used in the 1991 Census, with additions to allow for local and contemporary developments, provide a suitable baseline but require additional information on religion language and migration history for clinical and health service delivery planning.

There have been notable developments in health service strategy to meet the needs of black and minority ethnic groups which have been encouraged by good practice guidelines and local initiatives. Together with research into epidemiology and ethnic monitoring of services, these have enlarged understanding of the impact of diversity. A conceptual model is developed which explores the potential for such diversity to lead to variations in the cost of providing health services to a multi-ethnic population.

The research team reviewed the existing published evidence relating to ethnic health and disease treatment in medical, social science, academic and practitioner literature, using conventional techniques. Additional evidence was located through trawls of 'grey' literature in specialist collections, and through contacting all English health districts with a request for information. A number of authorities and trusts provided written and oral evidence, and a bibliography of key materials is provided.

Key issues considered include the need for and use of, interpreter and translation services, the incidence of 'ethnically-specific' disease, and variations in the prevalence and cost of treating 'common' conditions in minority ethnic populations. Sources of variation are discussed, and a 'scoping' approach adopted to explore the extent to which these variations could be adequately modelled. It is clear that while some additional costs can be identified, and seen to be unavoidable, there are other areas where the presence of minority populations may lead to lessened pressures on budgets, or where provision of 'ethnic-specific' facilities may be alternative to existing needs.

The literature provides a range of estimates which can be used in a modelling exercise, but is deficient in many respects, particularly in terms of precise costs associated with procedure and conditions, or in associating precise and consistent categories of ethnic group with epidemiological and operational service provision data. Certain other activities require funding to set them up, and may not be directly related to population size. There is considerable variation in the approaches adopted by different health authorities, and many services are provided by agencies not funded by NHS budgets. The study was completed before the announcement of proposed changes in health service commissioning which may have other implications for ethnic diversity.

Conclusions and Recommendations

The presence of minorities is associated with the need to provide additional services in respect of interpreting and translation, and the media of communication.

In order to achieve clinical effectiveness, a range of advocacy support facilities or alternative models of provision seem to be desirable.

Ethnic diversity requires adaptation and additional evidence in order to inform processes of consultation and commissioning.

Minority populations do create demands for certain additional specific clinical services not required by the bulk of the majority population: it is not yet clear to what extent the reverse can be stated since research on 'under-use' is less well developed.

Some variations in levels of need, particularly those relating to established clinical difference in susceptibility or deprivation, are already incorporated in funding formulae although it is not clear how far the indicators adequately reflect these factors.

Costs are not necessarily simply related to the size of minority populations.

The provision of services to meet minority needs is not always a reflection of their presence, but has frequently depended upon the provision of additional specific funds.

There is a consensus that the NHS research and development strategy should accept the need for more work to establish the actual levels of need and usage of service by ethnic minority groups, and that effort should be made to use and improve the growing collection of relevant information through ethnic monitoring activities.

A variety of modelling techniques are suggested, and can be shown to have the potential to provide practical guidance to future policy in the field.

Current data availability at a national or regional scale is inadequate to provide estimates of the 'additional costs of ethnicity' but locally collected data and the existence of relevant policy initiatives suggest that a focused study in selected districts would provide sufficiently robust information to provide reliable estimates.

The review has demonstrated that there are costs associated with the presence of minority ethnic groups in the population which can be shown to be unavoidable and additional, but that others are either 'desirable' or 'alternative'. It would be wrong to assume that all cost pressures of this nature are in the same direction. Our study has drawn attention to deficiencies in data collection and budgeting which may hinder investigation of the effectiveness of the service in general. The process of drawing attention to ethnic minority needs itself leads to developments in services which are functional and desirable for the majority population.

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University of Warwick, January 1998

INTRODUCTION

This report was commissioned by the Advisory Committee on Resource Allocation Group (ACRA), as a feasibility study to be based on a search of available literature which might serve to answer the question: 'Are there unavoidable costs associated with ethnicity' in health service provision. The answer to this question might justify or require allocation of additional funding to Health Authorities which were responsible for the care of areas containing significant numbers of people belonging to minority ethnic groups. The enquiry was in part stimulated by the observation of a London authority that:

The more ethnic communities a District has in its total population the higher the costs faced by their providers if they provide appropriate and timely services. Put simply, a DHA/Trust which has a population which only speaks one language faces no increases in costs due to language. If the population has two major languages (e.g. Florida: English and Spanish) costs associated with language will be small as the infrastructure to set up and maintain appropriate language facilities need only be done once and the population should be able to respond to those needs overtime. If a DHA/Trust has a population which uses, say, over 10 languages the cost of setting up and maintaining language services has to be repeated and increases as the number of groups increase or change. Whether the population has 500 or 5,000 members, costs are incurred. Typically inner city DHAs and Trusts face dynamic and rapidly changing populations due to international instability and requests for asylum. (Leahy, pers. comm. 1997).

We should note that this is not a 'new' question or issue for welfare service providers: it is an issue across Europe, where (for example) German insurance funds have begun to employ 'second generation immigrants' or foreign workers to cater for the needs of Turks in Berlin or Italians in Cologne (Abel Smith et al 1995). Within Britain the Local Government Act of 1966, which re-organised the rating system and method of funding local authority services, contained a specific provision which is widely referred to as 'Section 11'. This regulation was to allow Central Government (through the 'Secretary of State') to make additional special payments to local authorities in respect of the cost of what was perceived as temporary or transitional arrangements for language training and employment of interpreters or bilingual workers. Despite many subsequent revisions of local government and funding regimes, this provision remains in force, and was re-empowered by the Labour Government following its election. While more than four fifths of this funding has historically been spent on educational provision (97% in 1996/7), it is clear that in its origins, it was available to health services, and that a significant amount of use has been made by social services departments (Johnson, Cross & Cox 1988). The Home Office (the responsible department) was unable to provide information about its current use in respect of health and welfare services, but notes that a review of the programme is currently underway. There are a number of other programmes and policies within the broader sphere of 'urban policy' which also make allowance for, or provide services to, minority ethnic groups and their needs, which we have not explicitly sought to examine in this study. Equally, it is at present uncertain to what extent the declaration of 'Health Action Zones' targeted at areas of urban deprivation (and Health Improvement Programmes) will provide another means of meeting those needs.

The allocation of funds to health authorities (HAs), to provide them with a base budget or revenue resource to purchase Hospital and Community Health Services (HCHS) has evolved from that laid out in the 'Resource Allocation Working Party' (RAWP) formula, but is still based upon a weighting applied to the capitation (number of people) of the area in question. This formula is revised from time to time, according to current evidence and priorities, and applies only to the core services for which HAs are responsible. It should be noted, however that the formula provides an overall figure and is not prescriptive as to the allocation of the funds to specific services. Further, activities which were formerly the responsibility of Family Health Service Authorities (FHSAs) are in general treated separately. This therefore excludes from the HCHS formula services provided by 'independent contractors' such as General Practitioners (GPs), which are governed by different rules including the 'Statement of Fees and Allowances'. This report is not concerned with those, except insofar as GPs are the gatekeepers (and may indeed be 'purchasers') of much health service provision and expenditure - and their activity cannot therefore be entirely divorced from any analysis of health service use. However, we have not attempted in general to explore the costs to that sector of primary care provision, of serving an ethnically diverse population. We would, however, wish to draw attention to the implications of the move to new models of commissioning which involve primary care providers and communities more.

The existing NHS formula for the allocation of revenue resources to Health Authorities does to a small extent make some acknowledgement of the effects of ethnic minority presence on health service delivery need (NHSE 1997). The principles by which funds are allocated derive from the original formula devised by the Resource Allocation Working Party in 1976, and adapted and adjusted subsequently in the light of changing information and priorities. The core element is that the budgets should respond to 'need and unavoidable differences in costs of provision', while being quite explicitly non-directive in terms of relating funding to specific provisions. Local autonomy is thereby upheld, and none of this core budget is 'ring fenced' or linked to a particular service or activity. Special weights are applied to the overall formula (or sections of it) to allow for such 'unavoidable costs' as labour market forces, and other special allocations are made in respect of particular issues where a highly skewed distribution of demand is noted (e.g. AIDS). Age-related weights are also applied to allow for demographic factors beyond the overall population numbers, derived from projections of Census-based population data. At present however, these do not take account of the 'ethnic minority' composition of the population, although it is possible that the differential birth-rates of certain groups (younger, or more recent, migrants) may be picked up in these calculations. More significantly, it can be seen that the historic indicator (i.e. that used in the 1971 Census and its analyses) of 'ethnic minority' presence: 'proportion born in the New Commonwealth' (NCWP), is used at two points in the formula's calculation. These relate to the Psychiatric Needs Index (NHSE 1997 p17 Table 5) and within the Non-Psychiatric Community Needs Index, as a weighting for Chiropody care (NHSE 1997 p19). Perhaps surprisingly (in the light of the findings of this enquiry), there is no such weighting in the allocation relating to Joint Finance activity (p37) where proxies for four other 'client groups' are used. We discuss below the potential value or weakness of this particular indicator, but conclude by observing that, in principle, it appears that the case for a weighting relating to 'unavoidable cost(s) of ethnicity' has already been accepted, albeit imperfectly and not necessarily in the sense that it would be accepted or understood by all those involved in the present enquiry. We are unable to estimate the effect of replacing 'the 'NCWP' weighting with the more modern Census estimator of ethnic minority numbers.

There is a well developed literature which has established significant variations in health among migrant and ethnic minority populations - indeed, there is a tradition in the science of epidemiology of using such variations as a means of understanding the causes of some aspects of ill health (Ahmad et al 1996). Confusingly, not all research demonstrates the same differences, and there are certain conditions (and services or procedures) where the minority groups are found to show under-representation, and others where there are clear excesses of morbidity, mortality, or treatment. Some difficulties of interpretation arise from differing categories of description - country of birth or 'origin' not always being clearly linked with other personal or genetic characteristics, and yet the former is most commonly the only information recorded routinely on medical (or death) files and certificates. These matters are discussed in greater detail below.

Particular attention has been paid to the question of 'ethnic health' in Britain since the 1991 report of the Medical Officer of Health (Calman 1992), which drew attention to the facts which had been established, and fitted them into the context of the developing 'Health of the Nation' programme (Balarajan & Raleigh 1993). More recently available data have enabled a clearer look at the relationship between 'ethnic health' (more properly, minority ethnic health) and the health variations selected for consideration in the Health of the Nation strategy (Balarajan 1995). The current move towards a broader focus on health inequalities and variations has accentuated, rather than reduced, the significance of these findings, while at the same time enabling greater consideration of certain other differences. We have drawn selectively upon the now rather extensive consequent literature, much of which is polemic or technical, in seeking evidence which is relevant to the specific question at issue, which is the extent to which there can be said to be 'unavoidable' health service costs associated with membership of, or provision of services to, specific minority ethnic groups.

DEFINING 'ETHNICITY' and 'ETHNIC GROUPS'

Ethnic categorisation is a complex issue. Traditional anthropology, which defined four major human races, identifies 'Caucasian' ('white' or European), 'Negroid' (Black or African), 'Mongoloid' (Asian, Chinese or Indic), and 'Australoid'. The latter three terms have largely been abandoned in scientific discourse,

although they still are used occasionally. Strictly, the majority of people from the Indian sub-continent belong to the same 'race' and meta-language group (Aryan, Indo-Sanskritic) as the inhabitants of Europe. Indeed, the group 'Caucasian' can be argued to be misleading, and to ignore significant genetic (or heredity-linked) variation within the populations of western Europe. The term is reported to have been originated by a German professor of natural history who sought to trace the origins of humanity to the grounding of Noah's Ark on Mount Ararat in the Caucasus mountains (Spencer, 1996). Some scientific reports, as recently as 1997, use a mixture of the above terms, and the term 'Europid' (White Caucasian of European origin) also appears. None of these group labels are regarded by most present-day geneticists as being of great scientific validity or practical value: policy and practice have led to new usages, and an increasing reliance on concepts of 'ethnicity', based on traditions of common descent or intermarriage and shared culture or history. Necessarily, in a world of migration and mixing, cultures and societies are dynamic rather than fixed.

The root of the problem of scientific usage is that the terms used are at present most carefully debated by social scientists, following an agreement under the auspices of the United Nations that the term 'race' had no scientific validity. The different words used (AfroCaribbean, African-Caribbean, etc) have various implications and are claimed or promoted by a variety of schools of thought, and may have political overtones. At the same time, they are also words in 'common parlance' and change their meaning with little recourse to formal definitions. There are further international differences - for example, American usage is to refer to 'race', defined as 'Black' and non-black; and to map across that and categories based on 'geographies of origin' (African, American, Pacific Island) the category of 'Hispanic', implying a Spanish language and cultural heritage (Hahn & Stroup 1994). Frequently only context and footnotes can be relied upon to clarify 'common sense' interpretation. However, at the same time, it can be shown that discrimination and aspects of disadvantage, as well as genetically-linked disorders and lifestyle behaviours are closely associated with the groups labelled in these ways: in short, there is little alternative to using a selection of these labels and categories (Bhopal 1997).

Medical journals are, slowly, moving towards a consensus, but have to wrestle with the issue of international comparability. The process of searching for references using Medline and other computerised databases elicited a number of categories which we had not expected to find, including 'Caucasoid-race' and 'Negroid-race' among MeSH terms, and MeSH terms whose use was idiosyncratic. The broad term 'ethnic' (22619 hits in this particular run) included 'ethnic groups' (17897), 'ethnic mixed' (1), ethnical (61), 'ethnically white' (2), and 'ethnioatrics' (1). The British Medical Journal has published a series of articles discussing the question of terminology and good practice. Its current guidelines provide a useful way forward (BMJ 1996: 1094).

Authors should describe in their methods section the logic behind their 'ethnic' groupings. Terms used should be as descriptive as possible and reflect how the groups were demarcated. ... if it is unknown which ... is the most important influence then an attempt should be made to measure all of them. A range of information is best collected:

- Genetic differences
- Self assigned ethnicity using nationally agreed guidelines
- Observer assigned ethnicity using ... national census categories
- Country or area of birth ...
- Years in country of residence
- Religion

The journal 'Ethnicity and Health' itself avoids a definitive ruling, and recently published a review of editorial policies (Bhopal, Kohli and Rankin 1997). Their conclusion is that there is at present much confusion and that the issue requires further debate.

The original legislation relevant to formal record keeping in Britain was the Race Relations Act 1976, which (Sect 3) defined a 'racial group' as 'a group of persons defined by reference to colour, race, nationality or ethnic or national origins...', while the scientific concept of 'race' had already been officially discredited for several years. 'Ethnicity' became more formally defined in UK law by a House of Lords decision (Mandla v Lee 1983) as relating to group with 'a long shared history and a distinct culture'. Other

'relevant' characteristics in defining an ethnic group include 'a common geographic origin or descent from a small number of common ancestors; a common language; a common literature; a common religion and being a minority within a larger community'. Specific ethnic groups, given that social scientists tend to argue (following the Swedish anthropologist Barth) that 'ethnicity' is a self-defined identity relating to boundaries placed in relation to 'others', can be as many as may be self-defined. For practical purposes, however, in most arenas of social policy, the ten or so groups identified by the 1991 UK Census are normally regarded as the most significant groups. The Department of Health & NHS guidance, in setting up the requirement that 'ethnic group' data be collected on all in-patient episodes, was that these Census categories should be the minimum, but that additional groups might be added if local circumstances required.

Subsequent to the 1991 census, new groups of interest to health policy have emerged, some due to recent refugee movements of population (Kurds, Bosnians etc), and there has been a growing tendency for young people of African-Caribbean origins born in Britain to determine their own identity as 'Black British'. For other health researchers (e.g. the current study of 'quality at consultations' by Prof. Howie at Edinburgh University), the most useful proxy is 'language used in the home'; while research in Peterborough on health service complaints (Imtiaz and Johnson 1993) found that the critical delimiter was religion, and members of the Muslim, Punjabi-speaking population of Birmingham often self-identify as 'Kashmiri' or 'Mirpuri' (Johnson et al 1996), referring to local district names in the place where they or their parents were born. These kinds of detailed self-identification, which may appear in local ethnic monitoring, are not available in the Census, creating some difficulties in calculating 'rates' based on an agreed denominator. The same problem arises with smaller groups such as Arabs, large groups without a clearly accepted 'ethnic label' but displaying relevant characteristics (e.g. the Irish), and most particularly, when the identifier is religious - as is increasingly being felt in relation to the need to respond to the requirements of Islam (Muslim patients), Sikhism, Buddhism and also of Hindus.

In terms of epidemiological research, the tendency in medical research has been to rely upon the relatively unequivocal and commonly recorded variable 'place of birth'. This data is, for example, normally available on death certificates. Consequently much of the current information on ethnic variation in health relies upon the analyses conducted (see Balarajani et al 1984; Balarajan & Raleigh 1993; Marmot et al) on those data and compared against the denominator of the 1971 and 1981 Census. However, there are clear problems in this, since in 1971 it was estimated that perhaps as many as 10% of those 'born in India' were of white ethnic origin, while in 1981 at least 5% of the heads of household (the proxy variable used in that Census) of Asian ethnic origin were UK-born. At the time of the 1991 Census, when for the first time an ethnic origin question was asked, over half the population in the 'Black' categories (54% Black Caribbean, 84% Black Other, and 36% Black African) were UK-born, as were half of those giving their ethnic group as Pakistani, 42% of 'Indians' and 37% of 'Pakistanis'. Clearly, with relatively high birth rates and a youthful age profile, these figures will now have increased to the point that considerably less than 40% of the ethnic minority population can be identified by birthplace - and increasingly few by the birthplace of their parents (a proxy variable used extensively in Scandinavia for similar analyses).

Certain other groups which need to be considered in any discussion of ethnicity and health service costs, are not recorded in any sense either in the census data nor in any other database providing a denominator for epidemiological studies or a basis for estimation of needs in any other sense. These include, in particular, 'gypsies' (Roma or travellers - McKee 1997) regarding whose health there is already a considerable lack of knowledge but growing interest (Feder et al 1993). The second, larger and more problematic but less easily defined, is the growing population of refugees and asylum seekers (for a review of the literature on this group, see Johnson & Akinwolere 1997). Both groups place particular demands on the health service, including a necessity of specialist knowledge and peripatetic service provision, as well as having distinctive language and cultural needs and creating problems for administrative record keeping when they have no long-term fixed residential address. A significant proportion of the 'grey literature' and comments received relating to unusual costs in response to our survey referred to these groups.

It is also important to note that while the greater proportion of ethnic minority groups are located within urban metropolitan districts, this is certainly not necessarily the case for gypsy groups. The consensus of expert opinion is that most refugees are located in London, with lesser concentrations in other metropolitan areas, most of which may have their own ethnic minority concentrations some of which are able to assist

with linguistic or cultural support. However, there is no necessary correlation between these, and many formal refugee resettlement camps were located in places such as Rugby, or on former military bases in the countryside. Recent flows of refugees have included groups (Kurds, Bosnians) for whom there are few 'traditional' UK-based communities of settlement, although some such as the Somalis have been able to locate long-established communities in Wales, Merseyside Birmingham and London (amongst others).

For the purposes of health service planning and needs assessment, there is clearly a need for local studies and close relationships with relevant third sector agencies which may be able to provide up-to-date estimates of numbers in specific ethnic groups locally. Costing of such services will also need to be undertaken on an ad hoc basis. By the same token, identification, categorisation and 'ethnic monitoring' will need to be reactive to local conditions, and sensitive to the political (data protection) fears of the members of such groups as refugees. In the interim, however, and until the inclusion of a religion question in the Census (which is currently under discussion), there is little alternative for national purposes other than the use of the OPCS-defined 10-fold categorisation developed for the 1991 census, which provides the only workable denominator. Good practice and consistency with Census planning requires that individuals are allowed to define their own ethnic group, based on the provision of suggested key categories, but allowing a 'write-in' option (as was the case leading to the category 'Black British'). Local requirements may suggest the value of including prompted names of other groups of special local interest for service planning (e.g. Somali), which may be 'mapped back' to the census definitions using the broader list of groups (see 1991 Census 'table A' which includes 35 categories) and expert advice. To this, as suggested by the BMJ, should be added the collection of information on religion, language, and if it is thought relevant to the issue, migration history. None of these questions, however, should only be asked of people who (may be thought to) belong to a minority group: if they are relevant, then they need to be collected and analysed for the whole population under consideration. Experience in implementation of ethnic monitoring has shown that the opportunity to self-identify in terms of culture, religion and so on is often welcomed also by members of the 'majority' population.

THE DEVELOPMENT OF ETHNIC HEALTH STRATEGY

A number of reports in the grey literature, as well as some of the academic studies reviewed, draw attention to the history of the development of ethnic health strategies. These 'milestones' are perhaps significant, but equally, recording them demonstrates clearly that there has been a delay between rhetoric and statutory guidance, and the implementation of the elements of the strategy.

Johnson (1984) has drawn attention to the first reported concerns with ethnic health, in the guise of 'port medicine', and the ways in which these have developed through an interest in 'exotic' disease to a growing awareness of the importance of considering access to services and the treatment or prevention of 'common diseases'. Other commentators (cf Ahmad 1993) have remarked on the unbalanced nature of this attention, with greater resources being allocated to 'control' than to 'care', and ethnic-specific interests frequently being ignored in policy allocation and development.

By 1981, Department of Health initiatives had begun specifically to address the issues of ethnic health, with the publication of 'Development of Interpreting and Advocacy Services' (1981) and the funding of the Stop Rickets Campaign. In 1984, a workshop led to the publication of 'Providing Effective Health Care in a Multi-Racial Society' and the DoH funded Asian Mother and Baby campaign. Subsequently, NAHA (now the NHS Confederation) published a report entitled 'Action not Words', commenting adversely on the speed at which HAs were implementing the earlier recommendations, and in 1989 the Department appointed its Ethnic Health advisor. Two year later, the SHARE database was established at the King's Fund as part of a wider initiative to develop information resources to support ethnic health initiatives, and the CMO's annual report (Calman 1992) drew explicit national attention to the state of ethnic minority health. Subsequent separate publication of the relevant chapter was intended to increase debate and awareness, and in 1993 the NHSE Ethnic Health Unit was set up with a brief to support developmental projects and encourage inclusion of monitoring of ethnic health as part of the quality standards approach. The 1994 Planning and Priorities Guidance issued to all commissioning bodies included a requirement to address ethnic health issues, and this was supported by information becoming available from the HEA survey of health and lifestyles (Rudat 1994) and the DoH Variations in Health initiative. After several years of experimentation and development, and debate, ethnic monitoring of inpatient events was also

required from April 1995 (EL(94)77 and CHIR), although some authorities had been doing this for at least two years previously. All of these were also supported by the production of materials from the Kings Fund, DoH and NHSEHU (e.g. Checklist on Health & Race - Gunaratnam 1993; Purchasing for Black Populations - Jamdagni 1996; Facing up to Difference 1996).

Given this history, it is alarming to note that in all the DPH reports received and reviewed by this study in 1997, only a minority have any explicit reference to these matters, and exceptionally few contain any ethnic monitoring data. It is clear that the Department of Health and authoritative reports already make a number of significant recommendations for 'additional' or 'special' services, and that health authorities must necessarily incur some additional costs through introducing and continuing to provide these. One of these costs is the requirement to implement ethnic monitoring, which is still not universally available - there are also 'opportunity costs' when data is collected and not used.

METHOD OF THE STUDY

The project began by drawing on critical reviews of research-based literature and other relevant studies. In addition to searching the CRER resources centre database and the results of our own previous research activities in this field, which include significant amounts of material for the Health Education Authority and various health authorities and commissions, we consulted the standard Medline database, the Leicester, Bradford and Kings Fund specialist 'ethnic health' databases, and our collection of (often unpublished) reports from good practice development projects. Edited textbooks, collections of papers from conferences and other similar materials (e.g. the review essay by Smaje 1995) were also examined.

In order to obtain the widest possible selection of 'grey literature' in the time available, health authorities and selected relevant community-based organisations, were contacted. In particular, we requested reports and costings from Directors of Public Health and 'ethnic health' projects (cf Scally 1997). A copy of the letter is attached as an appendix.

An outline of the conceptual modelling approach adopted (and developed throughout the project) is given in Appendix D below. It includes consideration of issues relevant to 'support' services such as translation, advocacy and dietary needs; 'ethnic-related' conditions such as the haemoglobinopathies (and relative lack of others such as Cystic Fibrosis or factor V Leiden); differences in prevalences of common 'conditions' (including maternity, acute and chronic physical services, mental health etc); and clinical services such as testing and diagnostics and blood/tissue banking. A critical element is the assessment of the degree to which costs are 'Unavoidable' and 'Additional'. It will also be apparent that in some cases the direction of cost variation may be negative, and in others, additive, while in others, the effects depend upon the degree to which an outcome or action is seen to be relevant to, or desirable for, health policy and practice. As a conceptual model, we are not in all cases able at this point to establish whether there is evidence of an 'ethnic effect', but all elements are based upon a reading of the relevant literature that suggests that there may be such an implication.

The starting point of the model is that there will be variations in costs arising from a series of different factors, some of which overlap, and others of which may be complementary or counter-balancing. The most immediately apparent effect of ethnic or cultural diversity, in service delivery terms, is perhaps the existence of linguistic barriers to communication. Consequently, one starting point is to examine the need for additional 'support services', which will include not only the translation of printed materials and signs, but also the costs of reproduction (which may be higher, because of special fonts or other technical issues as well as being in 'short runs'). The employment of interpreters will be necessary, together with the overhead costs of their accommodation and administration, and the impact of their work on others - which may include training in their use. In the field of 'ethnic health', there is now an established pattern of use of specialist advocates, to a higher degree than their broader use within the majority community. Cultural variation may also be responded to by additional or alternative provision in terms of food to meet religious constraints, prayer facilities and 'chaplains'. The degree to which these latter costs are additional, rather than alternative, will depend on establishing a cost differential between the facility or 'good' supplied to the majority and minority groups: it might be argued that atheists or voluntary cultural centre support save the NHS the cost of chaplains, for example.

Following on from the notion of cultural difference, we can examine the extent to which minority groups have access to, or prefer to use, 'alternative' therapies. Such evidence as we have identified (e.g. Ahmad 1993) suggests that the use of complementary therapies in minority communities, as in the majority, tend to be additional rather than alternatives to NHS service use. Indeed, the early research focus on 'ethno-medicine' (use of hakims, Ayurvedic remedies etc.) now appears to have been misleading. However, it was also suggested that some minorities may seek treatment when 'overseas' visiting relatives - and historically it was believed that use of private (paid-for) treatment was also commoner among certain ethnic minorities. In this review, we were unable to find conclusive evidence of these matters.

In addition to cultural difference, the existence of ethnic variation carries a number of clinical implications. We were concerned to examine the extent to which diversity might impact upon clinical support services which would have to extend the number of tissue types, clinical/biochemical tests and related costs to deal with these. Some costs (e.g. advertising for donors in minority media) might be subsumed under the translation and advocacy element while others would relate to the internal management or material budgets. In most cases, we would expect these to be additive, or to be more expensive 'replacement' (alternative) costs.

Ethnic minority epidemiology implies that there will be variations in the diagnostic and disease mix presented by communities of diversity. There is no *prima facie* reason to assume that these will necessarily be all additional - absence of susceptibility to certain diseases is as likely as the presence of 'exotic' (additional) conditions. This has been, after the language issue, the area where most observed variation has been remarked. We have attempted to review the field of ethnic-specific disease broadly, but are aware that we have not presented a fully comprehensive review of all such conditions.

In addition to the management of 'additional' ethnically specific disease, it is necessary to consider that the majority of expenditure is on 'common' diseases and conditions, both 'acute' and chronic. There are significant costs associated with nursing, therapies and with episodic use of services arising from maternity, mental health, and disability. These also may vary, and be affected by differential 'ethnic epidemiology'. Variations in costs may also arise from different patterns of treatment, including specialist staffing. The prevalence of chronic conditions will have similar implications.

Finally, we are aware that there is a literature within the social services field which lays stress upon different patterns of family life. There has been an assumption, which is now being challenged, that ethnic minority communities will 'prefer' to care for their own members, and thus relieve the statutory services of an element of this burden. Equally, in health services research there are references to poorer compliance and problems of access to community-based services which go beyond language. The need to provide (for example) gender-specific facilities or clinics at times to suit the work patterns of groups (e.g. the Chinese or Bangladeshi) who are apparently predominantly employed in catering trades, may be included in this category. Equally, there may be costs to other agencies, such as Social Services, and to communities themselves, in meeting culturally required care needs, providing day centre facilities and the like, some of which may be shared with NHS providers through joint finance. Similarly, as noted above, these facilities may be provided through alternative sources of funding.

In an attempt to establish the excess costs arising because of these factors systematic literature reviews were conducted in order to identify relevant recent literature. Searches were conducted using Medline for the period 1990-1997. Using simple high-level free-text and key-word searching ('Ethnic' and 'Cost') generated a fair number of citations under each of the two terms (drawing in 'Ethnic Groups' and 'Cost-of-Illness' as well as 'Cost-Benefit-Analysis' etc from the MeSH terms). Combined, fewer citations were elicited.

Following an initial trawl of the literature, it became apparent that it would be necessary to restrict the number of conditions on which we would seek more detailed information. A selection of disease groups which were felt to be most significant, and on which data appeared most likely to be available, were identified and are subsequently referred to as the 'index' conditions. These included:

- i. Diabetes
- ii. Renal Failure

- iii. Hepatitis C
- iv. Tuberculosis
- v. Stroke or Cardiovascular Disease
- vi. Thalassaemia
- vii. Sickle Cell

Keywords for each of the index problems, as well as the keyword ‘interpret(er)’, were also used in combination with the keyword ‘cost(s)’, and then later for another search, in combination with the keyword ‘ethnic’. The keyword ‘cost’ was used in order to identify any material which might contain relevant cost information. This, if combined with epidemiological information indicating a different incidence or prevalence of a particular condition, could potentially be used in order to assess the additional costs to the NHS arising because of variation in the prevalence of a given health problem. The searches conducted using the keyword ethnic, in combination with keywords for the selected health problems inevitably ‘picked-up’ epidemiological papers relating to the disease areas, alongside some other potentially useful literature.

In order to adequately assess any unavoidable NHS costs associated with ethnicity, for the index problems it is necessary to obtain cost and incidence / prevalence estimates for the United Kingdom. However, we made an explicit decision not to restrict our searches to British literature. This was because overseas economic analyses may contain useful information relating to the range of costs which could arise in the NHS due to a given health problem. Furthermore in the absence of good epidemiological information for the UK, overseas analyses may provide some indication of the extent to which a given health problem is likely to be related to ethnicity.

Other search terms were also deployed. We wanted to establish whether there were any good ‘burden-of-illness’ or ‘cost-of-illness’ studies which might be of use. Thus these keywords were used, and the ‘hits’ were trawled to identify papers of relevance. We then attempted to combine epidemiological information, treatment information, and cost information in order to assess the unavoidable costs of health problems associated with ethnicity, for each of the index conditions. The extent to which we could do this depended upon the extent of the availability of robust information on epidemiology and cost for the United Kingdom. Ideally, the epidemiological information needed should provide evidence on the extent to which the prevalence or incidence of conditions varies in the United Kingdom between whites and minority ethnic groups - with some level of detail. The cost information also should relate to the UK, and ideally should include the full range of costs associated with a given condition. In so far as procedure costs are likely to vary amongst ethnic minorities relative to the mainstream population, this should be reflected in the cost figures selected. This level of epidemiological and cost information was rarely identifiable.

LITERATURE ON COSTS AND PURCHASING

The suggestion that ethnic or ‘racial’ diversity, associated with migration and settlement from territories of the ‘New Commonwealth’, has costs for the British welfare state is not particularly new. Debates in Parliament in the 1960s referred to the greater propensity of ‘immigrant’ mothers to give birth in hospital rather than at home, and the Local Government Act contained a provision whereby the Secretary of State could make payments to local authorities where additional costs could be shown to be associated with cultural or linguistic diversity (‘Section 11 payments’). A study undertaken by the Cambridge National Institute for Social and Economic Research found that overall, migrant labour was cost-effective for the national economy (Jones & Smith 1971). Recent reports still suggest that ethnic differentials may be an issue:

Diversity is London’s most distinctive feature, with a striking variety of ethnicity, cultures, poverty and wealth within different parts of the city. Health services must address extremes of affluence and deprivation and differences of culture and race greater than anywhere else in the UK (King’s Fund London Commission 1997 :13)

These issues of diversity have also been responded to by the relatively recent expansion of conferences and guidance literature, most notably under the auspices of the King’s Fund itself, the NHS Ethnic Health Unit and Department of Health, and the Royal Colleges, to inform the processes of purchasing and commissioning for black and minority ethnic health (e.g. Office for Public Management 1996; NHS EHU

1996; McIver 1994; Gunaratnam 1993; Mohammed 1993; Hopkins & Bahl 1993). These highlight a series of issues, which while they may be also covering areas of general concern in purchasing (e.g. consultation, media of communication), are shown to have particular relevance and require particular attention in order to make them appropriate to minority ethnic groups. Suggestions, for example, include the necessity for single sex meetings, outreach events in community centres, and the problems of overcoming a history of negative relationships between black and minority ethnic groups and authorities. In nearly all reports, key recommendations include information gathering relating to local black and minority ethnic groups and their needs, revision of record forms and procedures to facilitate ethnic record keeping and monitoring, and training of reception and professional staff in cultural or racism awareness. In very few cases is attention paid to the resource implications of these, but it must be assumed that given their authoritative sponsorship, these are 'unavoidable' costs.

There are a few other items of NHS expenditure which may be described as 'ethnic-specific', and for which it is possible to derive costs, although in most cases we have found it impossible to obtain detailed or clear up-to-date estimates. The clearest example may be the additional or particular cost of conducting laboratory tests to identify diseases which are not (commonly) associated with the native white population: such as the tests required to identify cases of the haemoglobinopathies associated with the minority ethnic populations. Certainly in the early years of black and minority settlement, there was some resistance expressed to the possibility of routinely screening blood from mothers or births in the African-Caribbean population, sometimes on the ground of cost. Subsequent research has demonstrated that the necessary investigation can be conducted within the procedures used for routine testing conducted on the general population to identify cases of phenylketonuria, a condition rarely found in the minority population. It is important to note that this is not the only condition which demonstrates this kind of distribution - factor V Leiden, for example, is a carrier state which leads to an increased risk of deep vein thrombosis, and is significantly more common among European (white) populations, notably those of Swedish origin (Sarasin, Bounameaux 1998). The effective cost of screening cord blood for sickle haemoglobinopathies was at that time calculated at 30p/test, and the cost of using the 'heel-tap' blood for this screening was of the same order. (Henthorn J, Anionwu E, Brozovic M 1984). We have not attempted to include this small figure in our modelling.

The study was commissioned to inform the allocation of funds to Districts through the HCHS formula, which essentially refers to hospital and community costs, rather than the GMS monies which relate to General Practitioner activity. Given the 'independent contractor' status of GPs, and lack of discussion in any of the literature previously reviewed regarding the 'costs of ethnicity' in primary care, we have not attempted to model or examine in any depth the possible unavoidable costs of service delivery through General Practice. We should note that there are likely to be similar issues at work in this sector, and that there is some evidence of differential rates of consultation between white and minority ethnic communities (Balarajan & Raleigh 1995; Yee 1997; Johnson- unpublished data for HEA). Although higher rates are attributed by some to 'attendance with trivial complaints' (Smaje 1995), this is disputed (Johnson 1986) and recent data suggests that patient consultation rates for Black and Asian patients tend to be high for serious conditions (McCormick et al 1990; 1996). Irrespective of these facts, there will also be at least proportionate needs for interpreter and advocacy services, supply of female practitioners, and other matters relating to language and culture which affect hospital services in meeting the needs of minority ethnic groups. On the other hand, 'Jarman' weightings of GP remuneration using deprivation scores do already incorporate an element reflecting the well-established use by Department of Environment and Department of Health of 'ethnic minority presence' in those indicators. These do not however, cover the additional costs arising from the more transient presence of refugees, which were recently anecdotally reported to 'represent 5 per cent of my list and 30 per cent of my workload' (Dr Skolar, Camden & Islington LMC, reported in GP magazine 9 Jan 1998 :20). Where we have encountered data which directly relate to primary-care provision and 'unavoidable costs' relating to the ethnic composition of the population, we have incorporated them in this review.

INTERPRETING and TRANSLATION

The general issue of 'communication' is a priority not only for minority groups, but across the health service, and has been highlighted by the Audit Commission (1993), amongst others. That report demonstrated clearly that good communication was valuable in terms of clinical outcomes and business

efficiency, and detailed the mechanisms and sites where communication was a critical issue. A number of examples are drawn from places such as 'a hospital with a large non-English speaking population', as well as making reference to the needs of visually impaired and deaf people. A chapter is devoted to 'Communication with Non-English Speaking Patients' but comments that 'there is very little research' in this area. A review carried out for the West Midlands NHSE (Johnson 1996) located a significant number of items, but again, none of these were costed, and few would have measured up to 'gold standard' research evaluation. There is agreement that there should be more professionalism in the provision of interpreting services, and that their availability is poor, but that some examples of 'good practice' can be identified. A research study of these, including cost data, would be helpful for others seeking to develop their services. Useful data to feed into the needs assessment that should be associated with this can be located, including research conducted by the Health Education Authority and for the Basic Skills Agency (Carr Hill et al 1996). This latter provides a range of estimates of functional literacy in five minority linguistic groups (Bengali, Gujarati, Urdu, Punjabi and Chinese) and a variety of refugee groups (Bosnia, Tamil, Somali and Kurd). One of the tests used was an estimate of the ability to read instructions on a medicine bottle. More than a third of non-UK-born (and non-UK educated) Bengali and Punjabi speakers were unable to meet the basic test of completing their name and address on a library card application form. Nearly three out of four of those born outside the UK were 'below survival level' - an argument for including birthplace in any data collection and analysis related to ethnic minority group service provision. An appendix to that report provides a possible model for predicting interpreter provision need against census data.

Australian papers located (over the Internet) indicate that the Western Health Care Network budgetary formula includes a 'non-English speaking adjustment', particularly in relation to the needs of the mental health service, based on the fact that up to two thirds of the 'NESB' population may require interpreter support, and longer consultations. British grey literature suggest that at least one third of Chinese patients need an interpreter.

Evidence relating to the use of interpreters is accumulating, and a recent study of interpreter availability in London across several services noted that the health service provision was relatively well developed (Stewart and Bartram 1996). An unsupported observation within that report suggested that medical consultations (across languages) without the use of a proper interpreter could take three or four times as long, and result in a less satisfactory (effective) diagnosis and treatment. The same report noted that two out of three NHS Trusts also provided interpreters for BSL (British Sign Language - used by those with hearing loss). Some cost data is provided, including the 'set-up' cost of a subscription to the telephone-based Language Line (at that time between £1,200 and around £2,000), but no detail of the overall cost per patient or the amount of use made of that service on a 'pay-per-minute' basis. Other estimates of the additional cost of interpreters suggest an extra 15% of consultation time or an additional 50%: this is an area where research would be beneficial.

CLINICAL CONDITIONS: PREVALENCE AND COST

It is possible to identify a variety of clinical conditions considered to be potentially more or less prevalent in ethnic minority populations. Research and monitoring is continually increasing the number of diseases for which this can be stated. For example, standard text books refer to the fact that Systemic Lupus Erythematosus is more commonly found in the United States of America among Black women, and in the 'Far East'. No British 'ethnic epidemiology' of this disease can be identified as yet, but there is growing interest (and concern) about the disease among the minority communities here. Since this report concerns itself with trying to establish the costs to the NHS arising because of a higher prevalence of certain health problems among ethnic minorities, we have concentrated in the scoping exercise on a limited number of conditions where the evidence currently appears to be strongest on both cost and prevalence. The index conditions are considered in greater depth, following a shorter review of evidence relating to other conditions.

The original Health of the Nation white paper selected five key areas, and seventeen indicators, (including ten mortality indexes) for particular attention. Data for morbidity was not always available to distinguish between 'ethnic' groups, although there is a complex and well-established pattern of differences in respect of admission to hospital for mental illness. In terms of mortality, in each of the main areas, there were significant 'ethnic' differentials, although for the area of Cancer there was in general a lower incidence

(except for certain selected but relatively rare varieties) among most minority ethnic groups. Irish born persons, however, exhibited much higher rates of lung cancer and suicide. Particular attention was drawn to raised mortality from Coronary Heart Disease (CHD) amongst people 'born in' the Indian subcontinent, from Stroke amongst those born in Bangladesh, the Caribbean and (Commonwealth) Africa; and Suicide (amongst Indian-born people, but equally significantly rarer among those born elsewhere on that subcontinent). There was some suggestion, but relatively little satisfactory evidence, of ethnic variations in accidents. It is however agreed that for purposes of planning service provision, it is more useful to pay attention to specific conditions which may not directly be recorded as 'cause of death', or which may form part of a complex leading to death - or to morbidity requiring intervention.

We therefore here review the evidence from the literature which relates to the prevalence of various types of ill-health, including both infectious diseases, and 'conditions' which may relate to lifestyle or be inherited, and for which there appears to be evidence of distinct variation between one or more ethnic groups. In some cases, the possibility of ethnic variance comes from reports located in the grey literature search of this project. We begin with some conditions for which there is relatively speaking, less evidence of relevance to the subject of this report - without implying that they are in any other sense 'less important'.

Accidents

An early 'classic' study on (immigrant) ethnic minority health differentials was commissioned because of an observation that immigrant workers appeared to be more susceptible to industrial accidents (Lee & Wrench 1980). Detailed investigation revealed that this was attributable to racially biased patterns of employment and work-place job allocation, rather than any inherent (unavoidable) characteristics of the minorities concerned (Wrench 1995). There remains some concern that there are similar differentials today, including a higher risk of Asian children's involvement in traffic accidents, but these too may be explicable in 'environmental' (spatial and socio-economic) patterns of risk, rather than being specifically 'ethnic' issues, except in an indirect sense. There is no clear evidence, despite a long-term study of the issue by RoSPA (pers. comm).

Attempted Suicide

There is a well established link between areas of deprivation and high rates of suicide: included in these data is an association between areas with high rates of settlement by people born outside the UK, and other indicators of migration. We have not been able to identify references to rates of suicide among Black groups, but there is a repeated reference in the medical literature and less formal sources to problems of suicide and parasuicide among young Asian women in particular. Irrespective of the priority given to this question in the Health of the Nation initiative, this is clearly an issue meriting serious intervention, but again, no cost estimates, or even consideration as to whether this is a matter for NHS services or other sources of intervention, were identified.

Asthma

While there is some evidence that asthma may be provoked by migration, most notably from rural to urban settings, there is no UK based survey data which indicates a clear ethnic variation in the prevalence (or treatment) of this disease. However, it is clear that some communities (notably the South Asian) regard this as a disease which they are unfamiliar with or blame on 'British living conditions', and they therefore may require additional service input in terms of patients (and family) education (Sahara Project, Birmingham: unpublished study). The Doncaster health needs survey reported that Pakistani respondents were twice as likely as the average (14% : 7% overall) to report having asthma.

Coronary Heart Disease and Hypertension

Over one in four deaths in Britain are attributable directly to CHD, and it is probably the commonest form of disease, as well as being to a large extent preventable. Direct NHS costs attributable to CHD have been estimated at around £500 million annually, with another £10 million spent on preventive action (Langham et al 1990). Very high levels of undetected heart disease are known to exist, so that there is no accurate estimation possible of incidence or prevalence. Best estimates are derived from mortality data, which show

that 'Asian immigrants' (i.e. those born in South Asia) display SMRs (Standardised Mortality ratios) around 120 - i.e. an excess of about 20% deaths in both men and women aged 20-70. Other estimates suggest higher rates, particularly among diabetics (Chaturvedi & Fuller 1996). The pattern for those born in the West Indies or other sources of ethnic minority migration does not show such a difference. At present, however, there is no good data for 'ethnicity', although in this case, given the age-related patterns, it may be possible to accept birthplace as a suitable proxy for ethnic origin. A very high proportion of the cost burden of CHD falls upon the general practitioner service, mostly through the cost of prescription medicines. There is some evidence of a need for different patterns of prescribing, since ACE inhibitors have been shown to be somewhat less effective in the control of hypertension in African-Caribbean patients. We have not located any economic data relevant to this question.

Cancers

In general, there seems to be a lower incidence of most forms of cancer among minority ethnic groups. The reasons for this are unclear and may relate to environmental factors (exposure to trigger factors) as much as ethnicity, although changes can be expected in the UK-born population as it ages. Certain forms of cancer related to diet and lifestyle (notably smoking and the chewing of paan - a mixture of areca nut, lime, betel pepper leaf and sometimes tobacco and spices) are associated with some South Asian population groups, and oral cancers are particularly more common among Bangladeshi people. These, however, may be seen as 'lifestyle' or behavioural rather than 'ethnic' and unavoidable variations - HEA interventions have already been dedicated to bringing about a greater awareness of risk factors and change in these groups. Less explicable are reported excesses in Liver (SMR 910) and Gall Bladder (SMR 538) cancers among Bangladeshi men (Balarajan and Raleigh 1997). The same, relatively recent, data also show rather lower than expected rates of cancers among Bangladeshi women, in particular deaths from Breast (SMR 16) and Cervical (SMR 51) cancers. Despite high smoking rates, Lung cancer SMRs for both Bengali men (SMR 82) and women (SMR 54) are significantly lower than the national.

Dental Health

We have identified a small but growing literature relevant to dental health among minorities. It appears that while there is a low level of service utilisation among older people of minority origin, there is growing concern about their oral health - often related to gum diseases as much as dental caries, while levels of dental caries among Asian children seem to be leading to a resurgence in health care need. There is some evidence that different approaches for preventive dentistry may be required among Asian populations (Holt 1990; Bedi 1989).

Eye Disease

There is very little information relating to the use of ophthalmic services or eye disease amongst minority ethnic groups. A report in grey literature from Nottingham notes that a Leicester study found 24% of the South Asian population aged 40-49 had signs of cataract (rate for whites = 0) : at age 60+ 73% South Asians compared to 41% whites had this condition. Overall, Leicester data imply a six-fold increase in vision problems among minorities. Diabetic retinopathy is slightly less common in South Asians.

Inflammatory Bowel Disease

While the search of medical literature failed to identify any published reference to this area of disease, the Nottingham HNA notes that ulcerative colitis appeared to be twice as common among the S Asian population; while coeliac disease is raised among Punjabi, compared to either white or Gujerati populations.

Mental health

Mental illness includes a wide variety of conditions and diagnoses, and is responded to with treatment deriving from a number of sources, including both NHS and 'joint finance' as well as other non NHS costs. In addition to the input of social service departments with an interest in the topic, provision is also governed by the Mental Health Acts, which place certain powers and responsibilities on the criminal justice system.

There are well established patterns of ethnic differentiation in the experience of mental health and use or uptake of relevant services, recorded by both social science as well as medical researchers. In particular, these suggest an over-representation of people of African-Caribbean origin (and under-use by those of South Asian background) as well as different patterns of experience within mental health services - notably in respect of diagnoses of schizophrenia and paranoid psychoses and the use of more interventionist forms of treatment (restraint, drugs and electro-therapy) (see Ahmad, Sheldon & Stewart 1996; also Nazroo 1997, for a more detailed review of this literature). This is not the place to continue that debate nor to attempt to resolve the causes of these patterns. Because of the contested nature of diagnosis in this field (see Johnson 1994, Halpern 1993), there are inherent difficulties in presenting definitive projections of prevalence. It is probably certain that current recording has under-estimated the need for mental health services (based on observed diagnosis) among British Asian populations (Williams et al 1997).

There is a paucity of data relating to the costing of mental health services, although a few recent papers have begun to address this question (cf Chisholm et al 1997). These do appear to indicate that there is an element of cost which may be independently explained by ethnic group, after taking location and 'provider' costs into account, although in statistical terms, only very small proportions of the variance can be attributed to ethnicity.

There are, however, certain aspects of mental health treatment which suggest that there should be particular attention paid to ethnic variation in the population. Diagnosis, and treatment, are peculiarly dependent upon communication (both in terms of direct language and cultural sensitivity to conceptual models and metaphor) and hence questions of training and interpretation are particularly significant (Johnson 1996). Many Trusts employ specialist transcultural psychiatric nurses, who may legitimately be seen as an 'unavoidable cost' - indeed, the Mental Health Act also requires Local Authorities to take explicit note of ethno-cultural differences and to have appropriately trained social workers available. The Australian study of interpreters referred to earlier was conducted specifically because of the expectation that interpreters would be required for those of 'Non-English Speaking Backgrounds' (NESB), and that the use of interpretation would have a direct impact on the length of the consultation. Unfortunately, beyond some anecdotal data in the survey of Districts (see above), we cannot locate any appropriate data on the differential cost of mental health services for minority population in Britain. We were, however, advised in clear terms during the fieldwork phase of the study that some Districts felt that they were considerably affected by the presence of significant numbers of African-Caribbean people in their area, and the tendency for people of this background to be referred to higher-security facilities, which had serious cost implications for them. There are also clear implications of 'ethnicity' for the training of workers and the provision of culturally, religiously appropriate and linguistically accessible information. We feel that this question would repay separate investigation.

Sexual health and HIV/AIDS-related disease

There is little evidence on the needs of minority groups for sexual health-related treatment, but papers have caused controversy by drawing attention to the number of people from Africa attending for AIDS-related conditions. Some grey literature referred to the demands of overseas visitors, but these are generally not 'UK citizen' minority ethnic patients, and should not be attributed to the same element of the cost formulae. Anecdotally, there appears to be a low uptake of many services, and additional costs have been incurred in outreach and patient education programmes. This may be an area justifying further research despite its difficulties (Fenton, Johnson & Nicoll 1997).

Index Conditions: Literature on Prevalence and Cost

Literature was examined which related both to variations in prevalence and cost variation between one or more ethnic groups. It has been pointed out that "There are two main ways of conducting cost of illness studies" (McGuire 1996). These include a 'top down approach' and a 'bottom down approach.' A 'top down' approach combines aggregate data relating to variables such as mortality, hospital admissions, GP consultations etc, and their associated costs in order to estimate the cost of illness. In contrast a 'bottom down' approach combines data on disease incidence and prevalence with information on disease and treatment probabilities and costs in order to estimate the cost of illness. As McGuire (1996) points out, a

major limitation of the ‘top down’ approach is that it may result in a misleading picture if the incidence of a disease is changing. We therefore attempted in the scoping exercise to utilise a ‘bottom down’ approach in order to estimate the cost-of-illness arising as a result of an increased health burden upon the NHS due to ethnicity. This involved examining the epidemiological evidence on variations in prevalence and any evidence of differences in treatment requirements between ethnic groups, in order to estimate their impact on cost of illness. However in the light of the limitations of the available cost and epidemiological data in the literature, this has proved to be problematic.

The ‘index’ conditions for which we were able to obtain most detailed data on prevalence and costs are reviewed below in order to assess whether there is sufficient information available to compile an indicative model.

i) Diabetes

Diabetes is a ‘group of disorders with common features’ with particular significance for the NHS, being estimated to be responsible for around 5% of UK health expenditure (Laing and Williams 1989; Grimshaw 1996). It includes a number of closely related but clinically distinguishable conditions: viz Insulin Dependent Diabetes Mellitus (IDDM or Type 1), Non-Insulin Dependent Diabetes Mellitus (NIDDM or Type 2), and Gestational Diabetes Mellitus (GDM). It can also be seen to be related to other disorders such as hypertension, cerebrovascular and ischaemic heart disease. It is recognised that ‘the two population characteristics which most strongly influence the numbers of people with diabetes are the age and sex structure of the population and the ethnic mix of the population’ (Stevens and Raftery 1994 :33). Recent estimates of the burden of cost suggest that diabetic treatment represented some 8.7% of inpatient revenue expenditure (Currie et al 1997), much due to the cost of treating vascular complications.

Epidemiological evidence: Evidence from an English study sheds some light upon the prevalence of diabetes amongst South Asian communities in Coventry. Screening for diabetes in an electoral ward in Coventry between December 1986 and April 1989 indicated (Simmons et al 1992) that the risk of Type 2 diabetes amongst Asians is greater than amongst ‘Europeans’, and that the likelihood of having diabetes varies by ethnic group. Findings demonstrated that that Gujerati Moslems had the highest age-adjusted prevalence per 1000 population of Type 2 diabetes (males: 160, females: 204) and that there was raised prevalence in Punjabi Hindus (males: 113, females: 116). This compares with lower figures for other Punjabi Sikhs (males: 89, females: 75); Pakistani Moslems (males: 91, females: 103); Gujerati Hindus (males: 84, females 88). (All of these prevalence rates fell within confidence intervals at the 95% level of significance). This led Simmons to conclude that the higher prevalence of diabetes in these Asians groups (in spite of their dietary, cultural, and socio-economic diversity) suggests that predisposition to Type 2 diabetes is inherited, although environmental factors may play a part.

Calculations based on the Simmonds (Coventry) study and other data produce the following prevalences and risk ratios for Asian, African-Caribbean and ‘Europid’ (White) populations for combined Type 1 and Type 2:

Prevalence of clinically diagnosed diabetes (Types 1 & 2) (Williams 1990 :48)

Age Group	South Asian	African-Caribbean	White	RR (Asian)	RR (A/C)
Male:					
20-39	15.5		6.2	1:2.5	
40-59	82.0		26.7	1:3.1	
60-79	172.7		46.3	1:3.7	
45-74		245.3	18.5		1:13.3
Female:					
20-39	11.5		3.2	1:3.6	
40-59	59.0		37.8	1:1.6	
60-79	142.9		42.7	1:3.3	
45-74		129.6	17.2		1:7.5

Some research (Burden et al 1992) identifies an increased incidence of End-Stage Renal Failure (ESRF) secondary to diabetes mellitus in Asian ethnic groups in the United Kingdom. The authors calculated the incidence of treated ESRF within the county of Leicestershire between 1979 and 1988, using a measure of incidence known as person time at risk incidence. Patients of 'ethnic' (minority - i.e. Asian) origin had an incidence of ESRF of 486.6 (95% CI, 185.1 to 788.1) cases per million person years per year, compared with 35.6 (17 to 54.2) for White Caucasians. All the Asian patients had NIDDM. The authors point out that these findings indicate that ESRD in Asians "imparts significant public health implications for resource planning and allocation, and the need to initiate strategies to ameliorate renal disease in this ethnic group." The issue of renal disease is discussed further below.

In another paper Simmonds (1992), assesses the prevalence of type 2 diabetes and its relationship to parity (childbearing). It is pointed out that Asians have a high prevalence of type 2 diabetes, which commences at an earlier age. Amongst 'European' women in the 30-64 years age group the prevalence of type 2 diabetes was lower in women with 1-2 deliveries than amongst grand multiparous (parity ≥ 5) women, or nulliparous women. Amongst Asian women in the same age group (30-64 years) the prevalence of type 2 diabetes was much higher, and especially high in women who had had 5 or more children. This would tend to suggest that the burden upon the NHS due to type 2 diabetes might be especially high in Asian women who have had a large number of children compared to European women. However as the paper gave no indication of how this might impact upon future treatment requirements we currently lack the information required to enable us to assess the excess costs to the NHS arising in Asian women having several children in comparison with 'European' women.

Other evidence (Koukkou et al 1995) suggests that within the catchment area of one Central London hospital (based upon a retrospective study of 703 women selected for screening for gestational diabetes mellitus (GDM)) the prevalence of GDM was around 2% overall, but Asians and Africans / Afro-Caribbeans had between 4 and 2 times more risk of having GDM relative to Caucasians ($p < 0.01$). The increased incidence of GDM influenced the mode of delivery. GDM has also been associated with an increased risk of perinatal and maternal morbidity (e.g. macrosomia) and an increased risk of developing diabetes in the future. More detailed projections for specific ethnic groups are few, but Balarajan and Raleigh (1997) provide an estimate of mortality from Diabetes among Bangladeshi men at a very high level - SMR 685.

Treatment requirements: Gujral (1993) estimated the incidence of lower extremity amputation in Asians (patients were defined as of ethnic origin if they or their forefathers originated from the Indian subcontinent) and compared it with the incidence of amputation amongst white Caucasians in Leicestershire during the period 1980-1985. After adjusting for age and sex the estimated population of patients requiring lower extremity amputation who were Asian with diabetes was estimated at 3.4 per 10,000 population, compared with a much higher figure of 14.2 per 10,000 population amongst Caucasian whites. Burden et al (1992) estimated that diabetes in patients of Asian origin is nearly fourteen times more likely to lead to treatment for end stage renal failure (ESRF) than for white Caucasians (486.6:35.6 cases). Clark et al (1993) also suggest that diabetes mellitus is more often a cause of end stage renal failure in Blacks than in Caucasians, although the relationship was not statistically significant ($0.1 > P > 0.05$).

Koukkou et al (1995) clearly indicate that ethnic minorities have an increased likelihood of suffering from GDM, which implies that alternative delivery methods will have to be deployed for some of this group of ethnic patients. The data presented do not state precisely what size effect might be expected.

Calculating the Cost of illness: Based on the above evidence, it is not unreasonable to assume that the increased prevalence of diabetes amongst ethnic minorities will result in some additional costs to the NHS. However it is far from clear, based upon the evidence at our disposal, that this is necessarily the case at the general population level. Whilst it may be true to say that ethnic minorities have a higher prevalence of type 2 diabetes, there is some evidence to suggest that they may be less likely to suffer from certain types of diabetic complications. For example the findings of Gujral (1993) would seem to imply that the cost to the NHS arising because of amputation amongst ethnic minorities is likely to be lower than amongst the mainstream population. That said there is evidence (reviewed in the Renal Failure section) to suggest that ethnic minorities do suffer from more end stage renal failure which is related to ethnicity. Evidence from overseas (Gulliford et al 1995) also indicates that diabetes may result in increased in-patient admissions to

the health care system due to a variety of other diabetic complications including admission for hyperglycaemia, cardiac problems, myocardial infarction, angina, stroke, and cataracts. Additional outpatient consultations may arise for a variety of other reasons including the need to monitor insulin levels, and to check for diabetic complications including diabetic retinopathy, diabetic nephropathy, diabetic neuropathy, and cardiovascular disease.

Attempts to track down cost literature in order to ascertain the additional costs to the NHS arising from these treatments have been largely unfruitful. The only recent United Kingdom information indicates that the cost per patient of visiting the outpatient department for screening for diabetic retinopathy is in the region of £15.71 (Gillam et al 1995) per outpatient visit. It is, however, suggested that this condition is found slightly less commonly among Asians than whites (Leicester and Nottingham grey literature). Another study (Koperski 1992) has costed the running of out-patient 'Diabetes days' at a General Practice in London (£58 per patient/year to the NHS). Given the specific needs and problems of compliance among some Asian populations, it may be that a similar approach (which has been suggested) would be appropriate in reaching ethnic minority patients, and so this cost data could also be relevant.

ii) Renal failure

Relatively good data are available on the costs and management of renal failure. Currently however, most evidence is based on 'predominantly white' populations. Costs associated with end stage renal failure (ESRF) will depend on the modality (treatment method - CAPD, transplant, hospital haemodialysis etc) used - transplants being the most cost-effective in the long term. Among transplant co-ordinators, there is considerable concern because of low rates of organ donation from minority ethnic groups, which tend to have distinctive patterns of tissue type - this may be another source of cost to the NHS, but has as yet not been properly explored.

NHSE Renal Purchasing Guidelines (1996), while at present still indicative, include (p31) allowance for the impact of an ethnic minority presence: calculating the 'expected acceptance rate' for a transplant at around 80/million population for an 'entirely white population' and 240/million for the proportion of the population made up of Black and Asian minority ethnic groups. This adjustment is calculated in much the same way as for age structure, and there is no suggestion made that there are any other costs specifically associated with ethnicity. It is recognised that 'acceptance rates' for treatment will rise further among Black and Asian populations as their demographic profile ages (Beech et al 1994).

Epidemiological evidence: It has been reported that in the United States ethnic minority populations have higher rates of ESRF for each of the 3 most important causes of ESRF including hypertension, diabetes, and glomerulonephritis (Feldman et al 1992). Findings relating to the Thames regions (Anon 1994) suggest that take up of renal replacement therapy is higher amongst ethnic minorities in London than amongst the white population. The relative risk of ESRF in both the Black and Asian population compared to the white population was 2.8; furthermore age-sex specific ratios rose with age, to 4.0 for the black population and 4.6 for the Asian population in older groups. It was concluded that "Whilst these findings could be partly explained by access factors (ethnic populations tend to live closer to renal units), to numerator and denominator inaccuracies (including selective under enumeration), or to the method of ascription of ethnicity, it is probably mainly due to higher incidence of ESRF in these populations. Separate work is ongoing to separate the effect of access from ethnicity."

Other findings presented by Clark et al (1993) for the United Kingdom suggest that there is an increased prevalence of dialysis-dependent renal failure in ethnic minority populations within the West Midlands. Using a sample of 1,038 adult patients with dialysis dependent renal failure treated between 1981 and 1991 the authors reached the conclusion that in comparison with Caucasians a greater proportion of Asians ($p < 0.001$) and Blacks ($p < 0.001$) had ESRF. The relative risk of ESRF in Asians in comparison with Caucasians was 1.76 (95% CI 1.46 - 2.10), and for Blacks it was 1.76 (95% CI 1.39 - 2.20). Amongst Asians hypertension / vascular disease or tuberculosis were more frequent causes of end stage renal failure than amongst Caucasians, whereas diabetes mellitus appeared to be a more common cause of end stage renal failure amongst Blacks than amongst Asians or Caucasians, although this finding did not prove to be statistically significant ($0.1 > P > 0.05$). Hypertension and Lupus (SLE) were also more common causes of ESRF among 'Blacks'. The authors qualify their findings by suggesting that if "these data are confirmed by

prospective study they have implications for service provision". Other UK evidence also suggests there is a higher incidence of ESRF amongst minority groups. Evidence relating to Leicester (cited by Higgins et al 1995) suggests that age adjusted annual incidences of end stage renal failure amongst UK Indo-Asians per annum were 123 and 115 per million population respectively, which compares with 43 and 21.5 respectively for the White population.

Burden et al (1992) also cite UK evidence that implies that there is a higher incidence of ESRF secondary to diabetes mellitus in ethnic groups in Leicestershire. The incidence of ESRF in Asian patients with diabetes mellitus was 486.6 (95% Confidence Interval, 185.1 to 788.1) cases per million person years, which compares with 35.6 (17 to 54.2) in White Caucasians. Another (Thames region) study gave similar estimates of ethnic differentials amongst diabetics: - ESRF rates in the South Asian diabetic population 1974-1988 were estimated at 420 per million compared to 53 in the white diabetic population, a factor of 8:1, and demand for ESRF services was also higher in the non-diabetic Asian population (cited in grey literature).

Treatment requirements: Roderick et al (1994) tried to determine the use of renal replacement therapy by ethnic origin, and ascertain how provision of therapy varied with the distribution of ethnic minority populations. To this end they analysed retrospective and cross sectional data from 19 renal units within the boundaries of the four old Thames Regional Health Authorities. Rates of acceptance for renal replacement therapy (per million population) in 1991-2 were 61 for white people, 175 for black people, and 178 for Asians. The prevalence of renal replacement therapy per million were 351, 918, and 957 respectively. It was concluded that Black and Asian populations have a greater need for renal replacement therapy, and that the need for therapy increases with age. The authors claim that this has implications for the provision of renal services, and also for the management of diabetes mellitus and hypertension. Whilst this is undoubtedly true, it is less easy to establish the extent to which differences are related to a greater genetic susceptibility to disease, or to other factors for example social and health care situations which lead to poorer compliance or poorer accessibility of adequate treatment for diabetes and hypertension (Pugh et al 1995). In either case, the costs can be argued to be unavoidable and ethnic specific.

Boyle et al (1996) used a Poisson regression model in order to analyse the spatial distribution of all 539 adult patients resident in South-West Wales (Dyfed and West Glamorgan) who started chronic renal replacement therapy between April 1985 and March 1994. Findings suggested that there was a significant negative relationship between referral rates and distance from the renal unit for patients aged over 60 but not for younger patients even after controlling for other factors (patient age, population, distribution, socio-economic variables and ethnic group). The prevalence of renal replacement therapy rose from 128 to 454 per million in Dyfed, and from 188 to 647 per million population in West Glamorgan, between 1985 and 1995. This would indicate that the take up of renal replacement therapy amongst ethnic minorities might well be related to geographical proximity to a renal unit. This inevitably complicates any assessment of resource needs for ethnic minorities.

Finally, there may be other treatment costs associated with the higher prevalence and treatment of end stage renal disease amongst ethnic minorities. For example, Moran et al (1992) point out that Erythropoietin therapy has been demonstrated to be effective in treating anaemia in patients with ESRF but it was associated with higher costs of therapy. If this or other drug therapies are used in the UK they will entail an additional treatment cost (between £35 and £70 weekly per patient on current BNF data).

Calculating the Cost of illness: Wight et al (1996) calculated that the cost of running a renal dialysis programme in Sheffield during 1999-2000 for 266 patients was £2.78 million. On this basis the cost per patient for treatment of end stage renal failure are equivalent to £10,451; most sources consulted operated on an estimate of around £10,000 per patient.

iii) Hepatitis C

There is some evidence that the prevalence of both hepatitis B and hepatitis C varies between ethnic groups: in this review we have chosen to focus upon the latter.

Epidemiological evidence: Whilst there is some evidence that Hepatitis C Virus (HCV) infection may be related to ethnic origin (Olynyk and Bacon 1995) our literature searches have failed to identify any good epidemiological information which relates the incidence of hepatitis C to ethnic origin in England. That said, we have discovered that within South Africa the prevalence of Anti-HCV infection rates does appear to vary by ethnic group (Adewuyi 1996), which suggests that this may well also be the case in England. Moreover genotypes of Hepatitis C are ethnically related, indeed Olynyk and Bacon (1995) have identified 6 important HCV genotypes. Genotypes 1a, 1b, 2, and 3 are broadly distributed genotypes most often found in blood donors from the United States, Western Europe and Australia. Type 4 is widespread in Africa and has been found in India, whilst type 5 is prevalent in South Africa and has been detected in the Netherlands.

Differences in the prevalence of hepatitis C and differences in the genotypes of hepatitis C amongst United Kingdom ethnic minorities may go some way towards explaining an observation that has been made (Mutimer 1995) that in England hepatitis C “is a rare cause of liver failure” whilst hepatitis C is a common cause of liver failure for United Kingdom patients from the Indian subcontinent. It is unfortunate that we lack sound English epidemiological evidence to verify this claim.

However one possible explanation for Mutimer’s observation is that ethnic minority hepatitis C patients with cirrhosis may have a high degree of co-morbidity, because such patients have a high likelihood of also having diabetes mellitus. An English survey (Allison et al 1994) compared patients with non-hepatitis C related liver cirrhosis with patients with hepatitis C related liver cirrhosis in a sample of liver transplantation patients. The analysis established a statistically significant link ($p < 0.0001$) between hepatitis C virus infection and diabetes mellitus. Furthermore multiple regression analysis also demonstrated that a regressor relating to ethnic origin (Mediterranean or otherwise) had a statistically significant impact upon the likelihood of an individual having hepatitis C. This implies that hepatitis C is more likely among ethnic minority populations and also more prevalent amongst patients with diabetes.

Treatment requirements: Evidence compiled in the United States suggests that once acquired, hepatitis C is persistent and likely to induce chronic liver disease, leading to high treatment costs. Sharara et al (1996) suggest that as many as 80% of patients show evidence of chronic hepatitis, and between 20% and 35% develop cirrhosis. Unfortunately however it is unclear how much reliance could be placed upon these estimates because as Olynyk and Bacon (1995) point out whilst it is known that hepatitis C can lead to cirrhosis, end-stage liver failure, and hepatocellular carcinoma, it is unclear just how frequently these conditions arise, and there is controversy surrounding “which patients they can be expected to affect.” If this is true of the mainstream population, it is even more likely to be true of ethnic minority populations. This means that determining the treatment requirements of minority populations based solely upon information from the literature is not possible at present.

We do know that, as Sharara et al (1996) point out, “currently no known drug can reproducibly eradicate HCV early in the stage of disease to prevent progression to end-stage liver disease.” Conventional drug therapy involves the use of antiviral agents and immunomodulatory agents which are used in an attempt to alter viral replication and immune response. There is some evidence that different genotypes are associated with different degrees of responsiveness to treatment Olynyk and Bacon (1995). Furthermore in order to treat chronic hepatitis C, interferon alpha 2b (cost per dose £50 - £150) is sometimes used. Around 50% of patients initially respond to treatment (Sharara et al 1996), although relapse occurs in around 70% of patients. Despite these limitations some evidence (Dusheiko and Roberts 1995) suggests that treatment of chronic hepatitis C using Interferon therapy is cost-effective from a societal perspective, in the United States. In the light of the relatively low cost per life year saved in the United States these findings are likely to be generalisable to England. At present, however the drug is not licensed for this use in Britain.

Calculating the Cost of illness: Our examination of the available literature suggests that modelling the cost of illness associated with increased prevalence of Hepatitis C amongst United Kingdom ethnic populations is likely to prove difficult for a variety of reasons:

- The paucity of good information relating to the incidence / prevalence of hepatitis C in England.
- A lack of information on the probability of different ethnic groups advancing to chronic hepatitis C, and then of advancing to end stage renal failure.

- A lack of English cost information in the literature, relating to the costs associated with treatment for hepatitis C at these various different stages.

iv) Tuberculosis (TB)

There is a widely held assumption among health professionals that tuberculosis is a disease associated with minority ethnic groups - most specifically with those of South Asian origin. In practical terms, this results in the more-or-less automatic application of BCG vaccination to children born in this ethnic group (Pharoah, Watson & Sen 1996). A few reports were identified which stated this explicitly, and one of the DPH reports reviewed noted that:

‘Over 50% of cases of TB in Nottingham (1990-1995) were found among individuals with an ethnic minority background’

Bakhshi, Hawker and Ali, further, conclude that ‘from about the second decade of the next century TB in the UK will almost be entirely a problem of ethnic minorities ... even if new infection was eliminated now in Asian people’. We were unable to locate any studies which explicitly costed the implications of the policy of vaccination, or any other associated costs, but this conclusion suggests that it might be cost-effective in terms of prevention.

Epidemiological evidence: MRCCEG (1992) surveyed all cases of TB notified to environmental health medical officers for a 6 month period beginning in January 1988. The notification rate in the white population was 4.7 / 100,000 per year (a decline of 7.2% per annum since 1978). In contrast the rate in the population of Indian ethnic origin was 134.6 / 100,000 per year, whilst in the Pakistani or Bangladeshi population the figure was 100.5 / 100,000 per year. In both the Pakistani and Bangladeshi populations there was a decline of around 6% a year (since 1978) in the annual rate of notified disease. This epidemiological evidence suggests that there are major differences in the prevalence of disease between the white population and certain ethnic groups. However in the light of the other major finding of this paper, namely that in 1988 notification of TB infections in England and Wales had been falling for over a decade, we simply cannot extrapolate from such dated epidemiological evidence in order to provide up to date epidemiological data for a cost of illness study. This is especially the case because it has been suggested (Houston and Fanning 1994) that there has recently been a resurgence of TB infection in industrialised countries, which has been associated with the global epidemic of HIV infection. Some evidence based upon a national survey relating to England and Wales confirms this. Bhatti et al (1995) found that between 1988 and 1992 notifications of TB increased by 12%. Their evidence suggested that the national rise in TB affected only the poorest areas. Moreover the authors argue that local data pertaining to the London Borough of Hackney suggests that socio-economic factors are largely responsible for the increase in TB, and that recent immigration from an endemic area accounts for only a small proportion of the increase. This seems to be likely because an analysis using data from London (Mangtani et al 1995) found that a variable reflecting the influence of changes in the proportion of migrants from New Commonwealth countries was not significantly related to the rate of change in tuberculosis infection in London. Rates of unemployment were, however, significantly related to changes in the level of TB infection. We would argue however that we need to be careful how we interpret this evidence because although changes in the level of TB may not be significantly related to ethnicity, a good proportion of the underlying year on year levels of TB infection may be strongly related to ethnicity. Some evidence which may be taken to support this proposition is presented by Harding et al (1995) who surveyed TB in Croydon between 1988 and 1991. Findings suggested that TB occurred more frequently in those of Indian Sub-Continent (ISC) ethnic origin; of 222 cases presenting at a chest clinic over the period, 65% were of ISC origin, 22% were Caucasian, and 11% were Afro-Caribbean. For Bangladeshi men, Balarajan & Raleigh (1997) present an SMR (age-adjusted death rate) from TB of 422. In Birmingham, Bakhshi and colleagues (1997) present notification rates showing rates between 8.9/100,000 (Caucasian) and 149.9 per hundred thousand, with some effect of ‘birthplace outside UK’ but a degree of confusion over the definitions of ethnic group in use.

Finally, a major national review of TB notifications was located which gives additional support to the ‘ethnic patterning’ of this disease. Closer reading suggests that the key issue may not be ethnic origin but country of origin, since although South Asian (or ISC) patients made up over 40% of notifications, the rate

in this ethnic group has actually declined and ‘Forty nine per cent of patients had been born abroad and the highest rates were seen in those who had recently arrived in this country’ (Kumar et al 1997). It is understood that contributory factors to the prevalence of the disease include poverty, the ‘HIV epidemic’ and homelessness. Cases in the black Caribbean (formerly ‘West Indian’) ethnic group showed a considerable decline. Rates in South Asian people aged under 15 were not different to those of white or other ethnic groups, which may of course reflect the success of the vaccination programme. A significant increase was noted in the Black African group, particularly those who had recently come to Britain.

Minority ethnic patients were about twice as likely to have non-respiratory forms of the disease. A slightly higher rate of resistance to drug treatment (isoniazid) was noted in minority ethnic cases, but those of south Asian origin were very much less likely to be HIV positive. Overall, the implications of this study are that ‘ethnic origin’ data provide a poor estimate of the likely need for TB-related services, while ‘born outside UK’ data may have some relevance.

Treatment requirements: Aber et al (1992) in addition to pointing out that some ethnic groups in England and Wales had a higher rate of TB infection, also pointed out that the type of TB varied by ethnic group. Amongst white patients 80% of patients had only respiratory disease, 16% of patients had only non-respiratory disease, and 4% had both, whereas amongst those of Indian subcontinent ethnic origin 53% had only respiratory disease, 36% had only non-respiratory disease, and 11% had both. A larger proportion of patients of Indian subcontinent origin had TB lymph nodes (both extrathoracic and intrathoracic) with 16% of those with respiratory disease, and 52% of those with non-respiratory TB having lymph node disease. Amongst white patients the figures were 2%, and 37% respectively. These figures imply that the treatment costs of patients with TB are often likely to be greater than amongst white patients.

Calculating the Cost of illness: Based upon the information currently at our disposal it appears that modelling the cost of illness associated with increased prevalence of TB amongst UK minority ethnic populations is likely to prove difficult for a variety of reasons:

- A lack of up to date information on the likelihood of different types of tuberculosis in ethnic groups, and relating to progression of the disease.
- Little English cost information in the literature.

v) *Stroke and Cardiovascular disease*

Stroke is another condition which has major consequences for NHS resources, both in terms of immediate treatment and in the use of subsequent services to support victims with resultant disability. It has been estimated that, like diabetes, this condition also consumes about 5% of a District’s resources (Wade, in Stevens & Raftery 1994). While there is some evidence of ethnic differences in circulatory disease, there is less clarity on the precise nature or direction of these. There is rather more information available on the broader area of Coronary Heart Disease (CHD) than on Cardiovascular Disease (CVD) issues.

Epidemiological evidence: Knight et al (1992) assessed and compared the prevalence of established risk markers for ischaemic heart disease in a sample of Asian and non-Asian men (using a sample of 288 male manual workers aged 20-65 in Bradford). Unfortunately the authors did not examine ethnic differences in the actual prevalence of Cardiovascular disease so these findings are of little practical use for the purposes of the scoping exercise. Evidence from the United States however (Zweifler et al 1995) would seem to suggest that ethnicity may be a risk factor for Stroke, and that ethnic minority populations are less prone to stroke than whites. The authors (Zweifler et al 1995) prospectively evaluated 542 consecutive patients (416 whites, 77 Mexican Americans, and 55 Blacks). The findings suggested that whites had a higher proportion of transient ischaemic attacks (32% versus 18% and 17% for Blacks and Mexican Americans, respectively); there were no statistically significant differences between the groups in terms of prior stroke, hypertension, myocardial infarction, smoking, initial systolic blood pressure, serum cholesterol levels, and functional deficit. However, another paper emanating from the United States (Alter 1994) makes the observation that for the United States population as a whole a national survey suggests that “Blacks carry a disproportionate burden of strokes relative to the number of blacks in the population.” The author also suggests that whites are more likely to suffer from large vessel and embolic strokes whereas blacks suffer a higher frequency of

small vessel and haemorrhagic stroke. The extent to which these findings are generalisable to the United Kingdom is unclear.

Evidence relating to the incidence or prevalence of circulatory system disease in the United Kingdom amongst ethnic populations has proved difficult to obtain, or has proved contradictory. Cruickshank, who has researched the area extensively, suggests that while there is a 'clear excess of stroke deaths' for people of West Indian birth, (at 2-2.5 times the white rate: PMR 214), this is effectively cancelled-out by the deficit in deaths from Ischaemic Heart Disease, when taking into account the raised levels of death from hypertensive (PMR 627) and renal disease (PMR 233) (Cruickshank 1990). This is not however, as he points out, a reason for failing to tackle raised CVD morbidity, and so any additional cost of that activity must be retained in the model. Among Asian populations, however, the mortality risk appears to be greatest from CHD (Ischaemic causes), which has been tied to the so-called 'insulin-resistance' effect - linked, therefore to action relating to diabetes. On the other hand, Balarajan and Raleigh (1997) have recently shown mortality rates among Bangladeshi men to be significantly raised in both CHD (SMR 148) and CVD (SMR 267), as well as from cirrhosis (SMR 254).

Treatment requirements: The treatment requirements of ethnic groups who have a stroke or cardiovascular disease are difficult to define because of a lack of evidence on the prevalence of different types of stroke and cardiovascular disease in ethnic groups in England.

Calculating the Cost of illness: In the light of current information about the prevalence of various types of stroke and cardiovascular disease in ethnic populations in England it is not possible at present to accurately assess any additional NHS costs that may arise because of higher prevalence in ethnic minorities.

The Haemoglobinopathies

Finally, in this section, we consider two conditions which are generally regarded as being effectively 'ethnic-specific' diseases, in that they are 'rare' among the native White population of Britain, and have generally been discussed in the literature only in the context of 'ethnic medicine'. Both labels cover a number of forms of the diseases, and both are hereditary, genetically determined (recessive), so that a 'trait' (carrier) state can be identified but the need for treatment is confined to the rarer homozygotic state. One, Thallassaemia, is most commonly associated with populations of South Asian and Mediterranean origin, while the other, Sickle Cell, is regarded as effectively a marker of the African diaspora, being found at higher rates among people of West African origin, and somewhat lower rates among those of West Indian descent. It is important to note that cases of both have been observed in 'white' patients, and that with the increasing patterns of inter-marriage, the association with phenotypical appearance and known family history will become more problematic.

The evidence for these two conditions is presented very briefly, having been extensively reviewed by the Standing Medical Advisory Committee and others. We would however note that in the grey literature survey, we have found some suggestions that the estimates given may be lower than are found in practice (Streetly et al 1997).

vi) Thallassaemia

Epidemiological evidence: A report by the Centre for Reviews and Dissemination at the University of York suggests that in England there are a projected 44 Thallassaemia affected births per year. Brent and Harrow HA estimated that they were responsible for the treatment of about 35 Thallassaemia Major cases.

Treatment requirements: Modell and Kuliev (1991) outlined what they then considered to be a fairly average range of annual treatment / care required by a patient with Thallassaemia who presents to the UK NHS. They claim that such a patient is likely to require somewhere in the region of 12 transfusions, and 12 out-patient visits, they will require drug therapy (mainly desferrioxamine + accessories), and annual investigations. In addition the costs of screening ethnic groups for Thallassaemia need to be assessed. The report by the University of York assumes that there are 500 people per year requiring treatment due to Thallassaemia.

Calculating the Cost of illness: An assessment was made of approximate treatment costs associated with Thalassaemia in the University of York report. Based upon an assumption of treatment costs per annum of £8,150, and a minimum life expectancy of 35 years, lifetime treatment costs per patient were £285,250. Based upon an assumption of there being 500 living patients the total annual treatment costs in 1995 would be in the region of £4.1 million.

vii) Sickle cell

Epidemiological evidence: A report by the Centre for Reviews and Dissemination at the University of York suggests that in England there are a projected 129 potential sickle cell affected births per year. Brent and Harrow estimated that there were about 350 people with the disease in their area, and eight births annually with the disease (150 with 'trait' - i.e. carrier status).

Treatment requirements: It was assumed that 5000 living patients per annum required treatment. Tables in the reports cited indicate the distribution of these.

Calculating the Cost of illness: An assessment was made of the approximate treatment costs associated with sickle cell in the University of York report. Based upon an assumption of treatment costs per annum of £5,000, and a minimum life expectancy of 45 years, lifetime treatment costs per patient were £225,000. With 5000 patients requiring treatment, overall treatment costs in 1995 were in the region of £25 million.

OTHER SERVICE DELIVERY ISSUES

Culture and religion

Ethnic diversity creates a number of challenges to service providers. The Patient's Charter set up a number of expectations in respect of quality of care, and in 'Standard 1' made explicit reference to the need to respect cultural and religious beliefs. This has been used as a lever for change in a number of health authorities and trusts (cf Imtiaz and Johnson 1994) and clearly has cost implications. In the survey element of this study, reference was made to the need to provide suitable religious support, and there has been some correspondence relating to the need for quiet rooms, mortuary or prayer space which is not dominated by the symbols of the majority (Christian) religion and is suited to religious observance (and/or preparation of the dead) by other faiths. A major study of chaplaincy provision notes that there is considerable variation, and that the formally constituted Hospital Chaplaincy Commission has reviewed multi-faith provision, but apart from remarking on the lack of salaried or fee-supported staff, provides no useful cost data (Beckford & Gilliat 1996). Insofar as additional space may be required, there is the possibility of this having direct resource implications, but in other senses, it may be that an increase in demand for 'other faith' chaplaincy services will be counterbalanced by less work for those currently in post.

Diet

It is well established in 'good practice' literature that a variety of ethnic dietary patterns exist, and many health districts and trusts reported making arrangements to provide these, having tested caterers products for acceptability, and also to translate or otherwise adapt menus. In one case, a pictorial menu was in use, although this might also have been useful for illiterate members of the majority community. Discussions with relevant management staff did not lead to any conclusion as to the real costs of such changes. While cost has been given in the past as a reason for not making changes, none could provide precise details of what these cost might be. We were advised that 'UK patients have very varied dietary requirements', and that the ingredient or 'food' cost of the meal was probably the smallest element in terms of the overall catering budget, compared to heat, transport, staff and indeed wastage. That said, there clearly is a notional element of variance involved in the provision of food to meet vegetarian, halal, and other dietary preferences, although it may also be the case that some of these are cheaper to provide than the 'standard' hospital menu. None of the sites contacted could indicate the proportion of meals served that came from the 'ethnic' or 'alternative' menu.

Lifestyle

In addition to the 'additional' costs arising in the meeting of cultural requirements, it may be that there are longer-term savings to the Health Service, at least in certain ethnic groups, arising from religio-cultural factors in lifestyle. The prohibition on alcohol among Muslims (ignored by a few) is well known, as is the Sikh avoidance of tobacco. Other aspects of minority diet such as traditionally higher intakes of fruit and vegetables, high fibre content, and possibly attitudes toward sexual intercourse, may prove to persist in UK-born descendants, and be 'health-protective'. Therefore, it should not be assumed that 'different' necessarily means either 'more expensive' or 'worse' in terms of Health Service resource use.

Refugees

The field of 'refugee medicine' is less developed in Britain than in some other areas of Europe, but there is increasing awareness that this element of work requires special attention and provision (Johnson & Akinwolere 1997). Some health authorities contain very significant numbers of refugees, whose presence is not recorded in the Census or any other formal datasets. It is clear that special additional services, such as the use of bi-lingual counsellors trained in helping victims of torture and post-traumatic shock may be required, as well as additional advice and information services, many of which may be available through 'third sector' organisations such as the Refugee Council (and local groups). Camden and Islington HA estimates that there are 20,000 refugees in its area, and has recently provided such a counselling service. Such needs may also arise in non-metropolitan areas, such as Brighton where a research study was identified regarding the needs of refugee Copts (Elyas 1997 - grey literature).

Gender

A number of replies to the survey element of the study, as well as references in the research literature, indicate the additional demand for gender matching (mainly, but not exclusively, of female medical staff for female Asian patients - some males also indicated a preference for male nursing and personal care), arising from the presence of minority ethnic groups. Insofar as this was frequently backed by reference to religious requirements, this could be regarded as an 'unavoidable additional cost'. Costing of such additional provision is problematic.

Staffing

A more general issue is the question of the degree to which staff should represent or be drawn from, the minority ethnic makeup of the district in question. Good practice and the legislation would indicate that overall, there should be a measure of proportional representation, which could not be strictly seen as 'additional' in cost terms. That said, there may be cost implications to recruitment and training, or the provision of 'supernumerary' posts in order to ensure that there are staff with the necessary linguistic, cultural and other backgrounds or knowledge to ensure that service planning and provision is informed by ethnic specific concerns and empathy. There are also clear implications for the provision of training in these matters, for all staff and management.

Tissue Types

There is a growing literature on the differences in tissue type found in a society formed by migration. Chances of successful matching across ethnic groups are significantly reduced - but there have been considerable difficulties in recruiting donors from minority groups - so that (grey literature) while 25% of Birmingham waiting lists for kidney transplants are Asian, only 12% of matches, and 1% of donors, are from this group. Similar problems are reported by the Anthony Nolan Trust (bonemarrow) which has fewer than 1,500 African-Caribbean and 4,000 Asian donors on its register of over 280,000 names. Costs are increased for these services by the need to search for extra donors, to carry out complex matching, and to store and cross-index additional types. Delays in matching may also place additional demands on other services (such as CAPD and hospital dialysis), which may over time be more costly. Cord blood and T-cells may also be used in treatment of haemoglobinopathy, and there may be other conditions with similar implications (Mancheta 1997).

Population Demography

As is demonstrated in the data presented in Appendix H, the current demography of most minority populations is significantly different from that of the white majority. In particular, they tend to be younger, with more children and fewer people in older age groups. Total population fertility (the numbers of children in a family) has also historically been greater, although this is now changing to resemble more closely the UK average. While some of these factors may be accounted for by existing weightings in the HCHS formula, there may be scope to consider the effect of age, gender and fertility on costs if their effects are different between ethnic groups. In particular, it has been argued that elders of minority ethnic groups 'age faster' and may require greater intervention or additional services in future (Atkin & Rollings 1993). An alternative view may be that as people age and seek to retire, some of those who are migrants may return to their countries of origin, thereby effectively 'exporting' the cost to the NHS.

REPORTS FROM DISTRICTS

Letters were sent to the Directors of Public Health in each of the English health districts, with a request that they send any data that might be relevant to this study, including if possible a copy of their annual report, and pass the enquiry to any specialist officers (see appendix C). Those failing to reply were sent a reminder letter. Of the 100 contacted, sixty replied, as did five of the regional offices of the NHS Executive. It was not necessarily those with the highest proportions of minority ethnic population that did reply, and several which were known to have specific policy developments and activities did not respond. Information on these was drawn from our own resource collection, when possible.

Most responding districts sent us a letter or replied by telephone and/or supplied copies of (extracts from) DPH reports. Significant numbers also submitted their ethnic minority health development policies, details of expenditure on specific projects or issues, and copies of locally conducted research. The most common element of replies was a Health Needs Assessment, frequently based on Balarajan & Soni Raleigh's guidelines and applied to local (Census-based) population estimates. Many also gave lists of ethnic minority projects, frequently those supported by NHS EHU or other project funding, although few were fully costed in the material that we were sent. Details of the formal 'grey literature' reports, and some examples of other information, are given in appendixes E and F.

Key issues highlighted in these documents and correspondence included:

- Specific illnesses such as Sickle Cell Diseases, Diabetes etc (see elsewhere in this report for more detailed discussion of these);
- Ability to speak and read English, and various proposals to develop interpreter, language line or similar services - sometimes related to other forms of disability;
- Needs for specialist officers and access workers along with research and health needs assessment, including development of consultation and inputs to commissioning processes;
- The need for staff training and the provision of local directories of resources and ethnic specific information;
- The growing availability of ethnic monitoring data.

In addition, a selection of other matters were raised rather less frequently, but deserve consideration, or provide additional insight into local needs and issues that should be incorporated in future service planning and costing:

- Experience of racist incidents as a particular source of stress
- The problems of disassociating ethnicity and deprivation using existing data
- Over-representation in Maternity and mental health services

- The costs of developing ethnic monitoring
- Ethnic-specific health promotion work
- Diet-specific provision (and the problem of getting data on its uptake)
- The implication of S20 of the 1976 Race Relations Act (to avoid discrimination in service provision)
- Prayer facilities
- Single sex facilities
- Equal Opportunity Quality Standards
- Continuity of funding for ethnic health projects and staff
- Port Health issues and follow-up of notification of refugee arrivals
- Possible cultural variations in use of health services
- Workload implications for GPs and facilities offering ‘culturally sensitive’ services
- Rurality or the problem of reaching and serving small, dispersed groups.
- Dental health
- Administrative and management costs
- Problems of registering (minority) donors (kidneys, bone marrow etc)

Finally, by no means the least significant of the comments we received was the need to take into account a variety of different ethnic groups, many of which cannot be identified from census or other routine data. Even when groups were named in the Census, it was often suggested that these estimates were inaccurate, usually underestimating current population numbers because of migration, population growth, or exclusion of locally significant groups which may have been subsumed under ‘other’ categories. Some are differentiated by religion, nationality or status, and some may not fall within the ‘conventional’ definitions of ethnic minority. Others were ‘new’ groups. All, however, had been found locally to have specific needs and/or require particular attention in service development. Those listed included:

- Irish
- Somali
- Yemeni
- Sudanese Copts
- Arabs
- Travellers/Gypsies/Romani
- Armenians
- ‘Muslim lifestyles’.

It was generally apparent that there was a consensus over the need to develop and fund specific health-related activity to meet the needs of minority ethnic groups, although it was accepted by some respondents that changes might not necessarily require additional funding, provided that effort and will was available to bring about reallocation of resources and change. However, only one reply appeared to directly contradict the view that there were unavoidable additional issues, commenting that

the Jarman index ‘gives particular weight to the proportion of people from ethnic minorities. It is widely felt that this is given too much weight’.

It appears from the context that it was felt that social deprivation as represented in locally available data was not concentrated in the same areas as minority settlement. Another contribution also commented that use of Jarman weighting scores over-benefited London districts, and failed to take into account the additional costs of developing and providing services in areas of relatively low minority concentration.

Sixteen (one in four) of the districts replying provided us with some financial data which was readily distinguishable as related specifically to ethnic health care costs. There was very little consistency in this, and none covered all the issues mentioned. Frequently, data related to proposed extensions of existing services (e.g. £200,000 for extension of translation and advocacy services: another district had an annual budget of £7,000 which had been exceeded that year because of growing demand following publicity for the service). East London and City HA had reviewed their costs in particular detail and were able to state that provision for bilingual advocacy and interpretation exceeded £2,000,000. Other specific costs included post-traumatic stress counselling for refugees (KCW - £50,000 over two years), GP and community interpreting services (KCW £60,000 pa; Coventry £48,000 for community services; West Herts £125,000 over five years; Bromley £5,500), and African-Caribbean mental health facilities (Birmingham £305,000; KCW £110,000 pa). Various projects were also mentioned, many part-funded by City Challenge, other urban funds and NHS EHU grants. Many authorities set aside a small grants budget to support development projects and health promotion activity (Birmingham £56,000; Bromley £12,000; Coventry £36,000 Diabetic HP work; KCW £168,000; Tees £24,000). It is not possible to link these data with service levels or the size of minority populations, or even to be sure that they cover all the costs of the services mentioned. Equally, not all of these amounts were charged to NHS budgets but 'matching' funding would only be released against NHS contributions.

DATA AVAILABILITY

It will be clear from the above discussion that analysis of the prime question of this study is severely handicapped by the absence of suitable data. We remain convinced that there are possibilities to overcome this problem, through the analysis of routinely collected health service data, special datasets used for monitoring particular conditions, and other national data sources which have, or are in the process of adopting, ethnic group categorisation as part of their scope. Frequently, reference is made to the expectation that since April 1995, this has been a part of the cmds (contract minimum dataset) available to all 'purchaser' authorities from provider trusts on 'inpatient' episodes. It is equally clear that the standards of recording of these data are poor, and that their reporting is virtually unknown. Several authorities, however, indicate their intention to move on this front, so that they believe they are now in a position to begin analysis. In general, however, until or unless the NHSE and Department of Health make explicit demands for reports based on the data, and implement sanctions for non-compliance, it is unlikely that this will be solved at a national level. That said, we have identified several sources which are sufficiently well developed and may cover a large enough population to form a reliable basis for generalisation in future.

As part of the pre-feasibility element of our study, we requested a colleague to explore the degree to which routinely collected data in the (anonymised) HES dataset might be used to provide more concrete answers to some of our questions. Evaluation of more than one million consultant episodes (fces) recorded in the Oxford Region for 1994/5, 95/6 and 96/97 demonstrated that there is no obstacle in principle to such an analysis, although certain practical difficulties were encountered. It was, for example, possible to prepare analyses which identified numbers of patients with long lengths of stay ('bed-blockers') or 'frequent attenders' (more than an average number of episodes) by age, gender and ethnicity; and to compare the age distributions and length of stay by speciality, gender and ethnicity. A further exploratory analysis considered the proportions of patients in the nine different ethnic group categories recorded (essentially the 'OPCS 10', except that 'other' groups were merged), by broad diagnostic groups, looking in particular at the clinical conditions suggested by Modood et al (1997) as being particularly relevant to 'ethnic health'. These are given in that volume as including Heart Disease, Hypertension, and Non-insulin dependent diabetes. The authors also point out that data relating to mortality and morbidity are sometimes contradictory, perhaps due to poor data recording and non-equivalence of what is measured by proxy variables such as place of birth and 'ethnic group', migration etc.

While it was possible to conduct these analyses, no particularly significant variations could be identified, and in any case findings would have been suspect due to deficiencies in the data. While there were data on

diagnosis and ethnic group, both of these contained very large amounts of ‘not known’ or ‘not recorded’ codes, as many as 50% for ‘ethnic group’ and 30% for diagnoses. It was not possible to establish to extent to which such non-recording introduced bias into the analysis, but clearly it reduced the sample available to a large extent (e.g. to 35% if both ethnic group and diagnoses were required). It is possible that higher levels of recording would be found in areas where the ethnic minority (and its needs) represent a more significant element of the service planning population, especially at a district level. District level data in such cases should also contain a larger number of relevant variables, such as religion and use of interpreter. Furthermore, we were unable in the time available to obtain the requested information on health related groups and costs from the National Case Mix Office at Winchester, to establish the relationship with resource utilisation. Any future study would need to use these, and obtain data from carefully selected health districts which had a high level of quality in their ethnic group data recording. We understand that several have achieved rates over 90%.

Several of the Districts and Trusts contacted in the survey responded in very positive terms. Ealing Hammersmith and Hounslow have begun work to address the issue of quality of coding, and are also planning to include data on ethnic group and treatment in their coronary heart disease risk register, which covers around 120,000 people, and a newly established diabetes risk register covering 50 GP practices. Elsewhere in London, the St Mary’s information system has a reliable set of data incorporating ethnic monitoring. The West Midlands Congenital Abnormality register and Perinatal Mortality datasets have good recording of diagnostic data and code ethnic origin in terms of the 1991 census; some analyses have produced useful findings (e.g. in relation to neural tube defects and folic acid) but there have been some problems in establishing a suitable denominator for the data. These problems could probably be overcome in the context of a research project with access to suitable demographic and statistical expertise. We also understand that the Cancer Registry has some data which may be of value, and that the Confidential Enquiry into Stillbirths in infancy has routinely recorded ethnic origin of mothers since 1994. Some ethnic origin denominator data would also be available from the regular national Labour Force Survey (albeit on a sample basis), which also has some limited information on health status and use of services.

The overall result of our enquiries is that we believe that there do exist sufficient data to commence the costing of service provision for minority ethnic groups, but that this will have to be pursued within selected districts where the use of monitoring, and availability of disaggregated cost data, are best developed. It may not be possible to explore all elements of our conceptual model, but by selecting key conditions, including those for which there may be evidence of lower costs associated with a large ethnic minority population, (such as the cancers), a robust estimate should be feasible. Many districts are clearly concerned about these matters, and have begun their own internal consideration of them. Similarly, we have seen commissioning plans and other internal documents that could not be made publicly available because of confidentiality and commercial sensitivity, but which indicate the existence of internal data which would be helpful to such an analysis. This could be made available to a smaller-scale investigation based on district-level analyses, provided due safeguards were observed.

We finish by referring to the outcome of our scoping and modelling exercise, presented in Appendixes A and B. This should perhaps be read in conjunction with the data in Appendix H and the schema in Appendix G, which spells out the information which would be needed in an ideal model, with a start made on identification of its availability. In these, we have attempted to summarise the findings of the literature review regarding our ‘index conditions’, and to build these into a formula which takes account of the positive and negative cost pressures created by ethnic diversity. The formula can be adapted to suit a variety of additional conditions, including ‘social’ needs (e.g. including in ‘treatment’ cost staffing by specialist or bilingual workers such as trans-cultural psychiatric nurses). It also allows for the fact that generic or majority services also have costs, and that these should be replaced (subtracted) rather than simply added to. Further, approximations can be expected and allowed for, in terms of the variety of ‘ethnic terms’ in use, so that it may be necessary to use a single term for ‘South Asian’ groups, or to insert more specific weightings as they become available.

CONCLUSIONS AND RECOMMENDATIONS

It is clear that there are certain specific health service costs which are associated with the presence of populations of minority ethnic origin. These range from the particular needs of groups for treatment of

medical conditions which are not generally found within the majority population, through the provision of additional services (e.g. interpreters) to enable or facilitate access to generic services, to more indirect influences on costs such as the 'case mix' related to ethnic specific patterns of disease morbidity, and perhaps even more indirectly, through the different demographics of minority communities (including their mobility and the arrival of new groups in the form of refugee populations).

We were advised in one health authority that there was a perception that the high proportion of people from ethnic minority origins was reflected in a relatively high cost for provision of mental health services. Others referred to the significantly higher incidence of diabetes and diabetic-related complications, leading to higher needs for such services as community chiropody. These latter two examples can be shown to fall within the ambit of elements of the cost-budget formula which does contain at least a notional weighting for 'ethnic minority' presence, however flawed. We would therefore argue that there is a good case for considering the broader degree to which this principle might be extended or revised to take account of the findings of this literature review, and the formula updated to utilise more appropriate and/or more sensitive indicators of the population(s) 'at risk'. We have appended tables and maps using 1991 Census data, to illustrate the way in which these data can be used for this.

In saying this, however, we do not wish to imply that ethnic minority populations are necessarily 'more costly' to the NHS than the 'white majority' - or that any calculation should solely advantage health areas serving 'inner city' or 'urban' populations. While the greatest proportion of ethnic minority populations are located within the metropolitan areas, to a much greater extent than the population at large, there are clearly particular problems associated with responding to the specific needs of small minorities where there are no 'economies of scale' to be gained. A case might be argued for a 'flat-rate' payment to cover the costs of setting up (and/or maintaining) a mechanism to identify and meet such needs. The following points summarise the key issues which appear to emerge from our study.

- The presence of minorities is associated in general with a need for interpreter services which require staff additional to generic clinical and administrative provision. Some estimates of the scale of this need are available.
- The use of interpreters has other implications, including not only office accommodation and translated materials, but also training (including the training of medical personnel to use the service) and in terms of the length of the consultation. The precise nature of this needs to be established through UK-based research.
- In addition to interpreter services, access and subsequent compliance with treatment or clinical recommendations, including illness-preventive behaviours, may need to be enhanced by the provision of advocacy services with similar cost implications.
- At a broader level there are budget implications arising from the need for additional mechanisms for consultation with minority populations, to ensure suitable inputs to commissioning procedures. These may include a need for additional local research projects and employment of liaison officers with specialised skills or knowledge.
- Minority populations do make demands for certain additional specific services not used by the bulk of the majority population: it is unclear to what extent the reverse can be stated. Examples of specialised services include those (clinical, scientific and social - e.g. counselling) required in respect of the haemoglobinopathies. Cost estimates of these have been produced for SMAC and the NHS already.
- There are very clear variations in the levels of need for certain other services - notably those relating to diabetes and renal care - which are closely and unavoidably linked to the ethnic make-up of the population. Some of these have been established and are 'allowed for' in costing formulae; others are still to be confirmed or relate to services over which there is some controversy (notably mental health).
- Costs are not necessarily directly linked to the numbers of a minority present: there are certain 'basic' or 'set-up' costs required irrespective of the total number of people 'at risk' - in a sense, there may be 'economies of scale' for some of these.

- Availability of specific (targeted) funds has led in many areas to the development of services which are required but were not previously available - once provided, they have become 'unavoidable' but could not have been made available without initial pump-priming.
- A significant proportion of the above development, and other 'ethnic specific' services, have been funded out of 'Joint Finance' (local authority SSD-led), 'section 11' (Home Office) and/or SRB (urban regeneration grant) monies, as well as the ethnic specific grants of the NHSE and Department of Health.

A number of recommendations can be seen to arise from the findings of the research reviewed in this study. Decisions regarding resource allocation are outside the scope of our remit, but we believe that we have demonstrated the feasibility of developing a structured approach to the question, and that the information required for informed decision making could be elicited, if required, through at least case study approaches.

- There is a consensus that more research could and should be undertaken to establish the actual use of services by minority groups. Data are improving in quality, and such studies should be undertaken at a number of districts to provide a comparative perspective and to incorporate the needs of a variety of ethnic minority groups.
- Some attention should be given to the effects of 'rurality' and the cost of providing services to other minority groups or groups for whom provision is problematic because of their dispersal and infrequency.
- There is clearly scope for a modelling approach using such tools as decision analysis, which would allow consideration of the implications of variation in parameter estimates (e.g. prevalences) on the overall additional costs.
- The NHS R & D strategy, through the specialist responsibilities of the regional directorates, should explicitly take on board the implications of ethnic diversity in planning future research priorities and programmes.

This review has shown that there are costs which can be seen to be unavoidable and additional, as well as others which are desirable or alternative (such as, for example, provision of vegetarian meals or employment of female consultants). The process of drawing attention to minority ethnic needs, and of offering resources, has itself led to developments of service, and it may also be shown that a significant number of these improvements are relevant and desirable to, the majority ('generic' or 'white') population. At the same time, our investigation suggests that there are elements of data collection and budgeting which are absent. This not only hinders the answering of the research question posed here, but also implies an inability to justify some of the mainstream activity and thus meet the needs of the population at large.

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Useful WWW sites:

<http://www.ens.gu.edu.au/eberhard/vl/top/top~ethn.htm>

Australian multicultural mental health development activity

<http://hna.ffh.vic.gov.au/ceh/Welcome.html>

Australian multicultural health development activity

<http://www.fwfs.com/healthda.htm>

American site listing estimates of ethnic groups and health-related data

Selected (Cited) Research Projects and similar Grey Material

Accounting for Diversity: The case for recognising Cultural diversity in the resource allocation process (G Leahy, ELCHA 1997)

Cruikshank J 1993 'The challenge for the AfroCaribbean Community of Controlling Stroke and Hypertension' Paper for HEA Meeting and NTRHA Health & Ethnicity programme

Doncaster (nd) The Health of Doncaster's Black and Minority Ethnic Communities Doncaster Health (Singh P, O'Farrell P, Harkins D: ~1996)

ELCHA 1997 Review of Health Advocacy and Interpretation Services 1997/8 East London & The City Health Authority

HCSU 1994 Report of the Health Care Strategy Unit Review of Renal Services: Part II: Evidence for the Review.

Kensington and Chelsea and Westminster Commissioning Agency, (1994) Health Commissioning Intentions 1995/96: consultation document, KCWHCA.

NHSE North Thames - project funding application: The costs and consequences of bilingual health advocacy/interpretation services (no date or origin: ELCHA)

NHSE South Thames - project funding application: Prevalence and correlates of cardiovascular risk factors in South London (F Cappuccio, SGHMS)

NHSE South Thames - project funding application: Study of non-steroidal and anti-inflammatory drug related gastrointestinal side effects in the African-Caribbean population (T Mahmud, KCH)

NHSE South Thames - project funding application: Primary health care services for children from minority ethnic groups (S Arber, U Surrey)

NHSE South Thames - project funding application: Care in the last year of life: A comparison of Black Afro-Caribbean and White populations of South London (I Higginson, KCH/ St Christopher's Hospice)

NHSE South Thames - project funding application: Oral health needs, attitudes, barriers to care and provision of services to people of ethnic minority groups resident in South Thames region (S Gilbert, KCH Dental Dept)

Rankin J, Bhopal R, Wallace B - Factors influencing heart disease and diabetes in South Asians: The South Tyneside heart study. Gateshead/South Tyne HA & University of Newcastle

Western Health Care Network (Australia) 1997 A Proposed Budget Strategy for Funding Ethnic Mental Health Services Melbourne: Victorian Transcultural Psychiatry Unit

(see also Appendix F)

Appendix A: Summary of main findings regarding 'Index' conditions

Disease area	Epidemiological information	Treatment	Cost
<i>Diabetes</i>	<i>Some:</i> Limited information is available although there is evidence that there is a higher prevalence of Type 2 diabetes (NIDDM) (Simmons et al 1992) and Gestational Diabetes Mellitus (Koukkou et al 1995) in South Asian ethnic groups	<i>Lack of information:</i> Treatment requirements may include: Hyperglycaemia, Amputation, Cardiac problems, (Myocardial Infarction, Angina), Stroke and Cataracts, for Type 1 or Type 2 diabetes The increased / decreased risk of these conditions in ethnic minorities needs to be established for both (Type 1) and NIDDM (Type 2) (End Stage Renal failure is considered in the formula separately). Limited information on the treatment of GDM is however available (Koukou et al 1995)	<i>Lack of information:</i> There is a general lack of recent UK cost information
<i>Hepatitis C</i>	<i>Lack of information:</i> There is only anecdotal or overseas evidence (Multimer 1995) although there is every reason to assume that rates of Hepatitis C infection are higher amongst ethnic minorities (Adewuyi 1996)	<i>Lack of information:</i> Treatment requirements may include treatment for Cirrhosis, End Stage Renal Failure, and Hepatocellular Carcinoma, amongst others. There is a lack of robust UK information on the requirements of various forms of treatment following Hepatitis C infection	<i>Lack of information:</i> There is a lack of UK cost information
<i>Renal Failure</i>	<i>Some:</i> There is UK evidence of increased renal failure in ethnic minority population (Clark et al 1993; Higgins et al 1995; Burden et al 1992)	<i>Some:</i> Evidence suggests that there is a higher rate of acceptance for renal replacement therapy amongst ethnic minorities (Roderick et al 1994)	<i>Some:</i> For end stage renal failure. The cost per patient in 1999-2000 who is treated for end stage renal failure is equivalent to £10,451 per annum. Information on life expectancy and epidemiological data required for full costing. (Wight et al 1996)
<i>Tuberculosis</i>	<i>Some:</i> Information is available (Aber et al 1992) and Bhatti et al (1995). However, the information is a bit dated, or not stated in a suitable form to be used to calculate the Cost of Illness	<i>Some:</i> Aber et al (1992) point out that amongst White patients 80% had respiratory disease, 16% had only non-respiratory disease, and 4% had both, whereas amongst those of Indian subcontinent origin 53% had only respiratory disease, 36% had only non-respiratory disease, and 11% had both. The probabilities of requiring various forms of treatment however need to be assessed	<i>Lack of good information:</i> There is a lack of good cost information
<i>Stroke or Cardiovascular Disease</i>	<i>Lack of information:</i> There is no adequate UK evidence. Moreover overseas evidence is conflicting in relation to the burden of Strokes in ethnic minority populations (Zweifler et	<i>Lack of information:</i> There is an absence of information relating to the probability of ethnic minorities requiring treatment	<i>Lack of information:</i> There is a lack of good cost information

	al 1995; Alter 1994). There is a general lack of epidemiological evidence relating to Cardiovascular Disease.		
<i>Thalassaemia</i>	<i>Yes:</i> A report by the University of York's Centre for Reviews and Dissemination points out that there are on average 44 Thalassaemia affected births per year or 500 people requiring treatment at any one time.	<i>Some:</i> It is estimated that 500 patients per annum will require treatment due to Thalassaemia	<i>Yes:</i> The overall costs associated with treating Thalassaemia patients are outlined. Based upon an assumption of treatment costs of £8,150 per annum and a minimum life expectancy of 35 years lifetime treatment costs per patient were £285,250. Assuming that there are 500 living patients total annual treatment costs would be in the region of £4.1 million
<i>Sickle Cell</i>	<i>Yes:</i> A report by the University of York's Centre for Reviews and Dissemination points out that there are on average 129 potential affected Sickle cell births per annum, or 5000 people requiring treatment at any one time	<i>Some:</i> It is estimated that 5000 patients per annum will require treatment due to Sickle cell	<i>Yes:</i> The overall costs associated with treating Thalassaemia patients are outlined. Based upon an assumption of treatment costs of £5,000 per annum and a minimum life expectancy of 45 years lifetime treatment costs per patient were £225,000. Assuming that there are 5000 living patients total annual treatment costs would be in the region of £25 million
<i>Summary of main findings regarding provision of basic services</i>			
<i>Interpretation & Translation</i>	<i>Yes:</i> Various estimates by the Adult Basic Skills Unit, and local research studies	<i>Some:</i> Consensus that use of family or untrained interpreters is not satisfactory, but no reputable research on 'effects' for health work.	<i>Some:</i> Estimates of need, translation, interpreter and advocacy services are based on current provision rather than needs assessment and 'unit cost' approaches

Appendix B: **Modelling the Unavoidable Costs of Ethnicity**

A: The unavoidable treatment costs due to ethnicity for a specific condition.

The unavoidable treatment cost associated with ethnicity for a district health authority, arising because of a specific health condition is given by:

Equation 1

$$tc_x = \sum_{n=0}^9 (N^n \times P_x^n \times T_x^n) - \sum_{n=0}^9 (N^n) \times P_x^0 \times T_x^0 \dots\dots\dots$$

Term 1 - Term 2

Where:

tc_x = Total net costs associated with ethnicity for a district health authority, arising because of a given health condition 'x'.

Term 1: represents the actual cost of illness associated with all ethnic population groups in the district for condition 'x'.

- (i) N^n = The District Health Authority district population for ethnic group 'n'.
 - N^0 = White population within the Health Authority
 - N^1 = Black Caribbean population within the Health Authority
 - N^2 = Black African population within the Health Authority
 - N^3 = Black Other population within the Health Authority
 - N^4 = Asian Indian population within the Health Authority
 - N^5 = Asian Pakistani population within the Health Authority
 - N^6 = Asian Bangladeshi population within the Health Authority
 - N^7 = Chinese population within the Health Authority
 - N^8 = Other Asian population within the Health Authority
 - N^9 = Other Other population within the Health Authority

(See Appendix H for a Census estimate of the population structure of a typical HA)

- (ii) P_x^n = Probability of ethnic group 'n' having a given condition 'x', for example Diabetes
- (iii) T_x^n = Average annual treatment costs associated with people in ethnic group 'n' having condition 'x' e.g. average annual treatment cost for Black Caribbeans with Diabetes.

$$T_x^n = P_y^n \times C_y$$

Where:

- P_y^n = The probability of a given ethnic population group 'n' requiring treatment 'y', where 'y' covers a range of associated health complications e.g. amputation for Diabetes.
- C_y = The average annual cost of treatment 'y'.

Term 2: represents the predicted cost of illness for condition 'x' in a white population of the same size as the total ethnic population in the district.

The difference between Terms 1 and 2 (tc_x in Equation 1) represents the overall unavoidable treatment costs due to ethnic minorities in a district population arising from condition 'x'.

B: The overall unavoidable costs of ethnicity.

The overall unavoidable costs associated with ethnicity for a district health authority (C) is given by the sum of unavoidable treatment costs for a range of key conditions **plus** the costs of provision of certain basic services (C_s):

$$C = \sum_{x=i}^{vii} tc_x + C_s \dots\dots\dots \text{Equation 2}$$

Where:

- (i) C = Total unavoidable net costs associated with ethnicity for a district health authority.
- (ii) tc_x = Total net costs associated with ethnicity for a district health authority, arising because of a given health condition 'x'. (e.g. index conditions i-vii)
- tc_i = Total net costs associated with ethnicity for **diabetes**.
 tc_{ii} = Total net costs associated with ethnicity for **renal failure**.
 tc_{iii} = Total net costs associated with ethnicity for **hepatitis C**.
 tc_{iv} = Total net costs associated with ethnicity for **tuberculosis**.
 tc_v = Total net costs associated with ethnicity for **stroke/ cardiovascular disease**.
 tc_{vi} = Total net costs associated with ethnicity for **thalassaemia**.
 tc_{vii} = Total net costs associated with ethnicity for **sickle cell**.
- (iii) C_s = Other costs: for example, costs of provision of certain basic services which are not directly linked to population size, such as:
 interpreters, linkworkers, health information, or ethnic monitoring.

C: Treatment Information required to feed into the model.

As part of the scoping exercise, the information required for feeding into Equation 1 for the index conditions (i) - (vii) was identified and the availability of relevant data assessed. Prevalence data is discussed in the text above, and summarised in the tables: an indication of the areas of data needed (and some estimates of availability) is given in appendix G. Here we attempt an outline of sources of variation in treatment costs.

i) Diabetes***Type 1 (Insulin Dependent Diabetes Mellitus) - IDDM:***

Treatment requirements may include:

- monitoring blood glucose levels and patient weight
- amputation
- chiropody services
- orthotic footwear
- dietician services
- insulin (and monitoring insulin)
- treating hyperglycaemia
- hypertension
- treating diabetic retinopathy / cataracts, and screening for diabetic retinopathy
- treating other Type 1 diabetic complications (but not end stage renal failure which is accounted for separately)
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment/ screening requirements

Type 2 (Non-Insulin-dependent-Diabetes-Mellitus) - NIDDM:

Treatment requirements may include:

- monitoring blood glucose levels and patient weight
- amputation
- chiropody services
- orthotic footwear
- dietician services
- treating hyperglycaemia
- hypertension

- treating diabetic retinopathy / cataracts, and screening for diabetic retinopathy
- treating other Type 2 diabetic complications (but not End stage renal failure which is accounted for separately)
- treating other Type 2 diabetic complications, and the associated costs (but not end stage renal failure which is accounted for separately)
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment / screening requirements

Gestational Diabetes Mellitus (GDM).

The prevalence of GDM was around 2% for the population overall, but Africans / AfroCaribbeans has between 4 and 2 times the risk of having GDM relative to Caucasians ($p < 0.01$) (Koukkou et al. 1995)

Treatment requirements may include

- induced labour
- elective Caesarean section
- other treatment / screening requirements

ii) Renal Failure

The rate of acceptance per million population for renal replacement therapy per annum (175 for Blacks, and 178 for Asians, compared with 63 for Whites).

Treatment requirements may include:

- renal replacement therapy
- drug therapy
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment requirements.

iii) Hepatitis C

Treatment requirements may include:

- treatment for cirrhosis
- treatment for hepatocellular carcinoma
- treating other hepatitis C complications, and the associated costs (but not end stage renal failure which is accounted for separately)
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment / screening requirements

iv) Tuberculosis (TB).

Treatment requirements may include:

- drug therapy may involve the use of:

Isoniazid
Rifampicin
Pyrazinamide

and more rarely, Ethambutal and streptomycin (if resistance is suspected). Some new anti-tuberculosis drugs are in use in America but not in the UK.

- therapies other than antimicrobial therapy:
- emergency admissions and hospital stays
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment / screening requirements

The latter, in the interests of public health and to ensure good compliance, may include visits by specialist nurses and information giving (notably for 'new migrants').

v) Stroke or cardiovascular disease

Stroke

Treatment requirements may include:

- hospital stay
- intensive care
- drug therapy
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment / screening requirements

Cardiovascular Disease

Treatment requirements may include:

- hospital stay
- intensive care
- drug therapy
- additional GP / Specialist consultations (excluding interpreter costs, which are dealt with separately to avoid double counting)
- other treatment / screening requirements

vi) Thalassaemia

The number of people in England and Wales with Thalassaemia (500) x The average annual cost of treatment per Thalassaemia sufferer: £8,150) = c. £4.1 million per annum.

vii) Sickle Cell

The number of people in England and Wales with Sickle Cell (5000) x The average annual cost of treatment per sickle cell sufferer : £5,000) = c.£25 million per annum.

Appendix C:

A letter (on University of Warwick letterhead) was sent to all health districts in England, as part of our strategy to obtain locally produced studies and information on practice which had not been described in the formal research and academic literature: this letter is reproduced below:

For the attention of the Director of Public Health

Dear Colleague

The NHS Executive has commissioned CRER and the Centre for Health Services Studies at the University of Warwick to undertake an investigation into the 'unavoidable costs of ethnicity'. The conclusions of this report are intended to inform the discussions of the resource allocation process, if cultural and ethnic diversity prove to have significant effects on the costing of service provision. As part of our strategy to understand the responses of health authorities to the existence of ethnic and cultural diversity within their areas, we are seeking to obtain copies of current or recent annual reports of the Directors of Public Health, and any other reports or commissioning documents you may have which could shed light on the issue.

We are aware that many health authorities have conducted their own local studies into the needs and concerns of minority ethnic groups in their areas, and have set up liaison groups and other projects to meet the specific needs identified. Others have obtained supplementary funding from the NHSE Ethnic Health Unit and Department of Health to run such projects. While we can identify many of those funded by central agencies, and will be contacting them directly if necessary, we should be very grateful if you could advise us of any schemes, research or other relevant activity which you feel would be helpful in compiling this report.

If you wish to speak to the researchers personally, or have any questions to ask about the project, please contact me on the (voice-mail equipped) direct telephone number given above: all (unpublished) information supplied will be treated in confidence, and conclusions of the study shared with those who have supported us with information. We should also be happy to visit you and other relevant officers in your area, if you feel that this would be helpful.

If your authority has a specialist advisor or officer responsible for 'ethnic health issues', please would you also pass a copy of this letter for their attention. Similarly, if you know of relevant activities or officers in Trusts with whom you deal, we should be grateful to hear of them.

Please note that as we shall be meeting the NHSE to review progress in the week of November 24th, it would be helpful if you could reply within the next two weeks.

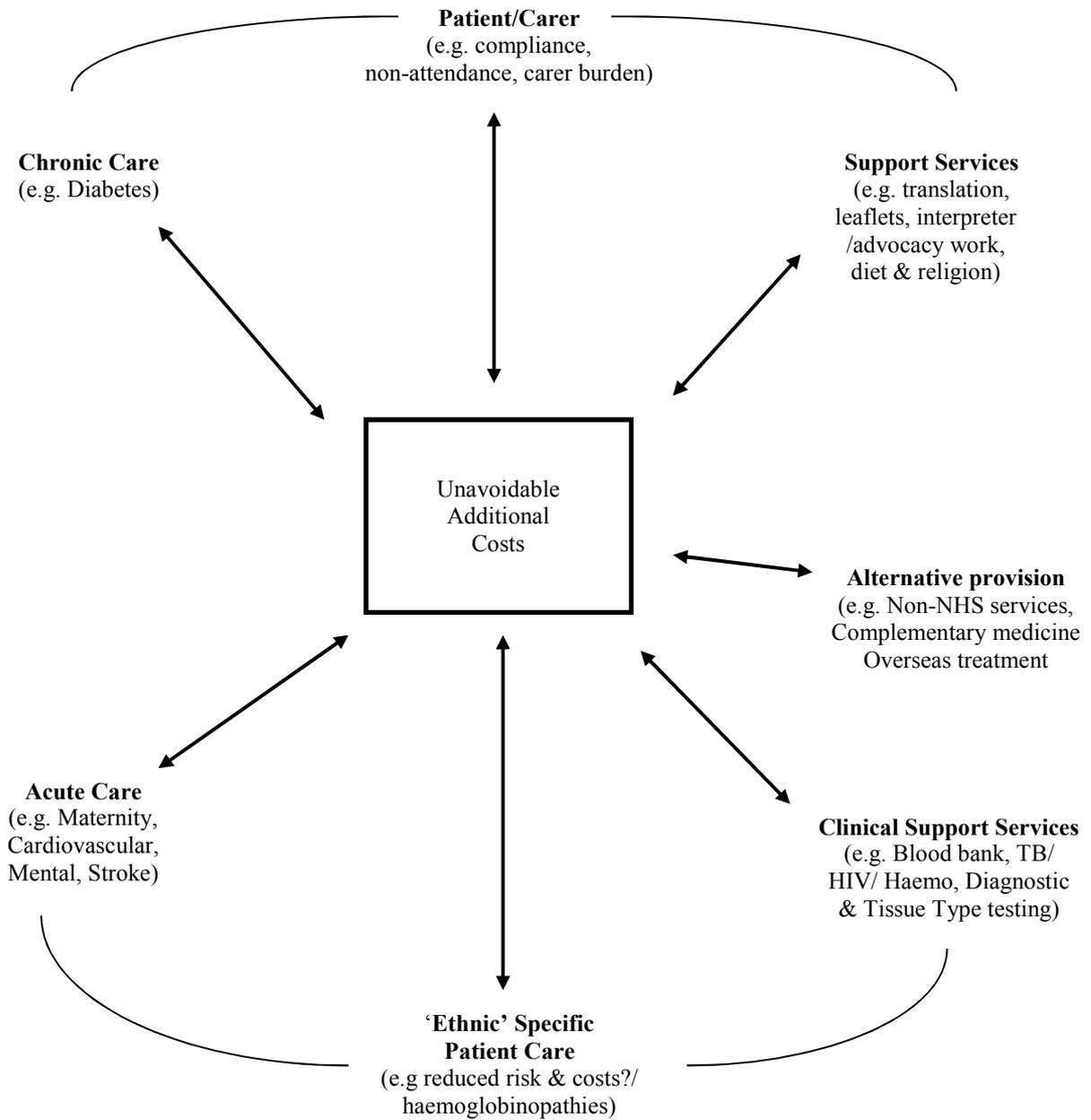
Thanking you in advance for your assistance, and hoping that you will appreciate the potential benefits to be gained from participation in this research,

Yours sincerely,

(Dr) Mark R D Johnson

Appendix D: Conceptual Model of Sources of Cost Variation

A Model of Sources of Cost Variation



Appendix E: Ethnic Health Initiatives - Examples

One District supplied a comprehensive list of ethnic health-related initiatives undertaken since the setting up of a management and ethnic health strategy group: no costs were supplied with this list, but it is indicative of the range of possible activities and demands on resourcing that can be identified: some of these were jointly funded by non-NHS sources (indicated below).

- Maternity service linkworkers
- Joint translation unit
- Bangladeshi and Pakistani commissioning officers
- Locality HP officers with community development projects
- Family Planning & sexual health services for Asian communities
- Family Planning and sexual health services for African-Caribbean communities
- Cervical Screening initiative with African-Caribbean communities
- Community Dental health service improvements
- Additional consultant haematologist sessions to support:
- Haemoglobinopathy service (SCD & Thalassemia)
- Haemoglobinopathy specialist nurse
- Service agreement with OSCAR (Sickle Cell VO)
- Neonatal screening service (African-Caribbean)
- Haemoglobinopathy training programme for community nursing staff
- Mental health Day Centre in African-Caribbean community base
- Respite Care service for African-Caribbean elders (with SSD)
- Asian alcohol counselling service (SSD/DoH specific grant)
- Asian communities (ethnic and gender specific) alcohol support networks
- Mental health information project
- Support for refugee health project
- Drug service co-worker
- Bilingual speech therapy service
- AKASH project (Asian women's health and exercise project: SRB led)
- Bangladeshi access project
- Asian stroke clubs
- Asian dietician
- Asian Diabetes strategy including specialist nursing, dietician and locality based service support
- Provision of service for religious circumcision
- Asian Discharge Planner
- Interpreters
- Various translation activities
- Racial harassment policies and awareness training for managers
- Various needs assessment activities (currently Yemeni group)
- Development of ethnic monitoring in Trusts, staffing and Primary Care

SRB: Single Regeneration Budget grant: SSD - Social services (Local authority department)

A similar list was supplied by another District:

Programme of specialist provision:

Written information, signage and audiotapes, Asian Hospital Radio - 3 Trusts providing 'within existing contract provision':

Interpreting agency provision supported by Urban Programme Grant (no actual cost supplied)

Catering, list of religious contacts and quiet room and multi-faith support worker (bereavement) also within existing contract:

Development of staff training programme for cultural awareness (NCH) funded by 'non-recurrent transfer' from NHA
Some SCD/T provision within existing contract; other supported by Urban Programme - similarly with mental health work

Drug prevention, Asian Child development nurse, Asian and African-Caribbean elders, Stroke support and Disabilities (OT) work funded by joint finance.

Asian Alcohol project supported by NHA (HIP) funds

Asian diabetic worker - within existing contract provision

Development workers to give advice on purchasing - also within existing.

In total - 28 initiatives - 3 UP; 6 Joint; 15 'existing contract' 2 special payment.

Appendix F: Health Districts replying to the Survey, and key Grey Literature

Note: Annual reports of the Directors of Public Health, although supplied by the majority of responding districts, are not listed separately in this list, unless focusing specifically on health inequality and ethnic health matters. Internal informal documents are not generally listed. This is not a complete list of grey literature supplied or consulted, but includes the main research reports supplied and other documents likely to be more widely available.

Avon

Improving the health of black and other minority ethnic people in Avon - a framework for action Avon HA 1997

Barnsley

'Some are more equal than others' : Health, Inequality & Barnsley - Annual Report of the DPH 1993

Berkshire

Bexley & Greenwich

Sickle Cell Disorders in Greater London A Streetly, K Maxwell, A Mejia (Fair Shares for London Report) 1997

Birmingham

Action Plan for Black and Minority Ethnic Health 1996-98

Karim J 1996 Access to Accident and Emergency Services for Minority Ethnic residents Birmingham Heartlands and Solihull NHS Trust

Brent and Harrow

Irish health profile - An investigation into the Health Needs of the Irish Communities in Brent and Harrow (BHHA with BIAS) nd ? 1996/7

Wiles R, Gordon G 1995 Health in Harlesden: Report of a community survey London: College of health

Bromley

Ethnic Health Strategy (BHA 1997)

Buckinghamshire

Access across services: Making it Happen (Report of Conference on improving access to services for minority ethnic communities) BHA 1997

Bury & Rochdale

Cambridge/Huntingdon

Cambridgeshire Interpreting and Translation Agency (leaflet)

Wells C, Foster R 1993 Community Interpreting in Huntingdonshire: A survey of community needs (no cost data)

Camden & Islington

Black and Minority ethnic children in C&I; health services and needs

Homelessness and health

Health needs assessment of Black and Minority ethnic people in C&I

Coventry

Primary Health Care Provision for and with Asian Communities in Coventry: Report to Coventry Health & Muslim Resource Centre, 1995

Implementing Ethnic Monitoring: report of the Pilot study 1992

Croydon

The health of Mothers and babies in Croydon: 1997 annual report of the DPH

Doncaster

Ethnic Minorities Development (Health) Officer's Update and progress report 1997

Dudley

Changing Health Needs in Dudley - Annual report of the DPH 1997

Ealing, Hammersmith and Hounslow

Better health for West London - Annual Public Health report and updated five year strategy (EHHHA) 1996

Ethnicity and health report

Programme budgeting for diabetes in localities

East and North Hertfordshire

Change Growth and Challenge - Annual report of the DPH 1997

East London & The City

Review of Health advocacy and Interpretation Services 1997/8

East Norfolk

East Riding

East Sussex, Brighton & Hove

Elyas S M 1997 Psychological Consequences of seeking Asylum: A survey conducted on the Sudanese Coptic refugees in East Sussex East Sussex, Brighton & Hove Health Authority

Exeter & North Devon

Gateshead & South Tyneside

Gateshead & South Tyneside HA : Rankin J, Bhopal R, Wallace B Factors influencing Heart Disease and Diabetes in South Asians: The South Tyneside Heart Study

Herefordshire

Isle of Wight

Kensington, Chelsea and Westminster

Facing up to difference 1997 and 1995 (Consolidation & Review documents)

Lambeth, Southwark and Lewisham

Leicestershire

Health of People in Different Ethnic Groups in Leicestershire: Technical document appended to the 1993 Annual report of the Directorate of Public Health Medicine, Leicestershire Health.

Liverpool

Liverpool HA Health & Race Information Pack 1997 (& Equality Standards)

Manchester**Newcastle & North Tyneside**

Taking Heart: Reducing Diabetes and Cardiovascular disease among Newcastle's South Asian and Chinese Communities 1996 (Newcastle Strategy Group)

Mughal S 1995 Better services for black and minority ethnic people NNTHA

Don't let me be misunderstood (Save the Children project) User views of interpreting services 1995

Mental health, counselling and Racism: Community views on needs and services 1996

Mapping Exercise of mental health provision for Black people in Newcastle & N Tyneside P Crowley 1996

North and Mid Hampshire**North Cheshire****North Derbyshire**

A Five Year Strategy for North Derbyshire Health to meet the needs of Ethnic Minority Communities 1997 NDHA Ethnic Minorities Health Needs Working Group

North West Anglia

A Measure of Equity: Health Needs of African Caribbean People in the City of Peterborough North West Anglia Health, 1995 (MRD Johnson with D Sangster)

Health Care provision and the Kashmiri population of Peterborough Peterborough Race Equality Council and NWAHA (MRD Johnson with S Imtiaz); 1993

North West Lancashire**North Yorkshire****Nottingham**

Health Needs Assessment of the Black Ethnic Minority Population of Nottingham 1997 (H Nerwal)

(Draft) Report of a study into the health needs of the Mirpuri Punjabi speaking Population of Nottingham

HEA 1997 HIPP: The HEA's Integrated Purchasing Programme

Portsmouth & South East Hampshire

A Health authority perspective on progress and action planning for black and minority ethnic groups (S A Clark 1997)

Salford and Trafford

Profile of Black Communities in Salford 1993 (Salford DHA, CHC & FHSA)

Baxter C 1993 The Communication needs of Black and Ethnic Minority Pregnant Women in Salford (Needs assessment exercise)

Williams G 1993 To tell you the truth, we are completely lost: The Health and Social needs of the Yemeni community in Eccles and Salford SHA

Sandwell

Smethwick Heart Action Research Project

Action for Community Health in Tipton

Refugee health research project (Johnson & Akinwolere - published)

Sefton**Solihull****South and West Devon****South Humber****South Lancashire**

Black and Minority Ethnic Groups in South Lancashire (briefing)

Southampton & South West Hampshire**Tees Health****Wakefield**

Ashrafi KH, Brian AJ 1996 Report of Ethnic Minority Women's Health Project Wakefield HA & CHC

Walsall

Howell J 1996 'Ethnicity and Complementary Medicine in Walsall' (dissertation for Membership of the Faculty of Public Health Medicine) -

Wallis DE 1997 'Travel health: Attitudes, beliefs and Knowledge of Asian people, Primary Care professionals and travel agents' (dissertation for Membership of the Faculty of Public Health Medicine) -

The Health and Lifestyle of Walsall's Asian Community aged 16-65: Results of the 1995 Lifestyle Survey WHA (DoH funded research)

Warwickshire

Services to Black and Minority Ethnic groups: Ethnicity and health strategy - WHA - (nd but 1996 and reviewed periodically) (also Equality Policy 1995)

Better Care Initiatives for Ethnic Minority Groups Uma Sharma - 1994 - FHSA/ RHA funded research projects made recommendations for £7,500-worth of initiatives to develop service provision.

reports include also: Access to Primary Health Care by Ethnic Minority Patients - South Warwickshire/Nuneaton & Bedworth/Rugby districts.

West Hertfordshire

Ethnic communities in West Herts: Core standards

Watford Ethnic Profiling Project

West Herts Annual Health report 1997

Invisible Minorities: Ethnic Minority Community Needs in Dacorum Hemel Hempstead: Dacorum Multi-Cultural Association (Johnson MRD with N Shaheen, R Sanghera) 1995

West Kent

Variations in Health in West Kent 1997**West Pennine**

Evaluation (NHS EHU) of 'People's Centre'

(Hoare et al 1994 Jnl Public Health Medicine 16,2 :179-185);

West Surrey

Health Promotion Service Annual Review 1996/97 - WSHA

Bailey J; Bano S; Randle C 1997 Mental Health - Issues raised within the Asian Community in Woking Woking CRF & WS HPS

Barclay J, Callaghan S (nd) A collaborative enterprise to enhance the health of the Asian population in Woking

WSHA HPS 1996 Study to identify current practices and perceived needs of health professionals and Asian patients and Carers in relation to the use of interpreters and translated information

Linney J; Alder H; Bano S; Bailey J 1996 Final report - health Advocacy Programme West Surrey health Commission & Woking Community relations Forum

Dumelow C, Bailey J 1993 Uptake of health services by the Asian Community Directorate of PHM, N-W Surrey HA

McAllister G 1992 Ethnic Minorities and breast Screening Development Worker project (DoH funded project)

1993 Promoting Healthy Options for Minority Ethnic Women.

Wigan & Bolton

Report of evaluation of Bolton Minorities Community Health Initiative Angela Young, 1997

Wiltshire**Wirral**

Wirral Minority Ethnic Health Development Project 1996 (WHA/WMCO)

Wolverhampton**Worcester****NHS Regional Offices, Trusts etc:**

North Thames

South Thames

North West England

North and Yorkshire

South West

East Birmingham (Heartlands)

South Birmingham CHT

West Midlands Perinatal Audit (Congenital Anomaly Register)

Tonks A, Wyldes M, Whittle M 1997 'West Midlands Congenital Anomaly Register: Neural Tube Defects 1995 - A Report of Incidence, Detection and Outcome'

Appendix G: Data required for Modelling: A matrix of availability

The Scoping Exercise has identified a selection of information that it would be desirable to incorporate into a formal model of cost variations arising from ethnicity. These tables demonstrate the approach, and to some extent indicate what data has, in our initial trawl, been located within currently available published series. It is likely that much more could be obtained at a local, specifically District, level, and will be found in use on a day-to-day basis. Various supplementary exercises could be suggested to extend these data or provide approximations which would be sufficient for modelling processes, such as Delphi exercises or other techniques to acquire working estimates.

Key to Tables

Ethnic groups.

Group 0 = White population within the Health Authority

Group 1 = Black Caribbean population within the Health Authority

Group 2 = Black African population within the Health Authority

Group 3 = Black Other population within the Health Authority

Group 4 = Asian Indian population within the Health Authority

Group 5 = Asian Pakistani population within the Health Authority

Group 6 = Asian Bangladeshi population within the Health Authority

Group 7 = Chinese population within the Health Authority

Group 8 = Other Asian population within the Health Authority

Group 9 = Other Other population within the Health Authority

Symbols

/ - data available for cell; ~ data, not specific to condition/ group or imprecise

= data available for grouped categories of ethnic group (e.g. 'South Asian': 1,2,3)

? data probably available, or apparently reliable estimates in literature

c) Diabetes: Gestational (GDM)

Population group									
Probability of having the condition									
0	1	2	3	4	5	6	7	8	9

Details of treatment needs possibly arising due to health problem	Probability of a given group requiring treatment for a range of associated health problems.										Annual average cost arising because of the range of conditions									
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
Induced labour Elective Caesarean Other treatment Screening	~																			

d) Renal Failure

Population group									
Probability of having the condition									
0	1	2	3	4	5	6	7	8	9
/				=	=	=			

Details of treatment needs possibly arising due to health problem	Probability of a given group requiring treatment for a range of associated health problems.										Annual average cost arising because of the range of conditions									
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
Renal replacement therapy Drug therapy Additional GP / Specialist Consultations for other reasons Other treatment requirements?	/	=	=	=	=	=	=				/	/	/	/	/	/	/			

i) Thalassaemia

Population group	Probability of having the condition	Details of treatment needs possibly arising due to health problem	Probability of a given group requiring treatment for a range of associated health problems	The annual average cost arising because of the range of conditions
		Not detailed here: See SMAC 1994 report		
Group 0	✓			✓
Group 1	/			✓
Group 2				✓
Group 3				✓
Group 4				✓
Group 5				✓
Group 6				✓
Group 7				✓
Group 8				✓
Group 9				✓

j) Sickle cell

Population group	Probability of having the condition	Details of treatment needs possibly arising due to health problem	Probability of a given group requiring treatment for a range of associated health problems	The annual average cost arising because of the range of conditions
		Not detailed here: See SMAC 1994 report		
Group 0	✓			✓
Group 1				✓
Group 2				✓
Group 3				✓
Group 4				✓
Group 5				✓
Group 6				✓
Group 7				✓
Group 8				✓
Group 9				✓

Appendix H: Census data and proportions modelling a ‘typical’ health District.

The following data tables show the ‘average’ ethnic composition of an English Health District. They could be used to assess the degree to which a district has more or less representation of a specific ethnic group (controlling for sex and age-group), and the expected proportion of the overall population represented by any specific ethnic group, by age and sex. Maps illustrate the national variation in distribution of minority groups.

Table 1 (Sheet 1) shows the mean population structure - i.e. the ‘expected actual numbers’ of a typical district with a population of 470,555 in 1991, broken down by the 10-fold Census ethnic category groups, gender and five-year age groups.

- The typical district will contain 16,005 males aged 0-4, of which 14,367 will be White, and 357 belong to the ‘Chinese and other’ group.

Table 2 (Sheet 2) represents the proportion of each age group (broken down by gender) falling in each of the 10 ethnic group categories.

- 93.6% of all males in the district are white; of those aged 0-4, 89.8% are white, and 2.2% are ‘Chinese and other’.

Table 3 (Sheet 3) represents the proportion of each ethnic group category (broken down by gender) falling in each age group.

- Of males, 7.0% are aged 0-4; 6.7% of white males are aged 0-4; 11.9% of Chinese and other males fall in this age group.

Table 4 (Sheet 4) shows the relative proportion of the whole population represented by any specific combination of age, gender and ethnic group category.

- 3.401% of the District population are males aged 0-4: 3.053% are white males aged 0-4 and 0.075% are Chinese or other ethnic origin males aged 0-4. The largest single group is white females aged 25-29 (3.73%).

Maps of the ethnic composition of Health Authorities in England

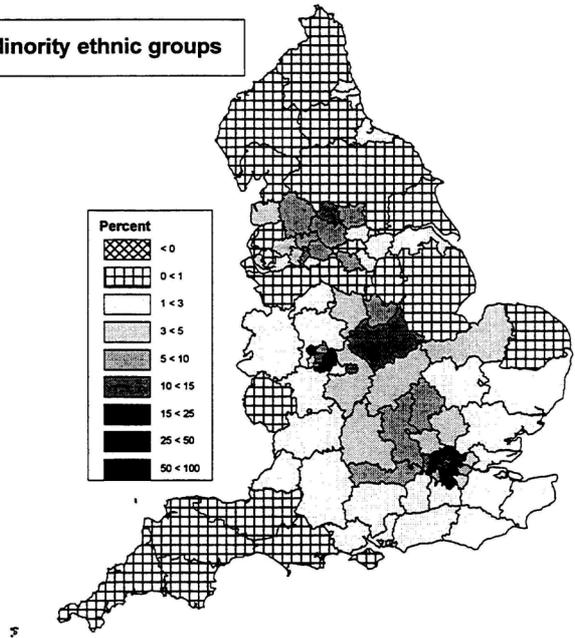
The maps present the ethnic breakdown of the population in 1991, using data from the 1991 Census of Population. The data has been aggregated to the 100 Health Authority Areas as defined in 1996. The ethnic groups used are those defined by the 1991 Census and the variable mapped for each is the percentage of the resident population of the Health Authority area from that ethnic group.

Ethnic minorities from the largest share of the population in London, the West Midlands and the conurbations of North West England and Yorkshire. The minority share of the population is somewhat smaller in HAs falling within the main ‘axis of urbanisation’ running from London to Manchester, and minorities represents a very small percentage of the population of more peripheral and rural HAs. The maps illustrate the different geographical distributions of the minority ethnic groups.

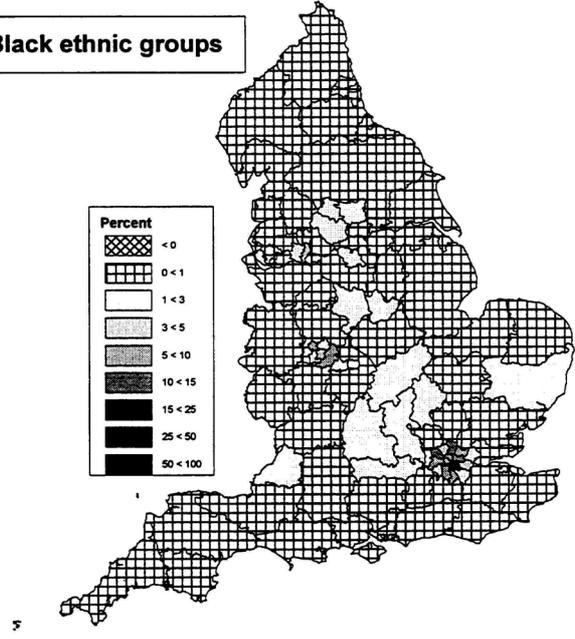
Black people have a more concentrated geographical distribution, focuses upon Greater London and the West Midlands, with a smaller level of concentration in the major Northern cities. South Asians are much more strongly represented in the Pennine area and the West Midlands, in addition to London and the West Midlands. The ‘Chinese and Other’ grouping has a more widespread distribution, but forms a much smaller percentage of the resident population than the other broad minority groupings.

These broad categories conceal variations between individual ethnic groups; for example, within the South Asian category, Pakistani people are much more likely to live in the North and Midlands than in London while Indian people are also strongly represented in London and the East Midlands.

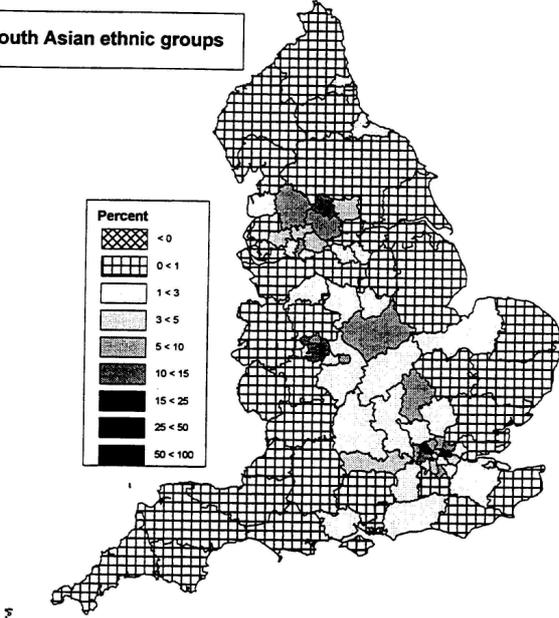
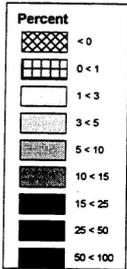
Minority ethnic groups



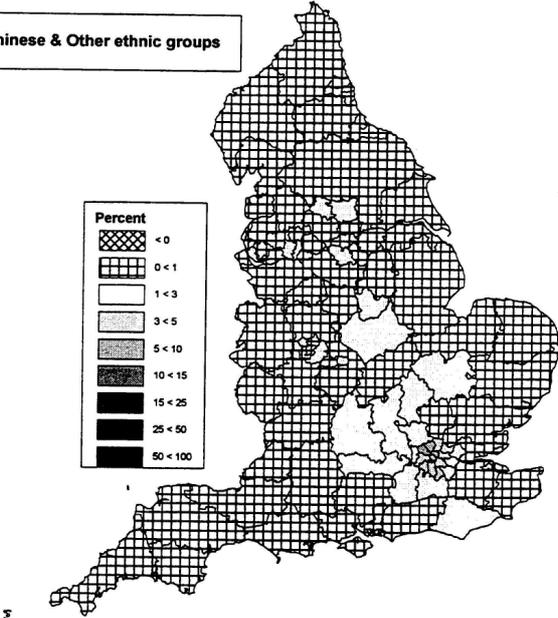
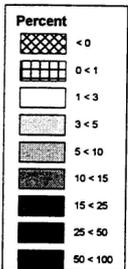
Black ethnic groups



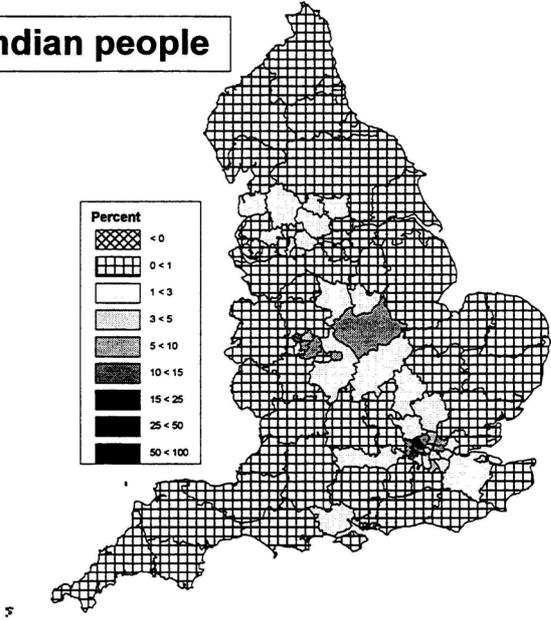
South Asian ethnic groups



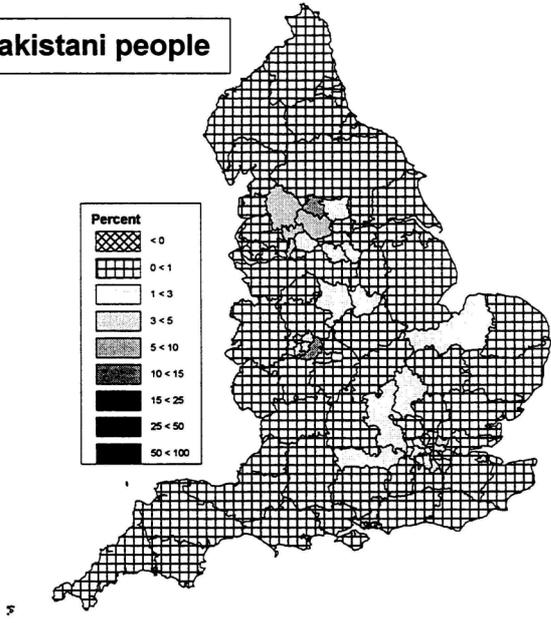
Chinese & Other ethnic groups



Indian people



Pakistani people



Sheet1

Mean population structure for 1996 Health Authorities in England (1991 population) : 5-year age groups

	All	White	Black			Indian	Pakistani	Bangladeshi	Chinese	Other		Born in Ireland	Minority ethnic gps.	Black	South Asian	Chinese & Other
			Caribbean	African	Other					Asian	Other					
Persons	470555	441450	4959	2070	1721	8236	4497	1578	1413	1892	2738	7678	29104	8750	14311	6043
Males	228129	213594	2372	1036	843	4142	2317	823	694	896	1412	3613	14535	4251	7283	3001
0-4	16005	14367	188	124	177	370	302	120	51	76	230	27	1638	489	793	357
5-9	15067	13477	181	94	139	408	326	124	53	77	187	54	1590	415	858	317
10-14	14422	13003	152	74	106	392	314	119	53	68	142	54	1419	332	825	262
15-19	15415	14181	152	69	85	346	241	102	62	66	112	69	1234	306	690	238
20-24	17463	16156	224	110	88	343	201	58	80	87	116	194	1308	422	603	283
25-29	18577	17239	281	151	92	332	133	43	83	88	135	276	1338	524	508	306
30-34	17067	15770	211	135	54	384	165	53	77	97	122	234	1298	401	602	295
35-39	15558	14462	129	87	28	390	172	38	62	93	97	261	1096	244	599	252
40-44	17221	16460	80	56	19	292	94	13	49	84	74	330	761	155	398	207
45-49	14500	13899	108	39	15	206	72	22	31	55	53	372	602	162	300	139
50-54	12818	12098	185	39	12	215	104	51	31	43	42	366	720	236	369	115
55-59	12003	11398	184	24	10	172	89	40	25	28	35	361	606	218	300	88
60-64	11611	11177	145	15	7	123	56	27	17	16	28	324	434	167	206	61
65-69	10799	10546	85	9	5	78	29	8	10	9	18	281	252	100	115	37
70-74	8159	8027	41	5	2	47	11	3	6	5	11	208	132	49	62	22
75-79	6130	6068	17	2	2	24	4	1	3	3	6	130	62	21	29	12
80-84	3532	3505	6	1	1	12	2	1	1	1	3	53	27	7	14	6
85+	1781	1763	2	1	1	9	2	0	1	1	2	21	17	4	11	3
Females	242425	227856	2588	1034	878	4093	2180	755	720	996	1326	4064	14569	4499	7029	3042
0-4	15290	13700	187	122	175	356	290	117	49	75	220	26	1590	484	763	343
5-9	14343	12809	174	92	137	396	312	117	50	75	180	53	1534	403	826	304
10-14	13708	12356	148	73	103	377	290	107	49	66	138	54	1352	325	773	254
15	14793	13608	155	72	86	334	215	91	57	61	113	71	1185	315	639	232
20-24	17876	16446	263	122	104	364	220	69	75	88	123	240	1430	490	653	287
25-29	19102	17556	352	172	113	382	159	47	83	108	132	275	1546	636	587	323
30-34	17254	15863	272	131	60	405	176	43	83	119	102	240	1392	464	624	304
35-39	15711	14581	174	80	29	371	151	49	80	118	78	291	1130	283	571	276
40-44	17352	16478	124	60	19	292	103	36	65	112	64	361	874	203	430	241
45-49	14486	13829	150	43	16	210	72	25	33	64	46	394	658	209	307	142
50-54	12801	12182	186	30	10	190	72	27	29	41	34	378	619	226	289	104
55-59	12149	11672	163	14	8	145	58	16	22	25	26	371	477	186	218	73
60-64	12428	12098	114	9	7	106	33	6	16	17	23	357	330	129	145	56
65-69	12534	12335	63	5	4	71	13	2	11	11	18	330	199	72	87	40
70-74	10721	10602	32	3	3	46	8	2	8	7	12	269	119	37	55	27
75-79	9518	9446	18	2	2	28	4	1	5	5	9	194	72	21	33	18
80-84	6952	6915	8	1	1	14	3	0	3	2	5	100	38	10	18	10
85+	5407	5382	5	1	1	9	2	0	2	1	4	61	26	7	11	7
Persons	470554	441450	4960	2070	1721	8235	4497	1578	1414	1892	2738	7677	29104	8750	14312	6043
0-4	31295	28067	375	246	352	726	592	237	100	151	450	53	3228	973	1556	700
5-9	29410	26286	355	186	276	804	638	241	103	152	367	107	3124	818	1684	621
10-14	28130	25359	300	147	209	769	604	226	102	134	280	108	2771	657	1598	516
15	30208	27789	307	141	171	680	456	193	119	127	225	140	2419	621	1329	470
20-24	35339	32602	487	232	192	707	421	127	155	175	239	434	2738	912	1256	570
25-29	37679	34795	633	323	205	714	292	90	166	196	267	551	2884	1160	1095	629
30-34	34321	31633	483	266	114	789	341	96	160	216	224	474	2690	865	1226	599
35-39	31269	29043	303	167	57	761	323	87	142	211	175	552	2226	527	1170	528
40-44	34573	32938	204	116	38	584	197	49	114	196	138	691	1635	358	828	448
45-49	28986	27728	258	82	31	416	144	47	64	119	99	766	1260	371	607	281
50-54	25619	24280	371	69	22	405	176	78	60	84	76	744	1339	462	658	219
55-59	24152	23070	347	38	18	317	147	56	47	53	61	732	1083	404	518	161
60-64	24039	23275	259	24	14	229	89	33	33	33	51	681	764	296	351	117
65-69	23333	22881	148	14	9	149	42	10	21	20	36	611	451	172	202	77
70-74	18880	18629	73	8	5	93	19	5	14	12	23	477	251	86	117	49
75-79	15648	15514	35	4	4	52	8	2	8	8	15	324	134	42	62	30
80-84	10484	10420	14	2	2	26	5	1	4	3	8	153	65	17	32	16
85+	7188	7145	7	2	2	18	4	0	3	2	6	82	43	11	22	10

Sheet2

Mean population structure for 1996 Health Authorities in England (1991 population) : 5-year age groups : percent of age group

	All	White			Black			Indian	Pakistani	Bangladeshi	Chinese	Other		Born in Ireland	Minority ethnic gps.	Black	South Asian	Chinese & Other
		Caribbean	African	Other	Asian	Other												
Males	100.0	93.6	1.0	0.5	0.4	1.8	1.0	0.4	0.3	0.4	0.6	1.6	6.4	1.9	3.2	1.3		
04	100.0	89.8	1.2	0.8	1.1	2.3	1.9	0.7	0.3	0.5	1.4	0.2	10.2	3.1	5.0	2.2		
5-9	100.0	89.4	1.2	0.6	0.9	2.7	2.2	0.8	0.4	0.5	1.2	0.4	10.6	2.8	5.7	2.1		
10-14	100.0	90.2	1.1	0.5	0.7	2.7	2.2	0.8	0.4	0.5	1.0	0.4	9.8	2.3	5.7	1.8		
15-19	100.0	92.0	1.0	0.4	0.6	2.2	1.6	0.7	0.4	0.4	0.7	0.4	8.0	2.0	4.5	1.5		
20-24	100.0	92.5	1.3	0.6	0.5	2.0	1.2	0.3	0.5	0.5	0.7	1.1	7.5	2.4	3.5	1.6		
25-29	100.0	92.8	1.5	0.8	0.5	1.8	0.7	0.2	0.4	0.5	0.7	1.5	7.2	2.8	2.7	1.6		
30-34	100.0	92.4	1.2	0.8	0.3	2.2	1.0	0.3	0.5	0.6	0.7	1.4	7.6	2.3	3.5	1.7		
35-39	100.0	93.0	0.8	0.6	0.2	2.5	1.1	0.2	0.4	0.6	0.6	1.7	7.0	1.6	3.9	1.6		
40-44	100.0	95.6	0.5	0.3	0.1	1.7	0.5	0.1	0.3	0.5	0.4	1.9	4.4	0.9	2.3	1.2		
45-49	100.0	95.9	0.7	0.3	0.1	1.4	0.5	0.2	0.2	0.4	0.4	2.6	4.2	1.1	2.1	1.0		
50-54	100.0	94.4	1.4	0.3	0.1	1.7	0.8	0.4	0.2	0.3	0.3	2.9	5.6	1.8	2.9	0.9		
55-59	100.0	95.0	1.5	0.2	0.1	1.4	0.7	0.3	0.2	0.2	0.3	3.0	5.0	1.8	2.5	0.7		
60-64	100.0	96.3	1.2	0.1	0.1	1.1	0.5	0.2	0.1	0.1	0.2	2.8	3.7	1.4	1.8	0.5		
65-69	100.0	97.7	0.8	0.1	0.0	0.7	0.3	0.1	0.1	0.1	0.2	2.6	2.3	0.9	1.1	0.3		
70-74	100.0	98.4	0.5	0.1	0.0	0.6	0.1	0.0	0.1	0.1	0.1	2.5	1.6	0.6	0.8	0.3		
75-79	100.0	99.0	0.3	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.1	2.1	1.0	0.3	0.5	0.2		
80-84	100.0	99.2	0.2	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.1	1.5	0.8	0.2	0.4	0.2		
85+	100.0	99.0	0.1	0.1	0.1	0.5	0.1	0.0	0.1	0.1	0.1	1.2	1.0	0.2	0.6	0.2		
Females	100.0	94.0	1.1	0.4	0.4	1.7	0.9	0.3	0.3	0.4	0.5	1.7	6.0	1.9	2.9	1.3		
04	100.0	89.6	1.2	0.8	1.1	2.3	1.9	0.8	0.3	0.5	1.4	0.2	10.4	3.2	5.0	2.2		
5-9	100.0	89.3	1.2	0.6	1.0	2.8	2.2	0.8	0.3	0.5	1.3	0.4	10.7	2.8	5.8	2.1		
10-14	100.0	90.1	1.1	0.5	0.8	2.8	2.1	0.8	0.4	0.5	1.0	0.4	9.9	2.4	5.6	1.9		
15	100.0	92.0	1.0	0.5	0.6	2.3	1.5	0.6	0.4	0.4	0.8	0.5	8.0	2.1	4.3	1.6		
20-24	100.0	92.0	1.5	0.7	0.6	2.0	1.2	0.4	0.4	0.5	0.7	1.3	8.0	2.7	3.7	1.6		
25-29	100.0	91.9	1.8	0.9	0.6	2.0	0.8	0.2	0.4	0.6	0.7	1.4	8.1	3.3	3.1	1.7		
30-34	100.0	91.9	1.6	0.8	0.3	2.3	1.0	0.2	0.5	0.7	0.6	1.4	8.1	2.7	3.6	1.8		
35-39	100.0	92.8	1.1	0.5	0.2	2.4	1.0	0.3	0.5	0.8	0.5	1.9	7.2	1.8	3.6	1.8		
40-44	100.0	95.0	0.7	0.3	0.1	1.7	0.6	0.2	0.4	0.6	0.4	2.1	5.0	1.2	2.5	1.4		
45-49	100.0	95.5	1.0	0.3	0.1	1.4	0.5	0.2	0.2	0.4	0.3	2.7	4.5	1.4	2.1	1.0		
50-54	100.0	95.2	1.5	0.2	0.1	1.5	0.6	0.2	0.2	0.3	0.3	3.0	4.8	1.8	2.3	0.8		
55-59	100.0	96.1	1.3	0.1	0.1	1.2	0.5	0.1	0.2	0.2	0.2	3.1	3.9	1.5	1.8	0.6		
60-64	100.0	97.3	0.9	0.1	0.1	0.9	0.3	0.0	0.1	0.1	0.2	2.9	2.7	1.0	1.2	0.5		
65-69	100.0	98.4	0.5	0.0	0.0	0.6	0.1	0.0	0.1	0.1	0.1	2.6	1.6	0.6	0.7	0.3		
70-74	100.0	98.9	0.3	0.0	0.0	0.4	0.1	0.0	0.1	0.1	0.1	2.5	1.1	0.3	0.5	0.3		
75-79	100.0	99.2	0.2	0.0	0.0	0.3	0.0	0.0	0.1	0.1	0.1	2.0	0.8	0.2	0.3	0.2		
80-84	100.0	99.5	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	1.4	0.5	0.1	0.3	0.1		
85+	100.0	99.5	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	1.1	0.5	0.1	0.2	0.1		
Persons	100.0	93.8	1.1	0.4	0.4	1.8	1.0	0.3	0.3	0.4	0.6	1.6	6.2	1.9	3.0	1.3		
04	100.0	89.7	1.2	0.8	1.1	2.3	1.9	0.8	0.3	0.5	1.4	0.2	10.3	3.1	5.0	2.2		
5-9	100.0	89.4	1.2	0.6	0.9	2.7	2.2	0.8	0.4	0.5	1.2	0.4	10.6	2.8	5.7	2.1		
10-14	100.0	90.1	1.1	0.5	0.7	2.7	2.1	0.8	0.4	0.5	1.0	0.4	9.9	2.3	5.7	1.8		
15	100.0	92.0	1.0	0.5	0.6	2.3	1.5	0.6	0.4	0.4	0.7	0.5	8.0	2.1	4.4	1.6		
20-24	100.0	92.3	1.4	0.7	0.5	2.0	1.2	0.4	0.4	0.5	0.7	1.2	7.7	2.6	3.6	1.6		
25-29	100.0	92.3	1.7	0.9	0.5	1.9	0.8	0.2	0.4	0.5	0.7	1.5	7.7	3.1	2.9	1.7		
30-34	100.0	92.2	1.4	0.8	0.3	2.3	1.0	0.3	0.5	0.6	0.7	1.4	7.8	2.5	3.6	1.7		
35-39	100.0	92.9	1.0	0.5	0.2	2.4	1.0	0.3	0.5	0.7	0.6	1.8	7.1	1.7	3.7	1.7		
40-44	100.0	95.3	0.6	0.3	0.1	1.7	0.6	0.1	0.3	0.6	0.4	2.0	4.7	1.0	2.4	1.3		
45-49	100.0	95.7	0.9	0.3	0.1	1.4	0.5	0.2	0.2	0.4	0.3	2.6	4.3	1.3	2.1	1.0		
50-54	100.0	94.8	1.4	0.3	0.1	1.6	0.7	0.3	0.2	0.3	0.3	2.9	5.2	1.8	2.6	0.9		
55-59	100.0	95.5	1.4	0.2	0.1	1.3	0.6	0.2	0.2	0.2	0.3	3.0	4.5	1.7	2.1	0.7		
60-64	100.0	96.8	1.1	0.1	0.1	1.0	0.4	0.1	0.1	0.1	0.2	2.8	3.2	1.2	1.5	0.5		
65-69	100.0	98.1	0.6	0.1	0.0	0.6	0.2	0.0	0.1	0.1	0.2	2.6	1.9	0.7	0.9	0.3		
70-74	100.0	98.7	0.4	0.0	0.0	0.5	0.1	0.0	0.1	0.1	0.1	2.5	1.3	0.5	0.6	0.3		
75-79	100.0	99.1	0.2	0.0	0.0	0.3	0.1	0.0	0.1	0.1	0.1	2.1	0.9	0.3	0.4	0.2		
80-84	100.0	99.4	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	1.5	0.6	0.2	0.3	0.2		
85+	100.0	99.4	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.1	1.1	0.6	0.2	0.3	0.1		

Sheet3

Mean population structure for 1996 Health Authorities in England (1991 population) : 5-year age groups : percent of ethnic/sex group

	All	White	Black			Indian	Pakistani	Bangladeshi	Chinese	Other		Born in	Minority	Black	South	Chinese
			Caribbean	African	Other				Asian	Other	Ireland	ethnic gps.		Asian	& Other	
<i>Males</i>	228129	213594	2372	1036	843	4142	2317	823	694	896	1412	3613	14535	4251	7283	3001
0-4	7.0	6.7	7.9	12.0	21.0	8.9	13.0	14.6	7.3	8.5	16.3	0.7	11.3	11.5	10.9	11.9
5-9	6.6	6.3	7.6	9.1	16.5	9.9	14.1	15.1	7.6	8.6	13.2	1.5	10.9	9.8	11.8	10.6
10-14	6.3	6.1	6.4	7.1	12.6	9.5	13.6	14.5	7.6	7.6	10.1	1.5	9.8	7.8	11.3	8.7
15-19	6.8	6.6	6.4	6.7	10.1	8.4	10.4	12.4	8.9	7.4	7.9	1.9	8.5	7.2	9.5	7.9
20-24	7.7	7.6	9.4	10.6	10.4	8.3	8.7	7.0	11.5	9.7	8.2	5.4	9.0	9.9	8.3	9.4
25-29	8.1	8.1	11.8	14.6	10.9	8.0	5.7	5.2	12.0	9.8	9.6	7.6	9.2	12.3	7.0	10.2
30-34	7.5	7.4	8.9	13.0	6.4	9.3	7.1	6.4	11.1	10.8	8.6	6.5	8.9	9.4	8.3	9.8
35-39	6.8	6.8	5.4	8.4	3.3	9.4	7.4	4.6	8.9	10.4	6.9	7.2	7.5	5.7	8.2	8.4
40-44	7.5	7.7	3.4	5.4	2.3	7.0	4.1	1.6	7.1	9.4	5.2	9.1	5.2	3.6	5.5	6.9
45-49	6.4	6.5	4.6	3.8	1.8	5.0	3.1	2.7	4.5	6.1	3.8	10.3	4.1	3.8	4.1	4.6
50-54	5.6	5.7	7.8	3.8	1.4	5.2	4.5	6.2	4.5	4.8	3.0	10.1	5.0	5.6	5.1	3.8
55-59	5.3	5.3	7.8	2.3	1.2	4.2	3.8	4.9	3.6	3.1	2.5	10.0	4.2	5.1	4.1	2.9
60-64	5.1	5.2	6.1	1.4	0.8	3.0	2.4	3.3	2.4	1.8	2.0	9.0	3.0	3.9	2.8	2.0
65-69	4.7	4.9	3.6	0.9	0.6	1.9	1.3	1.0	1.4	1.0	1.3	7.8	1.7	2.4	1.6	1.2
70-74	3.6	3.8	1.7	0.5	0.2	1.1	0.5	0.4	0.9	0.6	0.8	5.8	0.9	1.2	0.9	0.7
75-79	2.7	2.8	0.7	0.2	0.2	0.6	0.2	0.1	0.4	0.3	0.4	3.6	0.4	0.5	0.4	0.4
80-84	1.5	1.6	0.3	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.2	1.5	0.2	0.2	0.2	0.2
85+	0.8	0.8	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.6	0.1	0.1	0.2	0.1
<i>Females</i>	242425	227856	2588	1034	878	4093	2180	755	720	996	1326	4064	14569	4499	7029	3042
0-4	6.3	6.0	7.2	11.8	19.9	8.7	13.3	15.5	6.8	7.5	16.6	0.6	10.9	10.8	10.9	11.3
5-9	5.9	5.6	6.7	8.9	15.6	9.7	14.3	15.5	6.9	7.5	13.6	1.3	10.5	9.0	11.8	10.0
10-14	5.7	5.4	5.7	7.1	11.7	9.2	13.3	14.2	6.8	6.6	10.4	1.3	9.3	7.2	11.0	8.3
15	6.1	6.0	6.0	7.0	9.8	8.2	9.9	12.1	7.9	6.1	8.5	1.7	8.1	7.0	9.1	7.6
20-24	7.4	7.2	10.2	11.8	11.8	8.9	10.1	9.1	10.4	8.8	9.3	5.9	9.8	10.9	9.3	9.4
25-29	7.9	7.7	13.6	16.6	12.9	9.3	7.3	6.2	11.5	10.8	10.0	6.8	10.6	14.1	8.4	10.6
30-34	7.1	7.0	10.5	12.7	6.8	9.9	8.1	5.7	11.5	11.9	7.7	5.9	9.6	10.3	8.9	10.0
35-39	6.5	6.4	6.7	7.7	3.3	9.1	6.9	6.5	11.1	11.8	5.9	7.2	7.8	6.3	8.1	9.1
40-44	7.2	7.2	4.8	5.8	2.2	7.1	4.7	4.8	9.0	11.2	4.8	8.9	6.0	4.5	6.1	7.9
45-49	6.0	6.1	5.8	4.2	1.8	5.1	3.3	3.3	4.6	6.4	3.5	9.7	4.5	4.6	4.4	4.7
50-54	5.3	5.3	7.2	2.9	1.1	4.6	3.3	3.6	4.0	4.1	2.6	9.3	4.2	5.0	4.1	3.4
55-59	5.0	5.1	6.3	1.4	0.9	3.5	2.7	2.1	3.1	2.5	2.0	9.1	3.3	4.1	3.1	2.4
60-64	5.1	5.3	4.4	0.9	0.8	2.6	1.5	0.8	2.2	1.7	1.7	8.8	2.3	2.9	2.1	1.8
65-69	5.2	5.4	2.4	0.5	0.5	1.7	0.6	0.3	1.5	1.1	1.4	8.1	1.4	1.6	1.2	1.3
70-74	4.4	4.7	1.2	0.3	0.3	1.1	0.4	0.3	1.1	0.7	0.9	6.6	0.8	0.8	0.8	0.9
75-79	3.9	4.1	0.7	0.2	0.2	0.7	0.2	0.1	0.7	0.5	0.7	4.8	0.5	0.5	0.5	0.6
80-84	2.9	3.0	0.3	0.1	0.1	0.3	0.1	0.0	0.4	0.2	0.4	2.5	0.3	0.2	0.3	0.3
85+	2.2	2.4	0.2	0.1	0.1	0.2	0.1	0.0	0.3	0.1	0.3	1.5	0.2	0.2	0.2	0.2
<i>Persons</i>	470554	441450	4960	2070	1721	8235	4497	1578	1414	1892	2738	7677	29104	8750	14312	6043
0-4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
5-9	6.7	6.4	7.6	11.9	20.5	8.8	13.2	15.0	7.1	8.0	16.4	0.7	11.1	11.1	10.9	11.6
10-14	6.3	6.0	7.2	9.0	16.0	9.8	14.2	15.3	7.3	8.0	13.4	1.4	10.7	9.3	11.8	10.3
15	6.0	5.7	6.0	7.1	12.1	9.3	13.4	14.3	7.2	7.1	10.2	1.4	9.5	7.5	11.2	8.5
20-24	6.4	6.3	6.2	6.8	9.9	8.3	10.1	12.2	8.4	6.7	8.2	1.8	8.3	7.1	9.3	7.8
25-29	7.5	7.4	9.8	11.2	11.2	8.6	9.4	8.0	11.0	9.2	8.7	5.7	9.4	10.4	8.8	9.4
30-34	8.0	7.9	12.8	15.6	11.9	8.7	6.5	5.7	11.7	10.4	9.8	7.2	9.9	13.3	7.7	10.4
35-39	7.3	7.2	9.7	12.9	6.6	9.6	7.6	6.1	11.3	11.4	8.2	6.2	9.2	9.9	8.6	9.9
40-44	6.6	6.6	6.1	8.1	3.3	9.2	7.2	5.5	10.0	11.2	6.4	7.2	7.6	6.0	8.2	8.7
45-49	7.3	7.5	4.1	5.6	2.2	7.1	4.4	3.1	8.1	10.4	5.0	9.0	5.6	4.1	5.8	7.4
50-54	6.2	6.3	5.2	4.0	1.8	5.1	3.2	3.0	4.5	6.3	3.6	10.0	4.3	4.2	4.2	4.7
55-59	5.4	5.5	7.5	3.3	1.3	4.9	3.9	4.9	4.2	4.4	2.8	9.7	4.6	5.3	4.6	3.6
60-64	5.1	5.2	7.0	1.8	1.0	3.8	3.3	3.5	3.3	2.8	2.2	9.5	3.7	4.6	3.6	2.7
65-69	5.1	5.3	5.2	1.2	0.8	2.8	2.0	2.1	2.3	1.7	1.9	8.9	2.6	3.4	2.5	1.9
70-74	5.0	5.2	3.0	0.7	0.5	1.8	0.9	0.6	1.5	1.1	1.3	8.0	1.5	2.0	1.4	1.3
75-79	4.0	4.2	1.5	0.4	0.3	1.1	0.4	0.3	1.0	0.6	0.8	6.2	0.9	1.0	0.8	0.8
80-84	3.3	3.5	0.7	0.2	0.2	0.6	0.2	0.1	0.6	0.4	0.5	4.2	0.5	0.5	0.4	0.5
85+	2.2	2.4	0.3	0.1	0.1	0.3	0.1	0.1	0.3	0.2	0.3	2.0	0.2	0.2	0.2	0.3

Sheet4

Mean population structure for 1996 Health Authorities in England (1991 population) : 5-year age groups : percent of total population

	All	White	Black	Black	Other	Indian	Pakistani	Bangladeshi	Chinese	Other	Born in	Minority	Black	South	Chinese	
			Caribbean	African	Other					Asian	Ireland	ethnic gps.		Asian	& Other	
Persons	470555	441450	4959	2070	1721	8236	4497	1578	1413	1892	2738	7678	29104	8750	14311	6043
Males	48481	45392	5504	0.220	0.179	0.880	0.492	0.175	0.147	0.190	0.300	0.768	3.089	0.903	1.548	0.638
0-4	3.401	3.053	0.040	0.026	0.038	0.079	0.064	0.026	0.011	0.016	0.049	0.006	0.348	0.104	0.169	0.076
5-9	3.202	2.864	0.038	0.020	0.030	0.087	0.069	0.026	0.011	0.016	0.040	0.011	0.338	0.088	0.182	0.067
10-14	3.065	2.763	0.032	0.016	0.023	0.083	0.067	0.025	0.011	0.014	0.030	0.011	0.302	0.071	0.175	0.056
15-19	3.276	3.014	0.032	0.015	0.018	0.074	0.051	0.022	0.013	0.014	0.024	0.015	0.262	0.065	0.147	0.051
20-24	3.711	3.433	0.048	0.023	0.019	0.073	0.043	0.012	0.017	0.018	0.025	0.041	0.278	0.090	0.128	0.060
25-29	3.948	3.664	0.060	0.032	0.020	0.071	0.028	0.009	0.018	0.019	0.029	0.059	0.284	0.111	0.108	0.065
30-34	3.627	3.351	0.045	0.029	0.011	0.082	0.035	0.011	0.016	0.021	0.026	0.050	0.276	0.085	0.128	0.063
35-39	3.306	3.073	0.027	0.018	0.006	0.083	0.037	0.008	0.013	0.020	0.021	0.055	0.233	0.052	0.127	0.054
40-44	3.660	3.498	0.017	0.012	0.004	0.062	0.020	0.003	0.010	0.018	0.016	0.070	0.162	0.033	0.085	0.044
45-49	3.081	2.954	0.023	0.008	0.003	0.044	0.015	0.005	0.007	0.012	0.011	0.079	0.128	0.034	0.064	0.030
50-54	2.724	2.571	0.039	0.008	0.003	0.046	0.022	0.011	0.007	0.009	0.009	0.078	0.153	0.050	0.078	0.024
55-59	2.551	2.422	0.039	0.005	0.002	0.037	0.019	0.009	0.005	0.006	0.007	0.077	0.129	0.046	0.064	0.019
60-64	2.468	2.375	0.031	0.003	0.001	0.026	0.012	0.006	0.004	0.003	0.006	0.069	0.092	0.035	0.044	0.013
65-69	2.295	2.241	0.018	0.002	0.001	0.017	0.006	0.002	0.002	0.002	0.004	0.060	0.054	0.021	0.024	0.008
70-74	1.734	1.706	0.009	0.001	0.000	0.010	0.002	0.001	0.001	0.001	0.002	0.044	0.028	0.010	0.013	0.005
75-79	1.303	1.290	0.004	0.000	0.000	0.005	0.001	0.000	0.001	0.001	0.001	0.028	0.013	0.004	0.006	0.003
80-84	0.751	0.745	0.001	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.011	0.006	0.001	0.003	0.001
85+	0.378	0.375	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.004	0.004	0.001	0.002	0.001
Females	51.519	48.423	0.550	0.220	0.187	0.870	0.463	0.160	0.153	0.212	0.282	0.864	3.096	0.956	1.494	0.646
0-4	3.249	2.911	0.040	0.026	0.037	0.076	0.062	0.025	0.010	0.016	0.047	0.006	0.338	0.103	0.162	0.073
5-9	3.048	2.722	0.037	0.020	0.029	0.084	0.066	0.025	0.011	0.016	0.038	0.011	0.326	0.086	0.176	0.065
10-14	2.913	2.626	0.031	0.016	0.022	0.080	0.062	0.023	0.010	0.014	0.029	0.011	0.287	0.069	0.164	0.054
15	3.144	2.892	0.033	0.015	0.018	0.071	0.046	0.019	0.012	0.013	0.024	0.015	0.252	0.067	0.136	0.049
20-24	3.799	3.495	0.056	0.026	0.022	0.077	0.047	0.015	0.016	0.019	0.026	0.051	0.304	0.104	0.139	0.061
25-29	4.059	3.731	0.075	0.037	0.024	0.081	0.034	0.010	0.018	0.023	0.028	0.058	0.329	0.135	0.125	0.069
30-34	3.667	3.371	0.058	0.028	0.013	0.086	0.037	0.009	0.018	0.025	0.022	0.051	0.296	0.099	0.133	0.065
35-39	3.339	3.099	0.037	0.017	0.006	0.079	0.032	0.010	0.017	0.025	0.017	0.062	0.240	0.060	0.121	0.059
40-44	3.688	3.502	0.026	0.013	0.004	0.062	0.022	0.008	0.014	0.024	0.014	0.077	0.186	0.043	0.091	0.051
45-49	3.078	2.939	0.032	0.009	0.003	0.045	0.015	0.005	0.007	0.014	0.010	0.084	0.140	0.044	0.065	0.030
50-54	2.720	2.589	0.040	0.006	0.002	0.040	0.015	0.006	0.006	0.009	0.007	0.080	0.132	0.048	0.061	0.022
55-59	2.582	2.480	0.035	0.003	0.002	0.031	0.012	0.003	0.005	0.005	0.006	0.079	0.101	0.040	0.046	0.016
60-64	2.641	2.571	0.024	0.002	0.001	0.023	0.007	0.001	0.003	0.004	0.005	0.076	0.070	0.027	0.031	0.012
65-69	2.664	2.621	0.013	0.001	0.001	0.015	0.003	0.000	0.002	0.002	0.004	0.070	0.042	0.015	0.018	0.009
70-74	2.278	2.253	0.007	0.001	0.001	0.010	0.002	0.000	0.002	0.001	0.003	0.057	0.025	0.008	0.012	0.006
75-79	2.023	2.007	0.004	0.000	0.000	0.006	0.001	0.000	0.001	0.001	0.002	0.041	0.015	0.004	0.007	0.004
80-84	1.477	1.470	0.002	0.000	0.000	0.003	0.001	0.000	0.001	0.000	0.001	0.021	0.008	0.002	0.004	0.002
85+	1.149	1.144	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.001	0.013	0.006	0.001	0.002	0.001
Persons	100.000	93.815	1.054	0.440	0.366	1.750	0.956	0.335	0.300	0.402	0.582	1.631	6.185	1.860	3.042	1.284
0-4	6.651	5.965	0.080	0.052	0.075	0.154	0.126	0.050	0.021	0.032	0.096	0.011	0.686	0.207	0.331	0.149
5-9	6.250	5.586	0.075	0.040	0.059	0.171	0.136	0.051	0.022	0.032	0.078	0.023	0.664	0.174	0.358	0.132
10-14	5.978	5.389	0.064	0.031	0.044	0.163	0.128	0.048	0.022	0.028	0.060	0.023	0.589	0.140	0.340	0.110
15	6.420	5.906	0.065	0.030	0.036	0.145	0.097	0.041	0.025	0.027	0.048	0.030	0.514	0.132	0.282	0.100
20-24	7.510	6.928	0.103	0.049	0.041	0.150	0.089	0.027	0.033	0.037	0.051	0.092	0.582	0.194	0.267	0.121
25-29	8.007	7.394	0.135	0.069	0.044	0.152	0.062	0.019	0.035	0.042	0.057	0.117	0.613	0.247	0.233	0.134
30-34	7.294	6.722	0.103	0.057	0.024	0.168	0.072	0.020	0.034	0.046	0.048	0.101	0.572	0.184	0.261	0.127
35-39	6.645	6.172	0.064	0.035	0.012	0.162	0.069	0.018	0.030	0.045	0.037	0.117	0.473	0.112	0.249	0.112
40-44	7.347	7.000	0.043	0.025	0.008	0.124	0.042	0.010	0.024	0.042	0.029	0.147	0.347	0.076	0.176	0.095
45-49	6.160	5.893	0.055	0.017	0.007	0.088	0.031	0.010	0.014	0.025	0.021	0.163	0.268	0.079	0.129	0.060
50-54	5.444	5.160	0.079	0.015	0.005	0.086	0.037	0.017	0.013	0.018	0.016	0.158	0.285	0.098	0.140	0.047
55-59	5.133	4.903	0.074	0.008	0.004	0.067	0.031	0.012	0.010	0.011	0.013	0.156	0.230	0.086	0.110	0.034
60-64	5.109	4.946	0.055	0.005	0.003	0.049	0.019	0.007	0.007	0.007	0.011	0.145	0.162	0.063	0.075	0.025
65-69	4.959	4.863	0.031	0.003	0.002	0.032	0.009	0.002	0.004	0.004	0.008	0.130	0.096	0.037	0.043	0.016
70-74	4.012	3.959	0.016	0.002	0.001	0.020	0.004	0.001	0.003	0.003	0.005	0.101	0.053	0.018	0.025	0.010
75-79	3.325	3.297	0.007	0.001	0.001	0.011	0.002	0.000	0.002	0.002	0.003	0.069	0.028	0.009	0.013	0.006
80-84	2.228	2.214	0.003	0.000	0.000	0.006	0.001	0.000	0.001	0.001	0.002	0.033	0.014	0.004	0.007	0.003
85+	1.528	1.518	0.001	0.000	0.000	0.004	0.001	0.000	0.001	0.000	0.001	0.017	0.009	0.002	0.005	0.002