The hidden cost of being rural: an examination of geographical variations in Local Government funding with a focus on healthcare services.

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Abstract

This research examines the multiple and divergent definitions of rurality employed by public bodies in England. It sets out how evolving definitions have influenced what counts as rural England, and describes the resulting implications for rural land areas and populations. Evolving approaches to defining rural areas reflect changing social and political priorities. Prior to the increased political presence of rural areas, service provision and urban development concerns shaped geographical classifications with rural areas treated as a residual category. However, the rising emphasis on rural affairs policy since the late 1990s, marked by the creation of the Countryside Agency in 1998, has prompted the development of classification systems based on the defining characteristics of rural areas themselves.

The classifications and definitions of rural areas are relevant to the funding of government services as it is these classifications, alongside definitions of deprivation and need, which determine the type of services provided in an area and the amount of funding allocated for their provision. It is impossible to understand the funding services in England without an attempt to provide a summary of the datasets and methods. This thesis provides a guide to the funding methodology of health and social care in England with reference to the role of rural classifications. Although throughout the focus will be on the provision of health and social care services, most, if not all, of the issues raised are, in addition, relevant to the provision of other services.

The cost of delivering health care services to rural areas is higher per capita than their urban counterparts. The current English NHS funding formulae inadequately reflect this additional cost, leaving rural PCTs in debt (Badrinath *et al.*, 2006). The same problems face local authorities in their provisions of health and social care. Currently, in contrast with urban areas, the needs of rural areas are poorly characterised by both generic indices and by inappropriate classification systems. Change to the current formulae is therefore needed and this thesis provides a range of possible solutions.

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Abbreviations

ACA	Area Cost Adjustment: (Local Government Finance Settlement).
ACRE	Advisory Committee on Resource Allocation
AEF	Aggregate External Finance (Local Government Finance)
ASHE	Annual Survey of Hours and Earnings, conducted by ONS.
A&E	Accident and Emergency (NHS)
CA	Countryside Agency
CAP	Common Agricultural Policy
COWs Adjustment	Critical Ordinary Watercourses Adjustment (Local Government Finance Settlement).
CPRE	Council for the Protection of Rural England
DCLG	Department for Communities and Local Government
Defra	Department of Environment, Food and Rural Affairs
DoE	Department of Environment
DoH	Department of Health
DFT	Distance From Target (DoH Weighted Capitation Formula)
DTLR	Department for Transport, Local Government and the Regions
DETR	Department of Environment, Transport and the Regions
EACA	Emergency Ambulance Cost Adjustment (DoH Weighted Capitation Formula)
ED	Enumeration District
EPCS	Environment, Protective and Cultural Services (Local Government Funding)
EU	European Union
FMD	Foot and Mouth Disease
FSS	Formula Spending Shares (Local Government funding 1997 to 2003)
GOR's	Government Offices of the Regions
GMS	General Medical Services (DoH Weighted Capitation Formula)
HA's	Health Authorities
HC	Housing Corporation
HCHFS	Hospital and Community Family Health Service (Welsh version of HCHS, DoH Weighted Capitation Formula)
HCHS	Hospital and Community Health Service (DoH Weighted Capitation Formula)
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
HNI	Health Need Index (New South Wales health funding formula)
IMD2000	Indices of Local and Multiple Deprivation (2000)
LA	Local Authority

LSOA	Lower Super Output Areas
MAFF	Ministry of Agriculture, Fisheries and Food (now Defra)
MFF	Market Forces Factor (DoH Weighted Capitation Formula)
NCVO	National Council for Voluntary Organisations
NHS	National Health Service
NNDR	National Non-Domestic Business Rates
NUTs	Nomenclature of Units for Territorial Statistics
OA	Output Area
ODPM	Office of the Deputy Prime Minster
ONS	Office for National Statistics
OPCS	Office of Population Censuses and Surveys
PCT	Primary Care Trust
PIU	Performance and Innovation Unit
PSA	Public Service Agreement
PSS	Personal Social Services (Local Government Funding)
RARP	Resource Allocation Working Party
RDA	Regional Development Agency
RDC	Rural Development Commission
RNA	Relative Needs Amount (Local Government Funding)
RNF	Relative Needs Formulae (Local Government Funding)
RLP	Rural Lifestyles Project
RNF	Relative Need Formula (Local Government Funding)
RNA	Relative Needs Amount (Local Government Funding)
RSG	Revenue Support Grant (Local Government Funding)
RSS2000	Rural Services Survey 2000
SCFIR	Shire County Fire (Local Government Funding)
SCNFIR	Shire County No Fire (Local Government Funding)
SHARE	Scottish Health Authorities Revenue Equalisation (Healthcare Funding Formula)
SMR	Standard Mortality Ratio
SOA	Super Output Areas
SPARSE	Sparsely Partnership for Authorities Delivering Rural Services
SPLAT	Sparsely Populated Local Authorities Team
SSA	Standard Spending Assessment (Local Government Funding)
WHO	World Health Organisation

Chapter 1: Introduction

1.1 Aims and Objectives of the Research

This research examines the multiple and divergent definitions of rurality employed by public bodies in England. It sets out how evolving definitions have influenced what counts as rural England, and describes the resulting implications for rural land areas and populations of that geographical entity. Evolving approaches to defining rural areas reflect changing social and political priorities. Prior to the increased political presence of rural areas, marked by the creation of the Countryside Agency in 1998, it has been service provision and urban development concerns that have shaped geographical classifications with rural areas treated as a 'residual' category. The rising emphasis on rural affairs policy since the late 1990s has prompted the development of classification systems based on the defining characteristics of rural areas themselves. However, such systems still struggle to cope with the interdependency between rural and urban areas.

The four most commonly used classification systems in England are; the Office of National Statistics 1991 Urban Areas, Tarling *et al.*'s Local Authority District classification system for the Rural Development Commission [1993], the Oxford - Countryside Agency ward-based system [1998] and Defra's Rural/Urban Output Area-classification [2004]. This thesis will focus on two contrasting local authorities: the County of Devon in South West England and the City of Bradford Metropolitan District in West Yorkshire. Utilising the different classifications will allow comparisons to be drawn between the different definitions. Maps of the case study areas will be created which illustrate and examine how the percentage changes in the population totals, and the land area defined as rural or urban, changes within local authority areas.

The classifications and definitions of rural areas are relevant to the funding of government services as it is these classifications, alongside definitions of deprivation and need, which determine the type of services provided in an area and the amount of funding allocated for their provision. Throughout this thesis the focus will be on the

provision of health and social care services. However, most, if not all, of the issues raised are relevant to the provision of other services.

The cost of delivering health care services to rural areas is higher per capita than that of their urban counterparts. The current English NHS funding formulae inadequately reflects this additional cost, leaving rural Primary Care Trusts in debt (Badrinath *et al.* 2006). The same challenges face local authorities in their provisions of health and social care. Currently, in contrast with urban areas, the needs of rural areas are poorly characterised by both generic indices and by inappropriate classification systems. Change to the current formulae is therefore needed. In order to inform ideas for change to the current formula, advice was sought from local government organisation and healthcare providers within England. In extension to this, lessons are drawn from the comparative approaches to health care funding in other countries, which have until now been neglected. Having chosen countries with significant rural populations, their healthcare funding mechanism is examined, focusing on how their alternative approaches could influence the funding of health and social care in England.

The overall aim of this research therefore is to examine geographical variations within the funding of health and social care services in rural England. To achieve the aim of this thesis the following objectives were formulated:

1) To review and discuss the research methods and the definition of rural areas in use within the academic community.

2) To compare existing classifications and definitions of rural areas in England

3) To understand the challenges presented to healthcare providers in rural areas and examine why health and social care funding currently fails to recognise these special circumstances.

4) To provide an accessible and understandable description of health and social care funding in England

5) To compare the funding of health and social care services in England to those

in use in the rest of the UK and to International examples, and then examine the lessons learnt in the context of possible funding formula improvements.

6) Propose changes to the classification of rural areas used within health and social care delivery formula in order to improve the funding of rural areas.

1.2 Organisation of the Thesis

The thesis is organised into nine chapters as outlined in Table 1.1. This table relates the chapters to each of the research objectives.

Objective	Chapter
1: Review and discuss the research methods and the definition of rural areas in use within the academic community.	Chapter 2: A review of academic literature as it impacts on 'definitions of rurality and rural areas'
2: Compare existing classifications and definitions of rural areas in England	Chapter 3: Classifying Rural Areas
3: To understand the challenges presented to healthcare providers in rural areas and examine why health and social care funding currently fails to recognise these special circumstances.	Chapter 4: Healthcare in Rural Areas: Problems and Challenges
4: Provide an accessible and understandable description of health and social care funding in England	Chapter 6: Review of NHS Funding in England Chapter 7: Local Government Funding
5: Compare the funding of health and social care services in England to those in use in the rest of the UK and to International examples, and then examine the lessons learnt in the context of possible funding formula improvements.	Chapter 5:Lessons from other Healthcare Systems
6: Propose changes to the classification of rural areas used within health and social care delivery formulae in order to improve the funding of rural areas.	Chapter 8: Analysis and Implications Chapter 9:Conclusions and Recommendations for the Future

Table 1.1: The relationship of each chapter to the research objectives

Objective 1: Review and discuss the research methods and the definition of rural areas in use within the academic community.

Chapter Two provides an overview of research undertaken on the characteristics and definitions of rural areas within the academic community. The history of rural research and some of the associated challenges to conducting it will be covered in the first part of this chapter. The chapter then moves on to evaluate the definition and classification of rural through three academic discourses: social representations of rurality, socio-economic characteristics, and area morphology.

Objective 2: Compare existing classifications and definitions of rural areas in England

After Chapter Two has compared definitions within the academic community, Chapter Three introduces the definition and classification of rural and urban areas in England used by various government organisations for the distribution of funds and the assessment of service need. Section 3.1.2 examines the rationale behind why we classify and then sections 3.3 to 3.8 examine some of the classification systems used within Governmental organisations in England. The chapter ends with a review of the Defra 2004 Classification of Rural and Urban Areas (Shepherd *et al*, 2004). This classification is gaining wide acceptance within Governmental organisations as the new 'official' classification of rural areas.

Objective 3: To understand the challenges presented to healthcare providers in rural areas and examine why health and social care funding currently fails to recognise these special circumstances.

Arguably the most important question for those involved in rural healthcare provision is whether it is possible to target resources fairly in rural areas, since it is in these areas that deprivation and need are both geographically sparsely distributed and hidden. Chapter Four explores whether rural definitions can be created and implemented which are able to identify deprivation and heath related needs within rural communities. The following section examines the literature on rural health and healthcare, and details how

the perceived low levels of both poor health and of need in rural areas are actually open to debate. The chapter moves on to explain the healthcare structure in the case study areas and the needs and demands that could be identified and better met through new rural definitions.

Objective 4: Provide an accessible and understandable description of health and social care funding in England

Chapter Six discusses in detail the first of two main healthcare funding mechanisms in use in England, namely the NHS Weighted Capitation Formula. The chapter explains the components of the formulae and then analyses the impacts the funding outcome has for rural healthcare provision. Chapter Seven then provides detail on the second of the two main healthcare funding mechanisms, namely the Local Government Finance Agreement. The areas of the funding formulae which do account for the effects of rurality on service provision cost are examined and questions are raised about why this coverage is patchy and inconsistent across the formulae.

Objective 5: Compare the funding of health and social care services in England to those in use in the rest of the UK and to International examples, and then examine the lessons learnt in the context of possible funding formula improvements.

Chapter Five compares healthcare funding formulae in operation in other countries, focusing initially on other parts of the UK, then moving on to examine Australia, New Zealand and the USA. The chapter explores how these countries incorporate rurality in their funding arrangements and suggests what lessons could be incorporated within the English approach. The lessons learnt here were used to influence the tests in Chapter Eight to produce a fairer funding outcome for rural areas.

Objective 6: Propose changes to the classification of rural areas used within health and social care delivery formulae in order to improve the funding of rural areas.

The final objective of this thesis is covered in Chapter Eight with possible follow up work described in Chapter Nine. Chapter Eight details the construction of a variety of 'what if' scenarios to establish which elements of the Local Government Funding

formula were most sensitive to changes in the sparsity thresholds and establish the impact of different geographic scales. The tests then went on to establish the impact of using different rural definitions, which were discussed in Chapter Three, to explore if any of these were perceived to provide a 'better' outcome for rural areas.

Chapter 2: A review of academic literature as it impacts on 'definitions of rurality and rural areas'

2.1: Introduction

The implications of how rural and rurality are defined are far-reaching as they impact upon research results, policy development and application, programme administration and fund allocation. Rural studies have enjoyed a long tradition within English geographical research. The history of rural research and some of the associated challenges to conducting it will be covered in the first part of this chapter, whilst the second part of the chapter will provide a commentary on the issue of defining rurality and rural areas by discussing the current conflicting discourses within rural geography. These range from an abstract sociological construct to area based geodemographics.

This chapter provides an overview of research undertaken on the characteristics and definitions of rural areas within the academic community. Many academics have long been wary of using the word 'rural' in anything other than a loose and generic sense, with some suggesting that it is unhelpful to use it at all (Hoggart, 1990). If a special definition is to be formed then caution is required as the data may be insufficient to provide valid comparative analysis. Whilst an urban to rural transition may be recognisable, it takes place across many different variables such as: density of human settlement, remoteness from urban centres, patterns of land use and balance of particular economic sectors (Hodge and Monk, 2004). These variables transform at different rates in different locations. Therefore, there can then be no logical point at which 'urban' changes to 'rural' as the character of rural areas varies between places and through time. As a result Hodge and Monk state that "any search for a single definitive definition of rural must be arbitrary at best and potentially futile" (2004, p264).

Whilst there may be considerable conceptual justification for this attitude, policy makers have pragmatic reasons for requiring definitions. Once spatially defined areas are identified, it is a small step to provide descriptive data identifying the characteristics of those areas. Research methods such as geodemographics or function regions, recognise the need for definitions and classifications and strive to provide useful interpretations of the plethora of data available.

During the development and expansion of geographical and rural studies Newby (1986) noted that Britain avoided the rigid institutionalisation of the rural studies discipline that developed in North America, and most of Continental Europe, with the growth of institutions such as Land and Agricultural Universities. Britain kept a much wider research base with fewer separate departments and resulting disciplinary divisions. The cost of this was a great lack of research funding in comparison.

During the inter-war years traditional geography was beginning to develop with comparisons between urban and rural areas growing. Geographical studies of rural areas maintain a primary focus on the agricultural sector analysis. Studies in this period focused on two main features of rural areas. Land ties were still strong in the inter-war years with families having strong social ties to land and rural society was geared to maintaining the traditional land holding system. Alongside this, was a strong desire by society to defend the "sanctity" of rural traditions and culture. This defence of 'rural' was strongly influenced by its popularity in the USA. Rural areas were commonly regarded, as they often are today, as being under threat from externally imposed economic and social changes. The portrayal of rural England in a positive nationalist light reinforced the support for its protection and preservation. The task therefore for geographers and sociologists at this time was to document these ways of life before they disappeared. As today, the countryside was viewed as a stable and static environment whose positive future would be through the maintenance of its static nature rather than through the rapid development happening in urban areas in the same period.

Up until the inter-war period the distinction between what was rural and what was to be regarded as urban was generally seen as a clear divide. Though as early as the 1920s there was recognition by some that it was not this clearly defined, "in reality the

transition from a purely rural community to an urban one ...is not abrupt but gradual" (Sorokin and Zimmerman 1929 p.16 quoted in Cloke 1977 p.31). The next phase to dominate the rural definitions debate was the coining of the term "rural-urban continuum". This idea was pioneered by Redfield in his 1941 paper and his ideas were widely supported in the USA, with Queen and Carpenter agreeing that there was a "continuous graduation in the United States from rural to urban rather than a simple rural-urban dichotomy" (Queen and Carpenter 1953 p. 38, quoted in Cloke 1977 p.31).

This new idea of a rural-urban continuum went some way to explaining the rural – urban relationship and was certainly a better explanation than that of a simple rural-urban divide. From the mid 1960s onwards the geographical approach to studying rural areas changed dramatically. The conventional image of rural communities as stable and static was simply no longer tenable and various critiques emerged. However far the rural-urban continuum theory went, it was still not adequate to explain the complexities of the relationship. Mitchell echoed the continuing criticism of the then still-used model accusing it of being unrepresentative in that it is both over-simplified and misleading (Mitchell 1973, Quoted in Cloke 1977 p.32). In large part, problems of definition arise because of the marked variation in social, economic and environmental conditions between areas that are commonly regarded – by inhabitants and outsiders – as 'rural'." (PUI Report 1999 p21)

In 1966 Pahl began to examine an extension in complexity to this simple model by suggesting that the continuum concept might be replaced by "a whole series of meshes of different textures superimposed on each other, together forming a process which is creating a more complex pattern" (Pahl 1966, p. 327). By the 1970s there was also a realisation that many of the problems facing urban communities, such as poverty or education, were the same as those facing rural communities. This began the questioning of the existence of the rural-urban distinction and there were questions by some as to whether it should be abandoned. Bailey highlighted the difficulties of maintaining the strict distinctions within academic study. "(T)he crux for the sociologists is that the defining parameters of social problems are the same for rural as for urban areas" (Bailey 1975, p. 117).

It was after this realisation (that parameters overlapped specific geographical distinction) that the pure and applied geography schools of thought moved away from the purely quantitative analysis of rural areas and began to see encompassing themes. Themes such as poverty and social inclusion came to dominate the discipline rather than studies which were entirely location-based and focused on rural and urban differences and division. The split came because as Cloke put it at the time:

> "...planners are not yet ready to follow sociologists into a non-spatial view of rural and urban as a unitary area simply because of the vast differences in scale between the two extremes." (Cloke 1977 p.32)

Cloke felt that this theme had value by reducing the preconceived attributes of a study which came with the development of research based on location type rather than study focus. However, Cloke recognised that it was not yet possible for the processes of practical application and implementation of policy to follow this route.

At the time of writing, Cloke was still supportive of the idea that there were some characteristics which were distinctly rural and some which were distinctly urban. By measuring themes using qualitative methods he argued it would be possible to determine a degree of rurality and that "...attempts should be made not only to pin down the nebulous concept of rurality, but also to measure differences in the degree of rurality" (Cloke 1977 p3). Though Cloke believed that qualitative methods could be expanded into a policy concept most geographers did not. Peck (1999) expounded on the incompatibility of the two approaches (pure and applied geographies) in his editorial "Grey Geography". The culmination of this incompatibility was the split between the new sociological thinking of theory based research and the applied researchers creating practically applied government and business policy. The irredeemable split still exists in the attempt to establish a degree of rurality.

There are major opportunities for research in remote and rural areas. Recent events have focused political attention on the health and well-being of rural communities, and have highlighted the particular problems faced by such communities. Issues of health care organisation and delivery are being reconsidered. New models are being

advocated and it is essential to investigate the clinical and economic impact of these models. Existing informal healthcare networks in rural and remote areas may allow scope for much needed primary care/secondary care collaboration in research (Asthana *et al.*, 2002; Watt *et al.*, 1994). One methodological advantage of more scattered communities is that it may be possible to carry out studies of interventions with less risk of statistical contamination between centres. Whereas patients and health care professionals in some urban areas may feel that they have been over-researched, this is less likely to have occurred in rural practices where they may be more willing to participate, especially if the research has local relevance.

2.2: Challenges to carrying out Academic Rural Research

Most people have an intuitive notion of what "rural" means, but a precise and universally accepted definition has thus far eluded researchers and public administrators. "Rural," to most people, is "non-urban," "urban" is "non-rural"—a largely tautological definition that is not particularly helpful for research purposes. Depending on the specific definition of "rural" that is used, very different results can be obtained. In a large portion of research publications this problem is side-stepped by authors who do not explicitly define "rural," typically using the term as if the readers already know what it means. The lack of a precise definition means that comparisons of the results can be problematic.

The lower population and characteristic sparsity of rural populations means it is extremely difficult to find sufficient numbers of participants for research studies (in order to achieve statistical reliability) in comparison in centres of high population density. For research carried out in rural primary care trusts (where general practice list sizes are comparatively small) more general practices need to be involved to attain adequate numbers of patients or health care professionals. This leads to recruitment difficulties and to greater confounding effects of variation between practices (Godden and Richards, 2003). The wide geographical scatter of subjects may lead to important cluster effects in studies, and these must be considered at the design stage for the study

to be valid. Logistical difficulties are particularly important where local data collection is required. For example, the population density of the Scottish Highlands in the year 2000 was only 8 persons per square kilometre (General Register Office for Scotland). This necessitates prolonged travelling time for the researcher if subjects are to be studied close to home, or for the subjects if they are required to visit a central location. The latter problem may have a significant impact on participation rates in studies.

Research costs are heavily influenced by the expense of rural travel. Godden and Richards (2003) estimated the travel costs for an Inverness-based researcher to carry out a series of 1000 home interviews in a randomly selected population sample derived from Highland Region and the Western Isles at £19,000. This calculation is based on standard academic mileage rates and current public transport costs. Use of locally based research assistants would reduce these costs, but local appropriately skilled people are not always available and, even if they are, it may be inappropriate to use local researchers for reasons of confidentiality.

The ethical concerns of research in remote communities are primarily related to difficulties in preserving anonymity, both in quantitative and qualitative studies. Identification of research participants through conspicuous visits by researchers, or even from annonymised datasets, may be relatively easy in the remote rural setting. The use of locally based research staff may be precluded. In qualitative work greater care must be exercised within small populations to ensure that direct quotations cannot be linked to a particular person (if they wish to remain anonymous).

Transferability of research findings is a goal that many funders of research and policy makers rightly identify as important (Godden and Richards, 2003). Health services research in rural areas, particularly that which concerns models of service delivery, is often context specific and therefore limited in its wider application. However, this lack of generalisability is in itself a powerful argument for rurally-based research. Anecdotally there is also an unwritten, but nevertheless well established view in rural areas, which is held by both the general population and healthcare professionals, that the findings of locally performed research should be locally applicable. An issue with

any macro level research into relative differences between urban and rural health is that such studies paint an overall picture, and do not focus on the needs of individuals, whose ill health and needs are hidden in statistical averages, and who at times will be missed by healthcare providers (Wood 2004).

Statistical analysis is less reliable with small numbers. Methods of clustering and standardisation work reliably with data that have a normal distribution. However, highly skewed distributions can create problems. For example, the skew is most often observed in census data and causes the most problems when clustering is positively skewed, i.e. the majority of the data are found at the lower end of a 0–100% scale with only a few high values. The most common form is when a variable identifies only small sections of the population (Vickers and Rees, 2007). These problems become more acute as the spatial scale reduces because the likelihood of extreme values increases. Rural areas, with their small and scattered populations, are particularly vulnerable to these problems and as such may be less accurately represented than their urban counterparts.

2.3: Rural Discourses

Academic discourses are the constructs of academics attempting to understand and explain the rural through rigorous analysis (Hoggart, 1990). This section evaluates the definition and classification of rural through three academic discourses; social representations of rurality, socio-economic characteristics, and area morphology definitions. Social representations see rurality not as a fixed geographical locale but, as a way of conceptualising space. Rural, and its synonyms, are words and concepts understood by lay people in everyday conversation, used as symbolic shorthand to deal with the complexities of the modern world (Halfacree, 1993). Social representations are therefore, crucially, social – a conceptual way of making the unfamiliar familiar. However, only those who share a representation will use it in the same way, allowing multiple and converging understandings of the same concept (Halfacree, 1995). In contrast, classifications based on socio-economic characteristics are concerns with the extent to which individuals' socio-economic characteristics vary with the type of

environment in which they reside. The most widely known of these classifications is Paul Cloke's Index of Rurality (Cloke, 1977, Cloke and Edwards, 1986). The third discourse, area morphology, is empirical in conception, accepting that the rural exists and concerned with the identification of the correct selection of parameters to measure it. Denham's built up areas (1984) and Coombe's density measures (1991) are typical of this approach, concentrating on that which is observable and measurable.

In the context of the current debate about defining rural areas and rurality there is really only one aspect that all the groups concerned agree on; that it is generally accepted that current rural definitions, both the official government definitions and those used by other bodies, are problematic because they are not good enough for the needs of users. Apart from the reaching a consensus that the current definitions are inadequate, research ideas are split into the three core academic discourses: social representations of rurality, socio-economic constructions of rurality and finally, area morphology, which will each by discussed in the following sections.

2.3.1: Sociological representations of rurality

Some researchers have gone as far as to suggest that nowhere is really "rural". In the 1980s the category rural effectively became "theoretically abandoned" (Marsden *et al.* 1990) as research moved towards an application and development of abstract theory rather than a location focus (Pacione M, 1995).

There is an inherent danger that by having fixed boundary based distinctions between rural and urban, potentially more important and far ranging influences could be ignored, because they are not restricted by these designated boundaries. Copp criticised both such narrow studies and the maintenance of a rigid rural category for academic study by observing that:

> "There is no rural and there is no rural economy. It is merely our analytical distinction, our rhetorical device. Unfortunately we tend to be the victims of our own terminological duplicity. We tend to ignore the import of what happens in the total economy

> and society as it affects the rural sector. We tend to think of the rural sector as a separate entity which can be developed while the non-rural sector is held constant. Our thinking is ensnared by our own words." (Copp, 1972 p. 159)

Social scientists are often keen to dismiss the category of rural as a figment of our analytical imagination. Hoggart (1990) argued that simple descriptive categorisations of rural actually hamper the efforts of social scientists to understand social, economic and geographical change. The call to "do away with rural", was echoing Copp's earlier arguments that rural as a category of study should be abandoned. Whatmore (1993) strongly disagrees with this call to abandon the discipline and states that the academic inclination to discount the importance of the category 'rural' has rested on a "widely held view in the social sciences that, under capitalism, differences between places have been eroded and local distinctions dissolved by general structural processes first of industrialisation and more recently by globalisation" (Whatmore, 1993, p605).

Social Constructivists maintain that there can never be a good enough definition of rurality because the definitions are fluid and are adapted and modified, as all users have different feelings about what constitutes rurality and indeed what is rural. Even in an attempt to create a quantitative definition there will be inherent problems. These problems are well described by Schnore (1966) when describing another classification system; he warned that all definitions include a degree of arbitration.

> "In this case the major difficulties stem from the fact that the characteristics which have been singled out for attention ...are literally variables, i.e. they exhibit differences in degree from place to place and from time to time." (Schnore 1966, p135)

Sociological approaches are important because the association with rural is important in terms of cultural understanding, which stretches beyond practical boundary definitions. So rather than attempting to define rural in terms of physical space they focus on the creation and maintenance of the ideas of rurality. This uses rurality and the rural as a social construct which can then be analysed and contested through qualitative research.

In its definition of "rural" The Dictionary of Human Geography acknowledges that there is "no agreed quantitative definition of 'rural'" but it does attempt to create a definition based on the characteristics of the physical landscape by saying that

> "(t)he term is used to describe those parts of the country which show unmistakeable signs of domination by extensive uses of land, either at the present time or in the immediate past."
> (Goodall, 1987 p.417)

This definition has many weaknesses not least because it denies the necessary level of fluidity in the rural definition. The fluidity is believed to be necessary if rurality is a definition based upon whether the community considers itself to be traditionally rural. The greatest weakness to the definition comes from retaining the classification of "rural" to areas which are now developed and to most practical intents and purposes can be regarded as urban.

The issue of rural and ruralities, location in time, rather than space or culture, is one which has largely been ignored by many contemporary authors. Rurality is presented as a static snapshot which encapsulates the situation of the area at the specific time of the study rather than creating a sense of a trajectory of change. Academic writers and policy-makers in general frame their definitions of rural in the present. They, therefore, perhaps by omission rather than design, grant the degree of rurality to be a decision based on the current state of a place rather than its historical situation. Despite this lack of implicit academic examination of the time element, any debate over the definition of rurality must rest partially on tradition and culture and therefore have temporal as well as a geographical context.

When researchers identify communities with a strong sense of identity centred around ideas of 'rurality', and which define themselves as rural, they tend to be established towns and/or villages rather than newer developments as are seen in urban areas. This historical and traditional element is partially due to the fact that though the government might build "new towns" they do not build "new villages". In fact building regulations in most sparsely populated areas would forbid any development of that sort. If a sense

of rurality is based on tradition then this would explain the continuing propensity of residents to associate themselves with feelings of rurality despite the growth of the settlements they inhabit. In fact there is strong evidence that even commuter villages were traditionally full of farming communities and the residents still regard themselves as rural despite any reasonable growth of the settlement over time and the distance now created between the lifestyles and the land.

It is a key question whether or not areas can maintain their "rural" label after becoming urbanised. The Penguin Dictionary of Human Geography suggests that at least in the short term settlements that have a rural heritage should be considered rural. This definition is extremely problematic as the definition stated has no suggested time scale or any idea how this value judgement should be taken. After all, all areas in England were rural (under the criteria of all the current classifications) at some historical point. It is simply a matter of geographical development variation how long ago that rurality was lost. Time is also a crucial consideration within the use of qualitative definitions of rurality. The perceptions of what is culturally regarded as rural and urban have naturally changed a great deal over time as the average size of settlements has grown. What was regarded in the Victorian period as a significant urban area might well now be classified as a country town.

Time is also relevant because our opinions and perceptions change over time periods – due to changing cultural representations and norms, and also with age as representations of place change with our interaction to the space. Haartsen *et al.* found that in their 2003 paper that although residents in their study were visually figurative in their responses to the study questions, they gave more socio-culturally based answers with increasing respondent age. This study needs to be continued over a longer time period to see if today's youth changes its outlook to match today's older population or if its maintains its current perceptions of rurality. Either of these outcomes should raise serious considerations for the study of rurality and planning for rural areas. If these aspects are important then it is crucial to examine the age and socio-economic circumstances of today's policy-makers. After all this would suggest that they are imposing a white middle class and middle aged ideal onto a community which will probably not be composed of the same residential mix.

The only consistency within this doctrine is academics belief that there will always be contestation and struggle within the debate. The discourses generally agree that there will continue to be contestation within the definitions created. However, whereas the policy makers are trying to reach the greatest level of consensus possible, the Social Constructivists accept and value the conflict and fluidity in its own right. It is clear from the strength of feeling expressed by all sides in this debate that the sociology is important, but in terms of practical aspects of policy creation a more quantitative approach needs to be taken so that policy can be formulated and can have far reaching impacts on people's lives. The sociology is important though because the association with rural is important in cultural terms which stretch beyond practical boundary definitions.

2.3.2: Socio-economic constructions of rurality

Policy makers and those academics working in the positivist tradition tend to be committed to trying to improve definitions in a practical sense. They seek to create distinctions and definitions of rurality and rural areas which can be used in the creation and scrutiny of policy. Defining rurality, for quantitative geographers and for policy makers, is very complicated in Britain as in many countries and as a result no majority opinion or general consensus on the definition can be found between groups.

The basic concept of a classification is that people who live close to one another have a tendency to display similar characteristics and behaviours (Harris et al, 2005). The difficulty in rural areas is that often the clustering found in urban areas is not found in sufficient quantity to allow effective socio-economic definition of areas. This prescribed definition of rurality stems largely from classifications based on socio-economic indicator variables. The most well known of these is Cloke's Index of Rurality, created for the 1971 Census and subsequently extended to cover the 1981 and 1991 Census (Cloke 1977; Cloke and Edwards 1986; Harrington and O'Donoghue, 1998). The index has been widely adopted by researchers in the rural field.

The Index of Rurality involved using principle component analysis on 16 variables and then a sub set of 9. The scores from this were then used as a weighting criterion which indexed scores into a quartile classification ranging from 'extreme non-rural' to 'extreme rural'. This technique was most successful before the local government reorganisation of 1974, as the boundaries were more sympathetic to a rural / urban distinction. The creation of the new larger districts, often containing sizable urban centres created a "disruptive influence" (Cloke and Edwards, 1986, p290). The Index was insufficiently robust to be used at lower geographic scale such as enumeration district, and the use of the district scale led to much greater internal settlement morphology variation. 181 districts which were deemed by Cloke to be 'urban' in character were removed from the analysis (Ward, 2003) There does not seem to have been any scientific reason for this, rather a decision of judgement to ensure that the 1981 index matched the 1971 index. This will, of course, have altered the outcome as areas which had some rural character were occasionally excluded (Cloke and Edwards, 1986).

It is not only the spatial scale used that is criticised within socio-economic classifications. There is no standard method for the selection of variables and it is far from an exact science. Methods range from those which involve the minimum amount of statistical investigation to detailed statistical investigations. Variables can be selected based on the factors that are thought to be important and chosen on the basis of which best represent those factors. For example, the validity of the choice of percentage ethnic minority in the Oxford-Countryside Agency 1998 classification is critiqued in Chapter Three. Within the Index of Rurality, several of the variables fail to stand up to close scrutiny; population over the age of 65 is one such variable. Although a trend for retiring to the country exists in England, the trend could predominantly be classified as retiring to coastal areas. Arguably areas do not become more rural with an aging population; statistically they are likely to be more 'coastal'; examples of this include East Devon (rural) and Torbay (urban). Population change can also be a misnomer, as a European Commission report at the time noted (European Commission, 1997). Both population decline and population growth are features of rural areas (with population growth common in accessible attractive areas and population decline common in remote or economically vulnerable areas). Perhaps most surprising is that population density, possibly the least contentious variable within the calculation, only

receives a weighting of 0.58588 (Oxford Countryside Agency, 1998) making it the least significant variable.

Despite their problems, socio-economic classifications are popular with government organisations (this will be dealt with in greater detail in Chapter Three). For example The Countryside Agency used a synergy of data from three sources of information to classify wards and districts into rural/ non-rural wards (CA 1998; 2000). The data is drawn from: population density figures; socio-economic variables (Office of National Statistics); and, thirdly, the rural authorities list from the Department of the Environment. This class is especially unhelpful as it simply lists the previous traditional classification of areas. The Countryside Agency (2000) claims, using the above data, that just over one quarter of Britain's population live in rural districts.

Confusion is often a result of the sheer variety of definitions in use within England. A direct outcome of this choice is that it is possible for institutions to use whichever definition suits their purpose. For example, the definition of what constitutes a Rural Parliamentary Constituency is a clear example of the problems that this lack of coherent definitions can cause. Rural Constituencies have varied definitions as far as the Government is concerned: Constituencies deemed to contain 'more than a small rural element' are designated country constituencies and all others are designated borough constituencies (Boundary Commission for England, 1995, 12). Under these official definitions 363 constituencies in UK (55%) are rural or semi rural. (51% of English Constituencies are rural, 61% of Scotland's 85% of Wales' and 78% in Northern Ireland.) These are the figures used by the Labour Party in campaigning on rural issues but in reality most of the constituents in these constituencies live in urban areas.

Like many non-government organisations, MORI is dissatisfied with what it believes are over-simplified categorisations and attempted to make a more statistically elaborate definition of a rural area. Using an algorithmic cluster analysis over 350 socio-economic variables it is possible to create better "fit" classifications. According to MORI this reduces the percentage to only 7.5% of the adult population living in rural areas (Mortimer, 2000). Only 10 parliamentary constituencies are then in areas considered over 50% rural and only 86 are over 25% rural. Of these 86, Labour only

held 10 in the 1997-2001 parliament; this small number puts paid to Labour's assertion of being a rural party. Mortimer also highlights the insignificance of the rural vote arguing there was 'too much attention paid to the so called rural vote'. Claiming 180 of Labour's seats as rural represented a 'huge overestimate' as in almost every case the rural element in Labour's constituencies actually comprise of a 'tiny minority, if that' (Mortimer, 2000).

MORI are one of a large, and growing, number of organisations using **Geodemographic Classification** for statistical analysis. The classification of small areas into geodemographic or lifestyle types by means of multivariate statistical techniques was first undertaken on a national basis for local authorities and wards in Britain in the late 1970s using Small Area Statistics from the 1971 Population Census (Webber and Craig, 1978). In the following decades, further classifications have been produced by governmental and commercial agencies using an increasingly wide range of demographic and socio-economic information, primarily from the Census. These systems use the data gathered to segment the population into groups based on their characteristics. Group membership can then be used as a proxy indicator about the service needs or purchasing inclinations of the residents (Birkin, 1996).

In recent years these general area classifications have been used as a way of typifying the socio-economic and demographic character of areas in academic research and in national surveys such as the General Household Survey and the British Household Panel Survey. As discussed below, they are now widely used by commercial companies in various market sectors, such as retail, health care, financial services (Clarke, 1998) and by public organisations concerned with both policy implementation and resource allocation. The Office of National Statistics produced a national classification of wards and Local Authority areas, following each of the last three UK Censuses, using socio-economic indicator variables drawn from the Census (these are discussed in detail in Chapter 3). For the 2001 Census an output area classification was also developed by the University of Leeds and ONS (Vickers, 2007).

Commercial Geodemographic Classifications arose when the commercial sector began to see the benefits of area classifications following the 1971 census work of Webber and Craig (1978), providing a socioeconomic classification which enabled

comparisons between places at small scales. While census data has been gathered and processed by the Office of Population Censuses and Surveys (OPCS), a government office, private sector users will normally access data through an appointed third party 'Census Agency'. According to Birkin (1996) each agency paid OPCS a substantial fee for the right to hold and handle the census data (the size of the sum varies according to the precise use of the data, but a figure of £40,000 is not untypical) and passes on the appropriate royalty payments from clients who use the data to OPCS. In return, the agencies are free to reprocess and package the data in whatever way they feel appropriate, and to make such charges for their census products as they feel the market will stand. The removal of this fee after the 2001 Census opened up the market to smaller companies.

Whereas Webber and Craig (1978) used purely Census data, commercial companies have added new sources of data to geodemographic classifications. Datasets used include electoral registers, vehicle registration data and 'lifestyle' data from product guarantee forms and marketing surveys. The main benefit of adding these is that they add information about affluence or income not available from the Census; however, the data is not comprehensive, lacking the coverage of the census, and a bias towards 'prime' consumers (Clarke, 1998).

Although geodemographic systems in the UK have been available since the late 1970s (CACI's ACORN system being the earliest commercial application in the UK) they proliferated after the publication of the 1981 (Baker, K. 1997) Census and following their availability through GIS packages. By the mid 1980s four main systems were competing for dominance: ACORN (A Classification of Residential Neighbourhoods), Mosaic, PiN (Pinpoint Identification Neighbourhood) and SuperProfiles. There are other systems and suppliers but these represent the most important off-the-peg systems. There has been pressure to provide an industry standard classification, which could then be tailored to suit bespoke needs; however it now seems unlikely that standard classification will materialize (Birkin, 1996). For the moment, either ACORN or MOSAIC are the nominal industry standards. They are summarised briefly below:

ACORN (A Classification of Residential Neighbourhoods) created by the marketing data firm CACI Ltd in 1979 was the earliest commercial application in the UK (Clarke, 1998). ACORN categorises all 1.9 million UK postcodes into 5 categories which are then split into 15 groups and then 56 types (illustrated in table 2.1). These types are created by using over 125 demographic statistics within England, Scotland, Wales and Northern Ireland, and 287 lifestyle variables. Variables are drawn from a number of sources, primarily the Census and include age, ethnicity, county court judgments (CCJs), credit activity information, population densities and retail accessibility.

Although ACORN is not a classification of rural and urban areas *per se* (and many rural areas will fall into the same ACORN type as urban areas particularly in suburbs) some of the classification types could be used as a proxy for 'rural', such as:

Large Families and Houses in Rural Areas
Villages with wealthy commuters
Mature, affluent home owning areas
Affluent suburbs, older families
Farming Communities

Wealthy	Wealthy Executives	01 - Affluent mature professionals, large houses
Achievers		02 - Affluent working families with mortgages
		03 - Villages with wealthy commuters
		04 - Well-off managers, larger houses
	Affluent Greys	05 - Older affluent professionals
		06 - Farming communities
		07 - Old people, detached houses
		08 - Mature couples, smaller detached houses
	Flourishing Families	09 - Larger families, prosperous suburbs
		10 - Well-off working families with mortgages
		11 - Well-off managers, detached houses
		12 - Large families & houses in rural areas
Urban	Prosperous -	13 - Well-off professionals, larger houses and converted flats
Prosperity	Professionals	14 - Older Professionals in detached houses and apartments
	Educated Urbanites	15 - Affluent urban professionals, flats
		16 - Prosperous young professionals, flats
		17 - Young educated workers, flats
		18 - Multi-ethnic young, converted flats
		19 - Suburban privately renting professionals
	Aspiring Singles	20 - Student flats and cosmopolitan sharers
		21 - Singles & sharers, multi-ethnic areas
		22 - Low income singles, small rented flats
		23 - Student Terraces
Comfortably	Starting Out	24 - Young couples, flats and terraces
Off		25 - White collar singles/sharers, terraces
	Secure Families	26 - Younger white-collar couples with mortgages
		27 - Middle income, home owning areas
		28 - Working families with mortgages
		29 - Mature families in suburban semis
		30 - Established home owning workers
		31 - Home owning Asian family areas
	Settled Suburbia	32 - Retired home owners
		33 - Middle income, older couples
		34 - Lower income people, semis
	Prudent Pensioners	35 - Elderly singles, purpose built flats
		36 - Older people, flats
Moderate	Asian Communities	37 - Crowded Asian terraces
Means		38 - Low income Asian families
	Post Industrial -	39 - Skilled older family terraces
	Families	40 - Young family workers
	Blue Collar Roots	41 - Skilled workers, semis and terraces
		42 - Home owning, terraces
		43 - Older rented terraces
Hard	Struggling Families	44 - Low income larger families, semis
Pressed		45 - Older people, low income, small semis
		46 - Low income, routine jobs, unemployment
		47 - Low rise terraced estates of poorly-off workers
		48 - Low incomes, high unemployment, single parents
		49 - Large families, many children, poorly educated
	Burdened Singles	50 - Council flats, single elderly people
		51 - Council terraces, unemployment, many singles
		52 - Council flats, single parents, unemployment
	High Rise Hardship	53 - Old people in high rise flats
		54 - Singles & single parents, high rise estates
	Inner City Adversity	55 - Multi-ethnic purpose built estates
		56 - Multi-ethnic, crowded flats

Table 2.1: ACORN Neighbourhood Types Classification[1]

[1] Derived from information on http://www.caci.co.uk/acorn/acornmap.asp (accessed 2007/08/01)

Another popular geodemographic classification system in the UK is **Mosaic.** Mosaic's development was directed by Professor Richard Webber at Experian. The result is a classification that paints a rich picture of UK consumers in terms of socio-demographics, lifestyles, culture and behaviour (Experian website[2], accessed 01/02/2007). The system is based on an algorithmic cluster analysis of over 350 socio-economic variables including personal and household data on demographics and neighbourhood level data on, for example, the building stock, household structure, employment, residential density and retail accessibility. The cluster analysis is used to classify each neighbourhood into one of 52 distinct types, and each is assigned a stereotypical lifestyle descriptor (such as, for example, 'Smokestack Shiftwork', 'Bohemian Melting Pot', or 'Suburban Mock Tudor'). Of these 52 categories, 6 are defined as rural. These are 'Gentrified Villages', 'Rural Retirement Mix', 'Lowland Agribusiness', 'Rural Disadvantage', 'Tied/Tenant Farmers' and 'Upland and Small Farms' (see Experian, website, accessed 01/02/2007). Small areas which fall within the same cluster classification can be considered alike and to contain similar types of households. This is especially useful for those companies whose customers are concentrated in certain geodemographic segments and are keen to identify and target localities of the appropriate for their products (Clarke, 1998). Mosaic is used by over 10,000 organisations, including MORI for their 2000 classification of parliamentary constituencies.

Unfortunately many commercial firms do not publish lists of variables from which their classification are created. Studies that have published the variables which make up their classifications rarely provide a detailed explanation or an audit trail detailing how the variables were chosen (Blake and Openshaw 1995). This means that a critique of the methods used or comparison with government classification systems is not practically possible.

Challenges of using Socio-economic data sources primarily comes from the challenges of identifying 'need' in the way that populations are grouped. Identifying deprivation in rural areas presents a challenge as the widely used socio-economic

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[2] http://www.business-strategies.co.uk/sitecore/content/Products%20and%20services/Micromarketing%20data/Consumer%20segmentation/Mosaic.aspx (Experian Website, accessed 01/02/2007)

indicators such as the Townsend index and the Carstairs index, which are based on postcode sectors, are derived largely from, and are relevant to urban rather than rural settings. Rural communities tend to be more heterogeneous and it is therefore difficult to reflect the focal distribution of rural deprivation within a postcode sector. In addition some of the criteria which make up these indices, such as housing tenure, overcrowding and car ownership, do not necessarily correlate well with low income and deprivation in the rural setting (Godden and Richards, 2003). The use of nationally standardised census-based indicators in a primarily urban country yields values which may also misrepresent need in rural areas (Cullingford and Openshaw 1982, Haynes & Gale 2001).

The large apparent urban-rural gradient in the relationship at ward level can be regarded as a statistical artefact produced by an inconsistent scale of analysis and the geographical distribution of rich and poor (Haynes and Gale, 2000). In the UK, large districts of similar housing types in cities and towns tend to concentrate people with similar socio-economic characteristics, while in rural areas not even small enumeration districts contain homogeneous populations. Wealthy and poor live next door to each other in rural England. While average deprivation scores for a ward may give a reliable impression of the relative level of "need" in an urban environment, they are misleading in a rural context. Whatever index is chosen to measure deprivation, there is comparatively little variation between rural areas: the real variation is at the individual household level within rural areas.

There is also a strong argument put forward by Fieldhouse and Tye (1996) to suggest that prioritising money towards wards with high deprivations scores may not be the most effective distribution of funds. Their analysis of individual records from the census Samples of Anonymised Records has shown that conurbations in Britain not only have the highest deprivation scores based on aggregate census data but also contain the highest proportions of individuals who are deprived in terms of housing, material possessions, unemployment and so on (Fieldhouse and Tye, 1996). The same study showed that the most deprived local authority areas contained only a small proportion of the nation's deprived people: almost all local authority areas in England and Wales contain a substantial number of disadvantaged people. At the local authority

scale, most deprived people are not in deprived areas and most people in deprived areas are not deprived (Fieldhouse and Tye, 1996; Barnes and Lucas, 1975). Policies which allocate resources to areas with high deprivation scores are therefore likely to be inefficient. Rural districts obtain little from such policies, yet scattered within them are large numbers of households with very low incomes (Cloke *et al.,* 1994; Shucksmith *et al.,* 1996).

2.3.3: Area Morphology

Definitions of rurality based on distance and density have been employed with some success in quantitative research using secondary data sources. In general, these definitions introduce some sort of gradation of "rural" (that is, categories of rurality), primarily based on distance and density. More detail on the structure of these definitions is found in Chapter 3, which discusses in detail definitions in current or recent use by policy makers in England. Area Morphology based definitions are frequently more classifications than definitions in that they seek to label an area by its dominant land use rather than claim that this specific feature defines the area as a whole. The main types of definition are explored in table 2.2 below:

Definition Type	Examples	Characteristics
Administrative	Stevens, 1946; Lassy, 1977	Based on administrative boundaries
Built up Areas	Denham, 1984; Craig, 1987	Digitized settlement outlines and/ or population thresholds
Density/Sparsity	Fothergill *et al.*, 1985; Openshaw and Coombes, 1991.	Simple measure of population sparsity / density based on Census data
Functional Areas /Regions	Coombes *et al.*, 1982; 2000 Shepherd *et al.*, 2004	Composite Indices based on population size, settlement morphology and proximity to service providers, and/ or urban labour markets
Agricultural/ Land Use	Fuller *et al*, 1994; 2000 (Land cover map of Great Britain); Irwin et al, 2002 (residential land use patterns)	Land type use classification based on physical environment characteristics

Table 2.2: Land use, population and service distribution - definitions of the rural (partially derived from: Halfacree, 1993, p24; Cloke, 1985, p4).

Agricultural and Land Use classifications are based upon the predominant land use type in an area, such as developed land or arable farming. The definition avoids all mention of rurality. Rural areas are defined by proxy within these classifications as areas which are dominated either by agricultural land use or by 'non urban' land use such as parks or non-cultivated open space. The challenge lies in what to classify land within 'urban areas' - such as parks and allotments. There are industries based in rural areas which are not 'rural' (car manufacturing plants and airports being prime examples) meaning that large sections of the economy could be unaccounted for.

Administrative classifications are based on administrative boundaries and are primarily used for political studies (Halfacree, 1993). Prior to the 1974 reorganisation of local government, administrative boundaries were split along a proxy of rural/ urban

lines with the traditional shire structure holding rural areas. The subsequent reorganisation of the administrative geography of England means that it is too complex for such a simplistic approach. Classifications are still frequently delineated at administrative boundaries such as the Countryside Agency (1999; 2000). Administrative classifications, and classifications delineated by administrative boundaries, are extremely vulnerable to change over time. As changes to administrative boundaries common in England they quickly become outdated and historical comparison becomes impractical.

Built-up Areas: This is a descriptive physical definition which does not refer to the socio-economic characteristics of an area or the proximity to services. The current definition most frequently used by the government policy makers is the ODPM Urban Settlements 2001 (discussed in Chapter Three) which effectively involves drawing a line on a map around built up areas and calculating the number of people in each area using census data. This method has the advantage over other definitions because it is very transparent. It also fits with lay people's perception of what constitutes rural. The key advantage for policy makers is that it is very easy to use and not confusing for lay people. However, the problem of a strict definition still exists as there are many different classes used. For example a population over 3000 is urban in some studies; whilst in others any settlement under 25000 can be regarded as rural.

Density and Sparsity: Sparsity is a threshold measure usually used to establish the population of less populated areas. The exact definition of sparsity will vary for practical implementation purposes, but the concept can simply be applied to those areas where the population density is such that there has to be a marked difference in approach to service delivery (Devon Fire and Rescue, 1998). Measures of population sparsity and / or density can serve as relatively simple discriminators between rural and non-rural authorities. The measure is widely criticised because it offers no contextualisation, i.e. no consideration is given to the circumstances in adjacent areas (Coombes and Raybould, 2001). Functional regions can provide solutions to many of the criticisms levelled at sparsity measures.

Functional Areas are based around the idea that there are economic linkages between areas which straddle Local Authority boundaries and also that the social and economic functions of an area (or conversely the social and economic isolation) are intrinsically linked to the functions and features of the surrounding area. The key point for these classifications is that, in an increasingly complex pattern of settlement, linked to socio-economic variation, no single measure can represent all of the distinct aspects of settlement structure that will be of interest to public policy (Coombes and Raybould, 2001). The idea of functional regions was embraced by the academic world with the work of Coombes on commuter patterns (Coombes, 1982; 2000). There are three distinct dimensions to settlement classification within this methodology; these are settlement size, population density/ sparsity and accessibility/ remoteness. Under this system rural areas are those which are relatively independent of core functions and contain no large urban centres of their own (Ward, 2003).

A key strength of these types of definition is that they allow for comparisons. However, a common limitation of each of these definitions is that they do not deal in any depth with a social representation of "rural" and may not be appropriate for use in other types of research. Descriptive methods only classify the rural, they do not define it. As such, attention must be given to what it is they are describing. The role of sociological representations is to provide definition of rurality from which to form classifications.

2.4: Lessons Learnt

There are distinct limitations and benefits to each definition or classification type outlined above. From this discussion we can either choose to draw the conclusion that it would be impossible to create an all encompassing definition of "rural" or, at the very least, that any encompassing definition would be too unspecific to be useful to policy-makers and academics. However, it is important that neither policy-makers nor academics should be in a situation where they choose a classification based on its best fit to the argument they wish to substantiate. Some academics, however, prefer this approach. Du Plessis recommended that

> "... analysts consider the scale of a "rural" issue – whether it is local, community or regional – before selecting a definition (emphasis in original). This will influence the type of territorial unit upon which to focus the analysis and the appropriate definition to use" (du Plessis 2002 p3).

Whilst it is true that prior selection and identification of the issue is crucial, they do appear to be advocating fitting a definition to the study, rather than deciding on the definition to use first and then seeing if the study fits the definition. If the best policy is to try and create an all encompassing indicator then several points must be considered (du Plessis 2002):

- The formula or index underpinning the classification should be based on simplicity and ease of construction;
- The choice of indicators underpinning the formula or index should be as parsimonious as possible;
- The classification maximises internal homogeneity in an area while at the same time maximising the differences which distinguish it from surrounding areas.

In essence, any new definition must encompass geographic scale - it is important to first establish whether the rural issue is at a local, community or regional level. This will determine the most appropriate definition to choose - the geographic dimension (e.g., population size, density, labour market, and settlement context) most relevant to the issue must also be considered. Thus this advocates the creation of a specific tailored definition for each situation. Despite offering these recommendations to create a coherent definition of what is rural, de Plessis *et al.* conclude that "it is clear that there is no single rural" and that any attempt to create one would be unsatisfactory (2002).

There is no standard method for the selection of variables and it is far from an exact science. Variables can be selected based on the factors which are thought to be important and chosen on the basis of which best represent those factors. As there has been no consensus regarding a definition of rurality, researchers have usually employed their own definition according to the study area of interest. This can have

consequences for the presumed levels of service need and provision, which can vary greatly between urban and rural areas. Furthermore the lack of consensus regarding rural definitions can lead to the questioning of the differences between rural and urban need due to a perceived lack of methodological validity (Asthana *et al*, 2001).

Other important considerations must be the users' awareness of issues and limitations. The essence of what rural is in its entirety cannot be captured in one definition. At present, a commonly agreed upon definition of rural does not exist. Definitions are predetermined by initial selection of variables and by the classification methodology. Qualitative data is neglected with the focus being on the quantitative, a complaint echoed by Cloke (1995 and 1997). Implementation considerations are also crucial, as rurality and rural areas are social as well as practical concepts. Analysts need to be informed about the different definitions and how to use them.

The longevity of the classification has to be considered. Any variable whose understanding by the user may change over the life-course of the classification should not be included as it may cause confusion. A sociological variable to identify incomers to an area, such as Born in other European Union (excluding UK and Republic of Ireland) provides an excellent example of this. On Census day April 29th 2001 there were 15 members of the EU; on the first of May 2004 Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia joined increasing membership to 25 countries. The consequence of this is that the Born in other EU variable in the census no longer reflects the current membership of the EU. Therefore, it is easy to see how the inclusion of this variable would lose validity and could cause confusion over time, as the user may be unaware of either the time at which the data was created or the changing membership of the EU.

The accuracy of the data used in classifications must be assured. The census is the most complete and reliable socio-economic data set available in the UK. Even data from official sources such as Government departments can contain errors. Few data sets or definitions are as well documented as the census in terms of the enumeration and processing methods.

The most important lesson from this evaluation has been an appreciation of the importance of recording the methods used in the creation of definitions. Authors should record the methods used in the creation of the definition, as well as the rationale behind the selection of variables. Not only does this allow for a critical evaluation of methods, it also creates the possibility of adding to or extending the results of the analysis (Vickers, 2007). There are many examples of researchers who have failed to provide significant information about the decisions which were taken. The Tarling *et al.* (1993) classification for the Economy and Rural England Report failed to name the variables or even the method that was used in the study. For classifications in current use by a large number of users which fail to provide information about the creation of classifications and the steps that are used in cluster analysis we need look no further than providers of geodemographic classifications such as ACORN and Mosaic, in this case possibly because of the need for commercial confidentiality rather than poor scientific method.

2.5: Conclusions

Although the groups involved do not have a consensus over definitions, they do at least agree that definitions or a definition of rural and rurality are useful and desirable. Any definition created or adapted in the future will have to be on a flexible and adaptable scale which is able to be adapted to meet changes within the country and therefore not become dated and dysfunctional quickly as has been the case with more rigid definitions. The crucial point for this research is the search for a degree of rurality which can be measured and compared on different scales. This would therefore seek to remove the conflict and confusion caused by the classification changing depending on the survey area, or indeed the whims of the analyst.

In summary, there is no one definition that can capture the essence of what is 'rural' to the extent that any search for a single definitive definition of rural must be arbitrary at best and potentially futile (Hodge and Monk, 2004, p2). However, for the purposes of practicality, that is for policy-makers to be able to write effective policy, it is necessary to find a consensus within these conflicting ideals. Therefore, although there is no one all-encompassing definition which can resolve this debate, a definition must be found

that is usable. The key concern remains that any definition used does attempt to encompass identifiers of specific rural needs because, if this aspect is not deemed necessary to include then, it could almost be concluded that there was no need for a rural/ urban distinction at all.

Recent debate over the classification of rural areas has been conducted in highly inaccessible academic terms, leading the Rural Development Commission to conclude that 'arid conundrums' often seem to have destroyed the very thing which they sought to elucidate. The following chapters will offer an accessible and understandable analysis of the rural definitions and classifications in use both in the academic community and by policy makers, whilst offering suggestions to improve funding outcomes for rural areas based on changes to these classifications.

Chapter 3: Classifying Rural Areas

3.1.1: Overview

This chapter introduces the definition and classification of rural and urban areas in England used by government organisations for the distribution of funds and the assessment of service need. Section 3.1.2 examines the rationale behind why we classify and then sections 3.3 to 3.8 examine some of the classification systems used within Governmental organisations in England. The chapter ends with a review of the 2004 Classification of Rural and Urban Areas. This classification is gaining wide acceptance within Governmental organisations as the new 'official' classification of rural areas. The methods used and the resulting rural population count created by these systems have implications for the distribution of funding for services. Following this chapter the thesis will look at the role of classifications within funding formulae and the implications that changing the classification methods used would have to funding distribution.

3.1.2: The Purpose of Classifications and Definitions

The definition of rural is becoming increasingly important to governments and policy makers as rural populations are becoming more affluent and increasingly politically active (Countryside Agency, 2002). They are also currently growing notably faster than urban populations and between 1981 and 2000 the rural population, as defined by the Countryside Agency, grew by around 11% in comparison approximately 4.2% growth in urban areas (Countryside Agency, 2002).

The use of definitions of urban and rural areas for official purposes stretches back at least to the latter part of the nineteenth century. At that time, the structure of local government was grounded in the acceptance of a relatively clear distinction between 'urban' and 'rural'. The 'urban' areas were governed by county boroughs, municipal boroughs and urban districts. 'Rural' areas were the remainder, in this case rural districts

and most counties. Subsequently, this binary divide formed the basis for the reporting of a wide range of official statistics, especially the Census.

The definition of rural areas has evolved considerably. Three broad phases can be characterised in this evolution between the post war period and the present day. Between 1945 and the 1960s, the traditional model of rurality based around agriculture and other primary production continued to apply with rural development perceived as backward in comparison with rapid post-war urban change. The emphasis for definitions during this period was on urban development. This is shown through the focus on mapping and definition of urban areas. The definition of "rural" as anything other than a residual was not seen as necessary.

Important new social and economic trends began to emerge from the 1960s onwards. These included the trend towards counter-urbanisation and the urban-rural shift in manufacturing employment. In addition, local government restructuring prompted a rethink of physical geographically based definitions of areas. Government definitions of "rural" areas were somewhat behind these changing social perceptions and as a result rural remained the residual category in policy based on urban needs and urban change. In the space of a century there has been a reduction in the trend of urban area focused policy dominating the agenda to a revitalised 'rural identity' putting forwards rural needs, leading the government to create a new classification dominated by the need for an adequate rural definition which would meet the needs of end users.

3.1.3: Variations in Rural Populations

Perhaps there is no definition of a place that is more contested than "rural" (see Chapter Two). Government department and agencies define both "need" and "rural" places differently. These differences reflect not only the circumstances and geographies of individual areas, but also the mandates and missions of the agencies formulating the definitions. In common with academic approaches to classifying populations and locations, as discussed in Chapter Two, there are a substantial range of classifications used within governmental organisations. A huge variety of statistics are available to aid government departments and researchers to understand populations and geographical

areas. These include Census Returns, Benefits Claimants and Hospital Episode Statistics to name but a few. This variety, while often immensely useful can also be overwhelming and confusing. One of the ways of dealing with the volume and complexity of information is to simplify it through the use of classifications.

In subscribing to the positivist trend, that a classification of rural areas is obtainable, there are two main approaches to classification. First is the development of composite indicators (such as those describing the socio-cultural status of sections of population using definitions of deprivation) or through the creation of area characteristics based classifications. For the classification of rural areas it is the second type, the area classification, which is most relevant. Area classifications provide a unique way of bringing together area patterns from a range of variables, allowing the identification of similarities or dissimilarities (Weber and Craig, 1978). However, conflicting outcomes, in terms of areas and populations classified (see table 3.1), as well as the sheer amount of choice of methods potentially lead to a great deal of confusion.

Classification	Percentage Rural
ONS District and Health Auth (1999)	9.7%
ONS Wards (1996)	11.2%
Countryside Agency Rural Services Survey (2000)	15.0%
Defra Rural - Urban Areas (2004)	19.3%
DETR Urban Settlements (1991)	19.7%
Rural Development Commission (1996)	28.0%
Countryside Agency Ward Level (1998)	28.1%
Countryside Agency District (1998)	28.2%
Countryside Agency County Level (2000)	41.0%

Table 3.1: Percentage of the population of England classified as 'rural' (Defra population estimates based on 2001 census, remainder based on 1991 Census)

As table 3.1 illustrates, there is a huge range, from between 9.7% and 41%, in the percentage of the English population that is considered to be living in rural areas based on different classifications. This is also true when the percentage of the land area is considered. This varies because of the methods used to gauge rurality and also the

geographic scale used. The implications of these different definitions are important. As can be seen in table 3.1, the size and socio-demographic character of rural England will shift depending upon the definitional framework used. Whether rural England comprises 9% or 28% of the population can have an impact on its relative importance to media and public policy decision-makers. The significant variation shown above can be, in part, attributed to the complex administrative and organisational geography of England. Before looking at different definitions it is useful to look at the structure of administrative geography in England

3.2: The Structure of Administrative Geography in England

The administrative geography of England is not a simple hierarchical system and as such merits some explanation here. There are multiple hierarchical geographies within England, and the rest of the UK, including administrative, electoral, postal and health. The structure of hierarchies is also different between different countries in the UK. Policies and funding may be implemented at multiple levels of each hierarchy so it is crucial to the understanding of classifications that the geography of these hierarchies is understood.

The United Kingdom consists of four countries, three of which make up Great Britain. Unlike the rest of the UK, England has no devolved government and is therefore directly subject to the UK administration from Westminster. The structure of administrative geography in England is summarised below in figure 3.1. Government regional offices as the highest level of English administrative geography are little more than vehicles for statistical reporting with minimal powers.

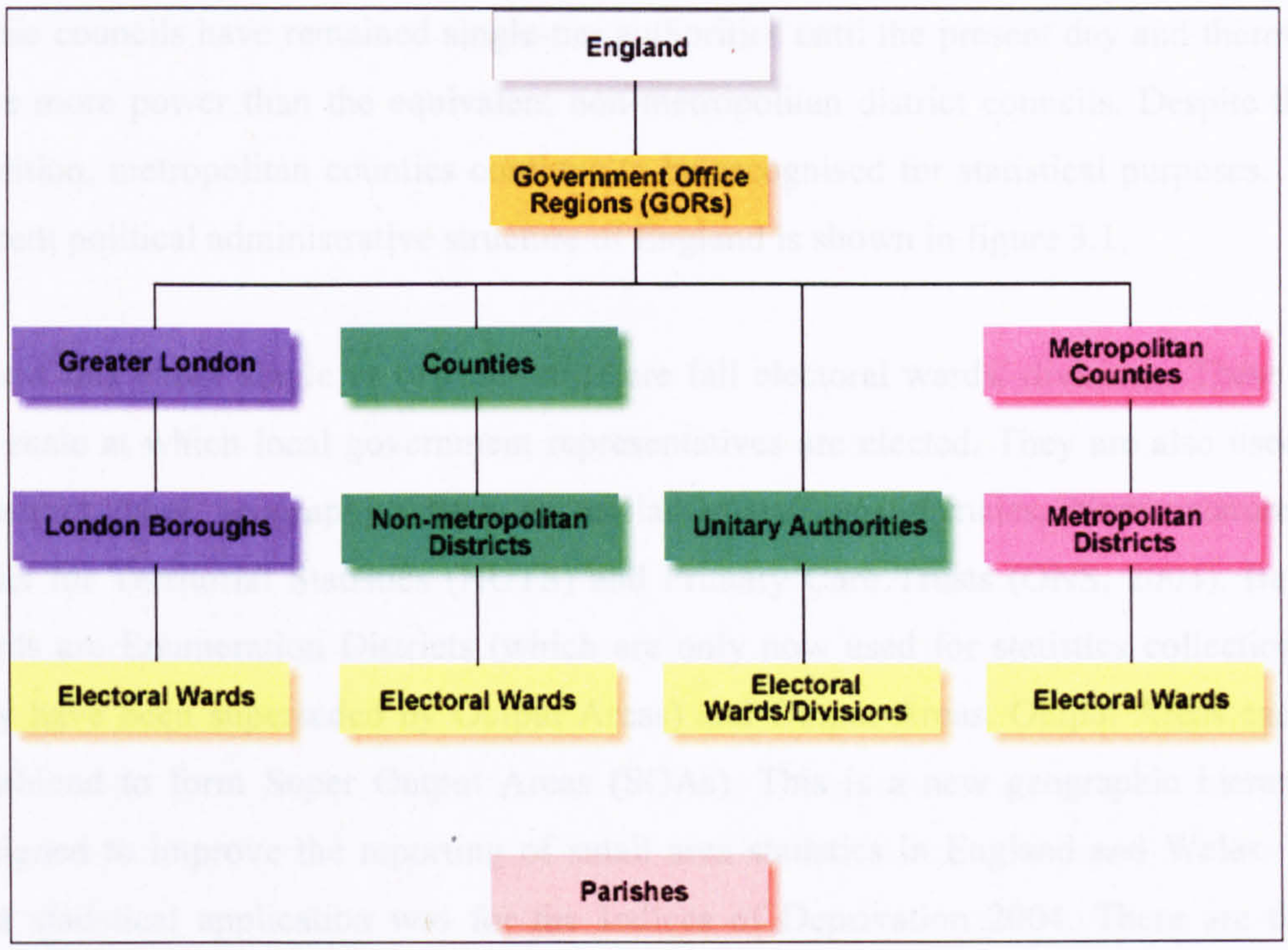

Figure 3.1: The current structure of English Government (ONS 2004) from Central Government though all levels of local distribution.

At the start of the 1960s the entire UK was administered using a two-tier system of local government based on counties along with a combination of other smaller administrative units which included municipal boroughs, county boroughs, rural districts and urban districts which acted as the lower tier of government. However, in 1965 a new structure was introduced to London. Greater London was formed from sections of the surrounding counties, with the London boroughs acting as the second, lower tier of the administrative system. In 1974 a similar structure was introduced to the remainder of England and Wales, and the county boundaries were revised. The revised, and in many cases larger counties, known as 'shire counties', provided the top tier of local government. In six heavily urbanised areas, such as West Yorkshire, these shire counties were instead known as metropolitan counties. In both cases the lower tier of government was divided into districts, known as non-metropolitan and metropolitan districts in the shire and metropolitan counties respectively. However the distribution of responsibilities between the county and district level was somewhat different for the metropolitan and non-metropolitan areas. In 1986 the six metropolitan counties were abolished leaving the metropolitan districts to operate as a single-tier administration.

Those councils have remained single-tier authorities until the present day and therefore have more power than the equivalent non-metropolitan district councils. Despite their abolition, metropolitan counties continue to be recognised for statistical purposes. The current political administrative structure of England is shown in figure 3.1.

Below this either single or two tier structure fall electoral wards/ divisions. These are the scale at which local government representatives are elected. They are also used to construct other geographies such as parliamentary constituencies, Nomenclature of Units for Territorial Statistics (NUTS) and Primary Care Trusts (ONS, 2004). Below wards are Enumeration Districts (which are only now used for statistics collection as they have been superseded by Output Areas) and Output Areas. Output Areas can be combined to form Super Output Areas (SOAs). This is a new geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. The first statistical application was for the Indices of Deprivation 2004. There are three layers of SOAs, the smallest being Lower Super Output Areas of which there are 32,482 in England with a mean population of 1,500. They are built from groups of OAs (typically 4 to 6) and constrained by the boundaries of the Standard Table wards used for 2001 Census outputs). Next are Middle Super Output Areas with a mean population of 7,200 built from groups of Lower Layer SOAs and constrained by the 2003 local authority boundaries used for 2001 Census. Lastly there are Upper Layer Super Output Areas, the geography of which is still to be determined (ONS, 2006).

Parishes (shown at the bottom of figure 3.1) are an historical relic from the time period when the Church had influence over administration due to significant land ownership and are isolated from England's administrative structure. There are still some Parish councils within England but geographic coverage is far from universal.

There are two main challenges to understanding and working within UK administrative geography. Firstly, that the boundaries of different systems are not coterminous and secondly, that they are subject to frequent change. English health geography boundaries have changed dramatically in the last 10 years making historical comparison of area trends almost impossible. In 2006 the 303 Primary Care Organisations were reduced to 152 (ONS, 2006) rendering the Defra (2004) rural/ urban classification of PCTs obsolete (Shepherd, 2006). Within electoral geography this can be equally problematic

with 1,549 electoral wards and divisions changed in 2002, as many as the rest of Europe combined (ONS, 2004).

3.3: Overview of Classification methods

Statistics are usually compiled from a large set of individual observations such as Census returns. In order to make conclusions, these observations need to be grouped or classified. The goal of effective classifications is that they should facilitate the accurate and systematic arrangement of data according to common properties, resulting in statistics that can be easily reproduced and compared over time as well as between different sources. Many classifications of rural areas are, and have been, in use concurrently by policy makers. This can lead to confusion and result in statistical outputs which are not readily comparable. Measurements of the outputs to meet the 'needs' of rural areas can be incredibly difficult to quantify between different government departments because their classification of what constitutes 'rural' varies so widely.

In order to understand these classification methods they have been grouped together into five broad categories of classification approach: Socio-Economic, Population Threshold, Built-up Area, Sparsity / Density and Functional Areas (table 3.2). This chapter will describe some of the classification systems in use in England in recent years with reference to these groups.

Type of Classification	Examples	Characteristics
Socio-Economic	Countryside Agency (Oxford - Countryside Agency Ward Level, 1998); Office of National Statistics (ONS Families, 1991 updated in 1999)	Socio-economic variables from the Census used to form composite indices
Population Threshold	Countryside Agency (Rural Services Survey, 2000); Housing Corporation (Rural Settlements Gazetteer, 1998)	Administrative boundaries combined with Population size based on census data, urban threshold varies from 1,500 + to 10,000 +
Built up Areas	DETR (Urban Settlements, 1981 updated 1991 and 2001); Ministry of Housing and Local Government (Developed Land 1958, updated 1974)	Digitized settlement outlines produced and/ or population size based on census data, urban threshold varies from 3,000 + to 25,000 +
Density / Sparsity	Department of the Environment ('De Facto' Urban Areas, 1974); Local Government (Finance Settlement, 1997 - 2003)	Simple measure of population sparsity based on Census data
Functional Areas	Defra (New Urban / Rural Areas Classification, 2004); General Registry Office (General Registry Office Conurbations)	Composite Indices based on population size, settlement morphology and proximity to service providers

Table 3.2: Five approaches to classifying urban and rural areas within a policy context.

There are a wide variety of approaches used in the classification of urban and rural areas for policy purposes within England. Table 3.2 describes a selection of approaches used within government organisations. There are a multitude of other approaches not covered within this chapter, which have been less commonly utilised in recent years. The approaches discussed are categorised based on their predominant classification method and may have influential secondary methods, such as the United Nations: English Conurbations classification (discussed in section 3.8.1), which would fall in to the Functional Area category mentioned above, uses both urban settlement patterns and socio-economic data which is then constrained to Local Authority Areas.

3.4: Socioeconomic Classifications

Socioeconomic classifications have the advantage of being based on a wide range of nationally consistent data (often derived from the census). These can then be related directly to an appropriate scale of rural policy delivery such as Local Authorities. However, geographic scale is a critical issue and definitions can fail to accurately portray areas if an inappropriate scale is used. Definitions of rural tend to be more complex than those focusing on urban areas, due to the small number statistics involved with identifying small populations. Rural classifications will thus be particularly sensitive to scale and this problem will be compounded if the Local Authority contains a large urban settlement and a small rural hinterland. Socioeconomic classifications systems can be further complicated for rural areas as they are based upon a range of characteristics which look for homogeneity to create groups. Rural areas are noted for their lack of homogeneity and therefore are difficult to classify in such systems.

3.4.1: The ONS Area Classifications (Health and Local Authorities)

The Office of National Statistics (ONS) developed a definition based on the economic and social characteristics of areas (also known as ONS Families). The definition focused primarily on Health Authorities and their associated boundaries but was later adapted for Local Authorities. This approach allows for the identification of urban and rural areas and also the differentiation within these areas. The classification was produced using Ward's hierarchical clustering procedure, based on the 37 socio-economic variables from the 1991 census Key Statistics tables (Bailey et al. 1999). One quirk of the classification is that it actually clustered only 432 local authorities, because the City of London was merged with City of Westminster and Isles of Scilly was merged with Penwith. This was done because the City of London and Isles of Scilly were considered to have too small a population to be clustered on their own. Revisions in 1999 and 2001 due to ward and health authority boundary movements mean that the census data remains the same but the mapped results and classifications are markedly different.

The classification both identifies, for each local and health authority, those other authorities to which it is most similar, and then secondly it groups authorities into a three-tier hierarchy of Families (7), Groups (15) and Clusters (27). This is illustrated in table 3.3. The families are: Rural (divided again into Rural Amenity and Remoter Rural), Urban Fringe, Coast and Services, Prosperous England, Mining and Manufacturing Industry, Education Centres and Outer London and Inner London (Bailey et al. 1999).

District	Family	Group	Cluster
Bradford	V Mining, Manufacturing, and Industry	K Manufacturing Centres	18 Manufacturing Centres
Exeter	III Coast and Services	G Established Service Centres	11 Established Service Centres
East Devon	III Coast and Services	F Coast and Country Resorts	9 Seaside Towns
Teignbridge South Hams	I Rural Areas	A Rural Amenity	1 Rural Amenity
Mid Devon Torridge West Devon	I Rural Areas	B Remoter Rural	2 Rural England and Wales

Table 3.3: The three levels of ONS Area classifications for the study areas (Bailey, 1999)

Given the complex variables involved this approach is time consuming to build and requires sophisticated statistical techniques to be employed. They were originally designed to reveal the characteristics of areas and be used for targeting of healthcare and other services and as a comparison point with other data. Although not originally intended to provide a definition of rural or urban areas they have frequently been used to indicate rurality or differentiate between urban areas.

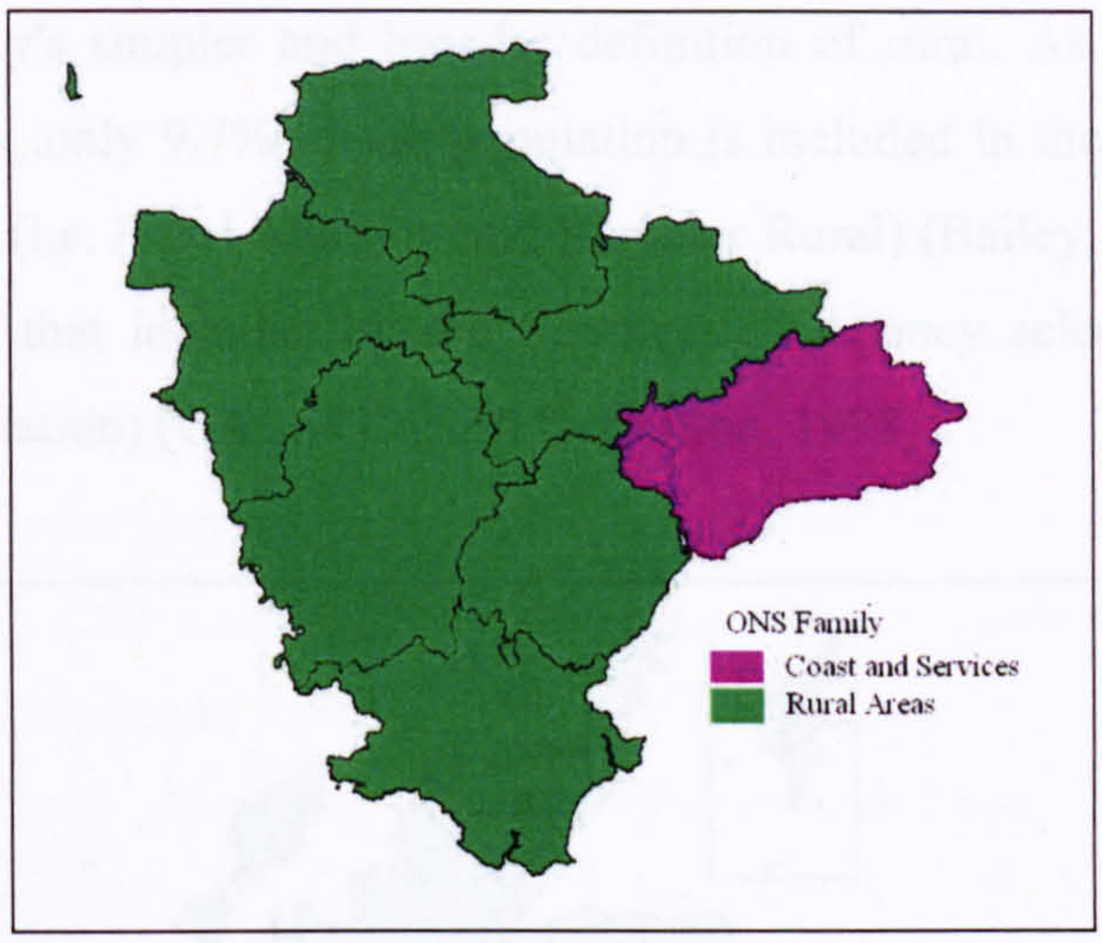

Figure 3.2: ONS Classification of District and Health Authorities 1999 for the case study area of Devon (derived from ONS, 1999)

Within the ONS categorisations there are two groups that subsume areas that might otherwise be considered to be 'Rural': Prosperous England' and 'Coastal and Service' family. As highlighted in figure 3.2 (showing Devon) and figure 3.3 the 'Coastal and Service' family is strongly represented in Wales, the South West and parts of the South East (Bailey, 1999). Despite the fact that these families have rural tendencies there are still, within them, significant variations. As a result of this it is not possible to simply regard 'Coastal and Service' as being equivalent to a 'rural' category. Many members of this family such as Exeter, Plymouth and Torbay, in Devonshire, are heavily urbanised and do not offer an extension to rural. The second group, the 'Prosperous England' family are concentrated largely in south and central England and reflects the fact that these parts of the country have been under the most intense development pressure for the last twenty or thirty years as jobs and residents have dispersed into the towns and villages of the 'core' area of south and central England. Again, this family does not form a direct extension to the 'rural' family as 'Prosperous England' includes many of the quite densely developed urban unitary authorities in the East, South East and Midlands, as well as the fringes of London. It is a mixed group of commuter areas and free-standing towns in addition to areas of open countryside which would otherwise be considered rural.

The 'rural' element of this classification is greatly reduced in comparison with the Countryside Agency's simpler and broader definition of rural. As a result of this, in England and Wales, only 9.7% of the population is included in the ONS district level definition of 'rural' (i.e. Rural Amenity and Remoter Rural) (Bailey, 1999). This is only about one third of that included by the Countryside Agency selection of authorities (28.2% of the population) (CA and Oxford Definition, 1998).

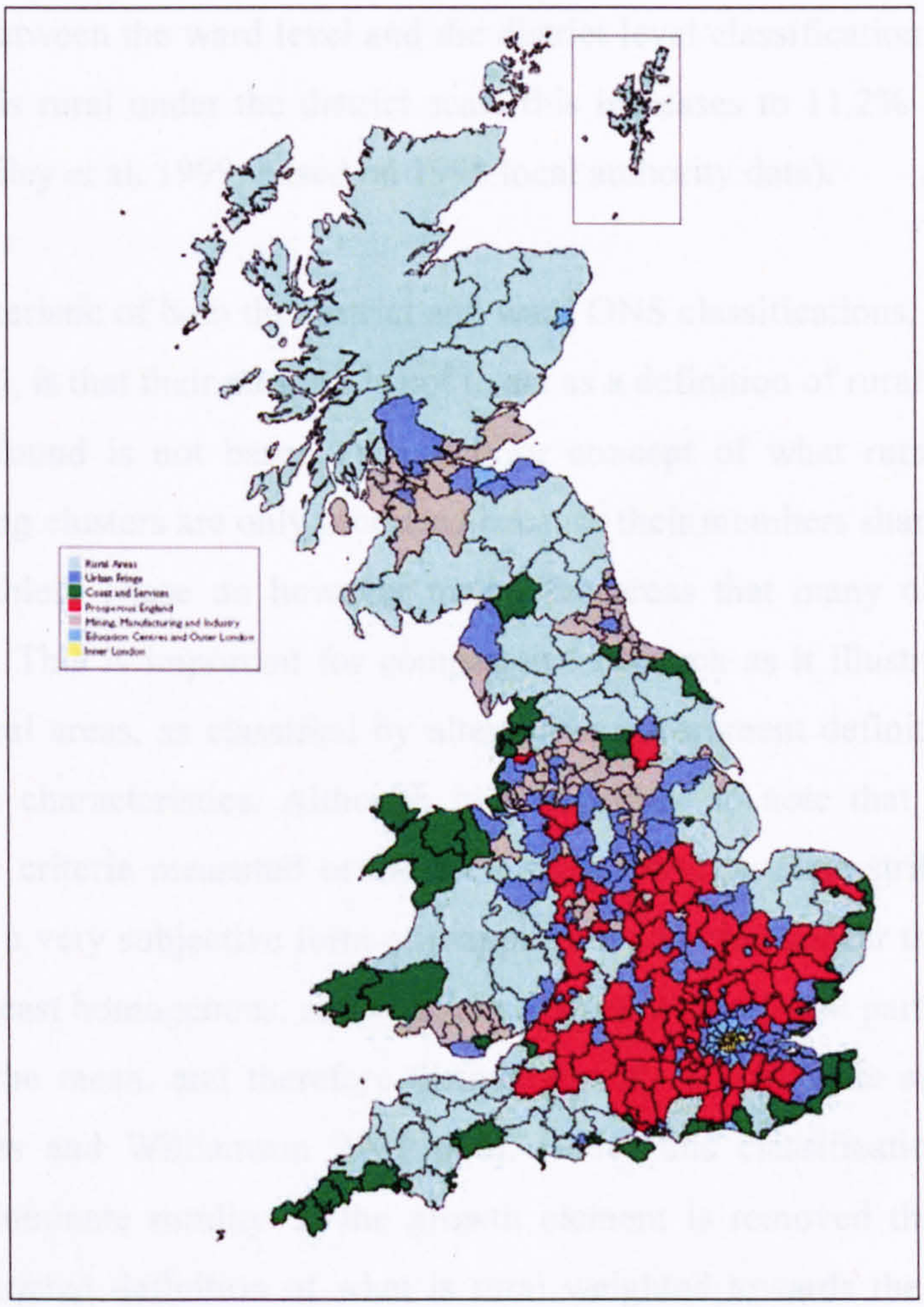

Figure 3.3: The Seven ONS Families - local authorities at April 1999 (Bailey et al. 1999 Map 3.1, p35)

3.4.2: The ONS Ward Level Clusters

There is also a ward level definition based again on the 1991 statistical ward boundaries and the 1991 census data. A statistical ward is a ward where the minimum population is 1,000 people. Wards with a population of fewer than 1,000 people were merged with a

neighbouring ward to create the statistical wards. There are 8,800 statistical wards in England (10,553 in the UK as a whole), which are classified into a three tier hierarchy of 9 super-groups, 17 groups and 26 sub-groups. The classification was constructed from 43 census variables extracted from the Census Key Statistics tables. The method used in creating these groups involved creating 1,000 clusters using the k-means clustering procedure, and then reducing this number by running Ward's clustering algorithm on the cluster centres that were produced by the k-means procedure. The main contrast between the ward level and the district level classification is that 9.7% of the population is rural under the district scale this increases to 11.2% under the ward based scale (Bailey et al. 1999: based on 1998 local authority data).

The key characteristic of both the district and ward ONS classifications, for the purpose of defining rural, is that their purpose is not to act as a definition of rurality, and that the 'rural' that is found is not based on any prior concept of what rurality represents. 'Rural' appearing clusters are only produced because their members share similar socio-economic variables. These do however match the areas that many observers would regard as rural. This is important for comparative research as it illustrates how many traditionally rural areas, as classified by alternative government definitions, share key socio-economic characteristics. Although it is important to note that changes in the socio-economic criteria measured or the weighting could produce strikingly different patterns, this is a very subjective form of mapping. Wards that appear the most unusual are among the least homogenous, and vice versa. Thus, a significant part of the apparent distance from the mean, and therefore distinctiveness, is explicable as "within-group diversity" (Voas and Williamson 2001 p68). Under this classification 'growth' and growth areas dominate rurality. If the growth element is removed this classification produces a restricted definition of what is rural weighted towards the relatively poor rural authorities and wards. There is the danger that this classification can label areas as being affluent in a clear example of how hidden by statistics issues such as poverty can become in rural areas.

3.4.3: Performance and Innovation Unit: Tarling Report

An early example of defining rural areas by Local Authority districts is the Rural Development Commission 'The Economy and Rural England' (1993), commonly

referred to as the Tarling Classification. The Classification was developed for the Rural Development Commissions Local Authority Classification (figure 3.8) of Urban; Rural; and Remote Rural. Though the criteria for defining the Coalfield areas and the Metropolitan Areas are rather unclear from the literature they were widely referenced in the 1990s. As illustrated in figure 3.4 Tarling et al. (1993) classified districts into rural (108 districts), remote rural (69 districts) and former coalfield area (10 districts) with the remaining areas being divided into urban (120 districts) and metropolitan (69 districts) (Tarling, 1993). Although these classifications were based on the old administrative boundaries (pre 1990 re-classification) they still inform policy today including the Performance and Innovation Unit Report on Rural Economies (1999) and in the Cabinet Office Report 'Sharing the Nation's Prosperity' (2000).

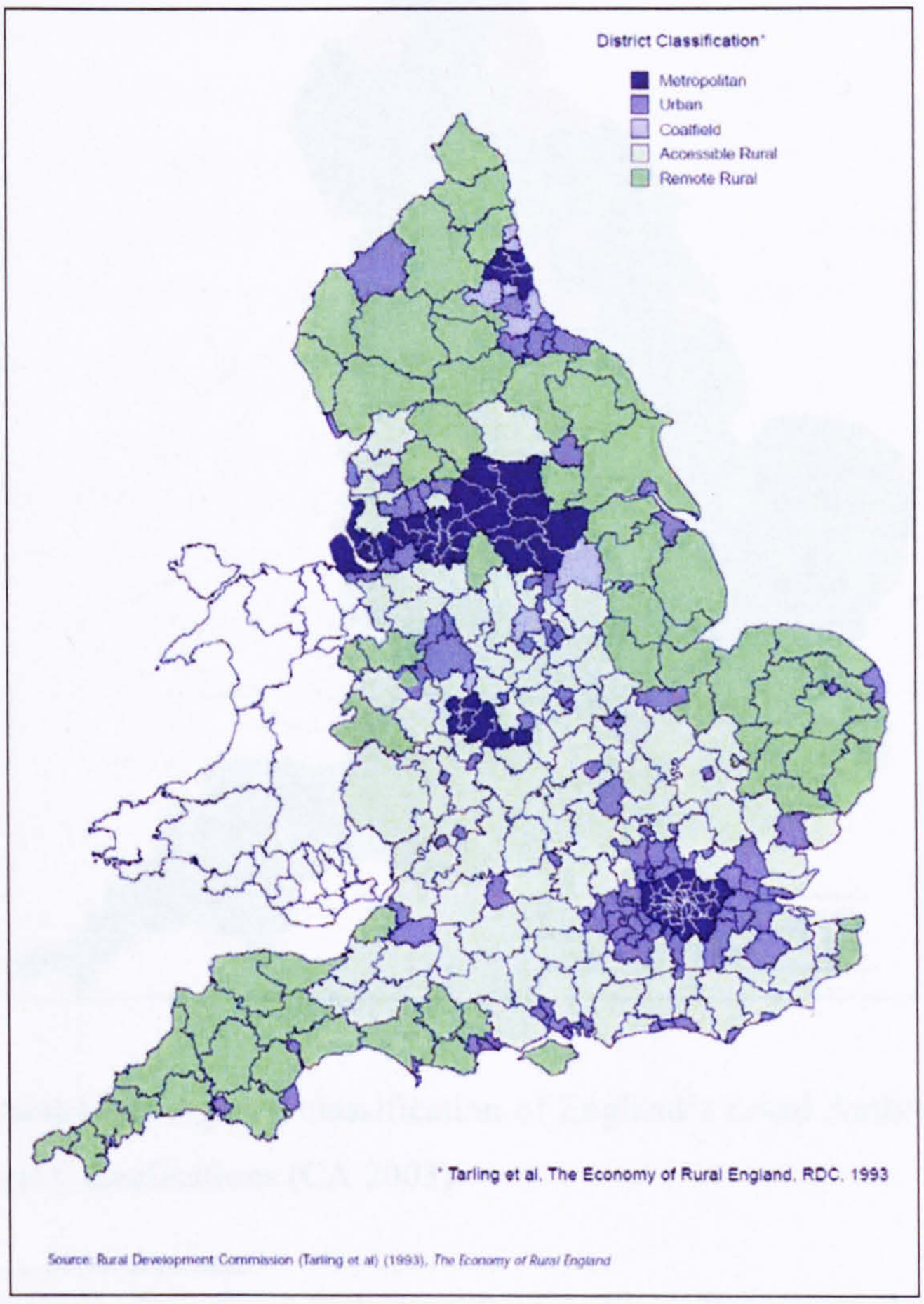

Figure 3.4: The Tarling District Classification (Performance and Innovation Unit 1999 p22)

3.4.4: Administrative Area Classification (Local Authority): Countryside Agency

The administrative area classification of rural local authorities was developed for the Rural Development Commission (and widely used by the Countryside Agency). The classification was created from an amalgamation of three previous classifications[1], these are: The National Council for Voluntary Organisations (NCVO), which were primarily based on population density, and the ONS and DoE list of rural authorities for the 1995 Rural White Paper. Currently this classification categorises 145 district authorities as rural (illustrated below in figure 3.5).

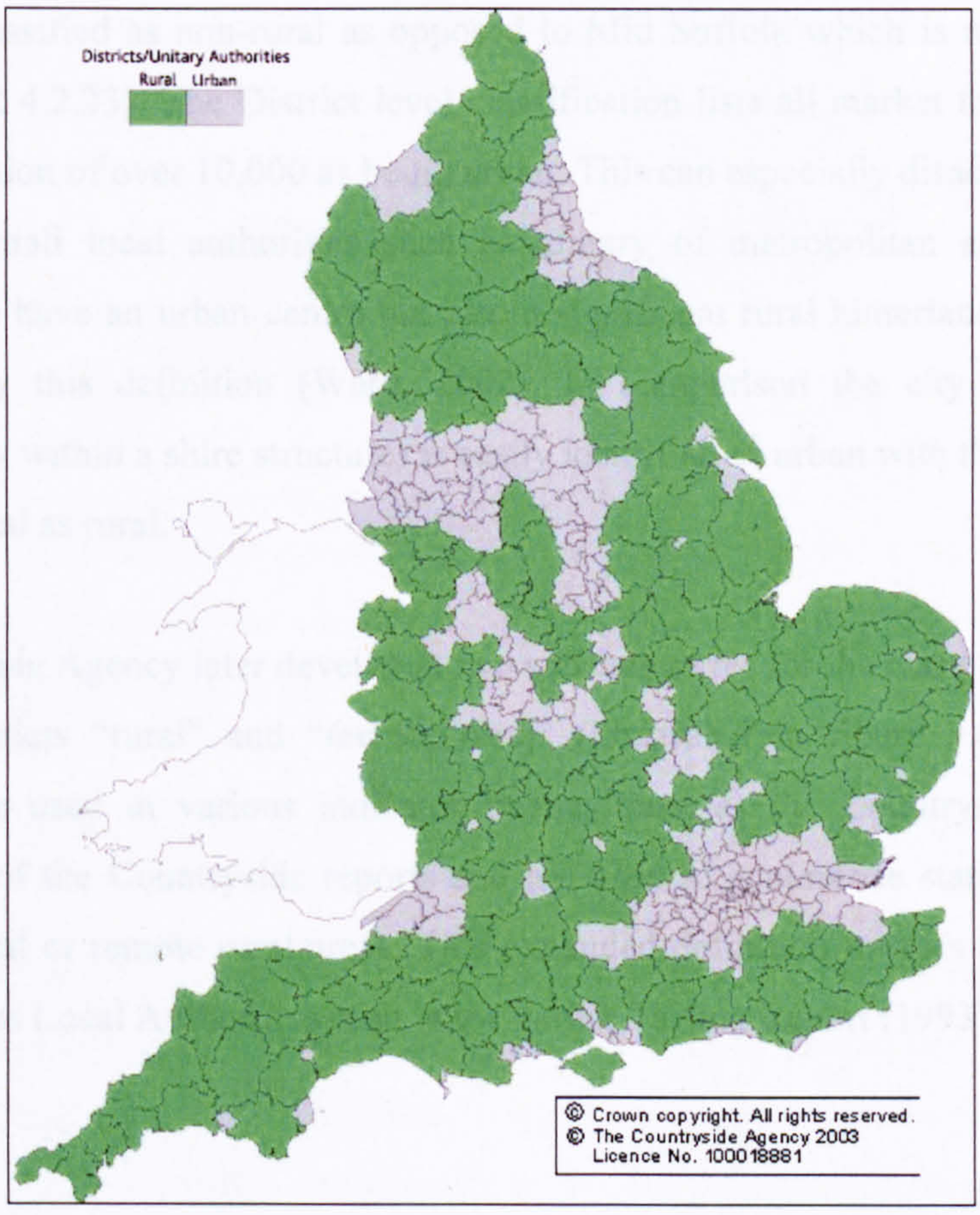

Figure 3.5: Countryside Agency classification of England's Local Authority Areas into Urban and Rural Classifications (CA 2003)

1 The National Council of Voluntary Organisations: Redefining Rural Districts in England (these are primarily based on population density), the ONS: 1991 Classification of Local and Health Authorities (The Seven 'Families, see section 3.4.1) and a DoE list of additional rural authorities prepared for the 1995 Rural White Paper.

There are weaknesses to this definition, not least the loss of accuracy due to the large scale and the associated problems of using delineation based on administrative rather than physical boundaries. When studying large areas of open countryside with one or more concentrated service centres, these areas may not be classified as rural under this definition despite being located in a significantly rural surrounding. Carlisle, for example as a centre has 103,000 residents, approximately three quarters of its District's population. However, the district as a whole has a population density similar to that of Mid Suffolk. Mid Suffolk on the other hand has a higher settlement density than the rural part of Carlisle. However, due to the significant size of the urban centre in the latter, it is classified as non-rural as opposed to Mid Suffolk which is resolutely rural (SERRL 2002 4.2.23). The District level classification lists all market towns or wards with a population of over 10,000 as being urban. This can especially disadvantage urban focused or small local authorities such as unitary of metropolitan authorities like Bradford who have an urban centre but also a significant rural hinterland which is not recognised by this definition (Ward, 2002). In comparison the city of Exeter, (a traditional city within a shire structure) is easily identified as urban with the surrounding districts classed as rural.

The Countryside Agency later developed two sub categories for the classified rural local authority districts "rural" and "remote rural" (illustrated in figure 3.6). These sub categories are used in various indicator themes such as the Countryside Agency's annual State of the Countryside reports and are used to summarise statistics as either accessible rural or remote rural areas. This expanded definition mirrors the patterns of rural and urban Local Authorities seen in the earlier Tarling Report (1993).

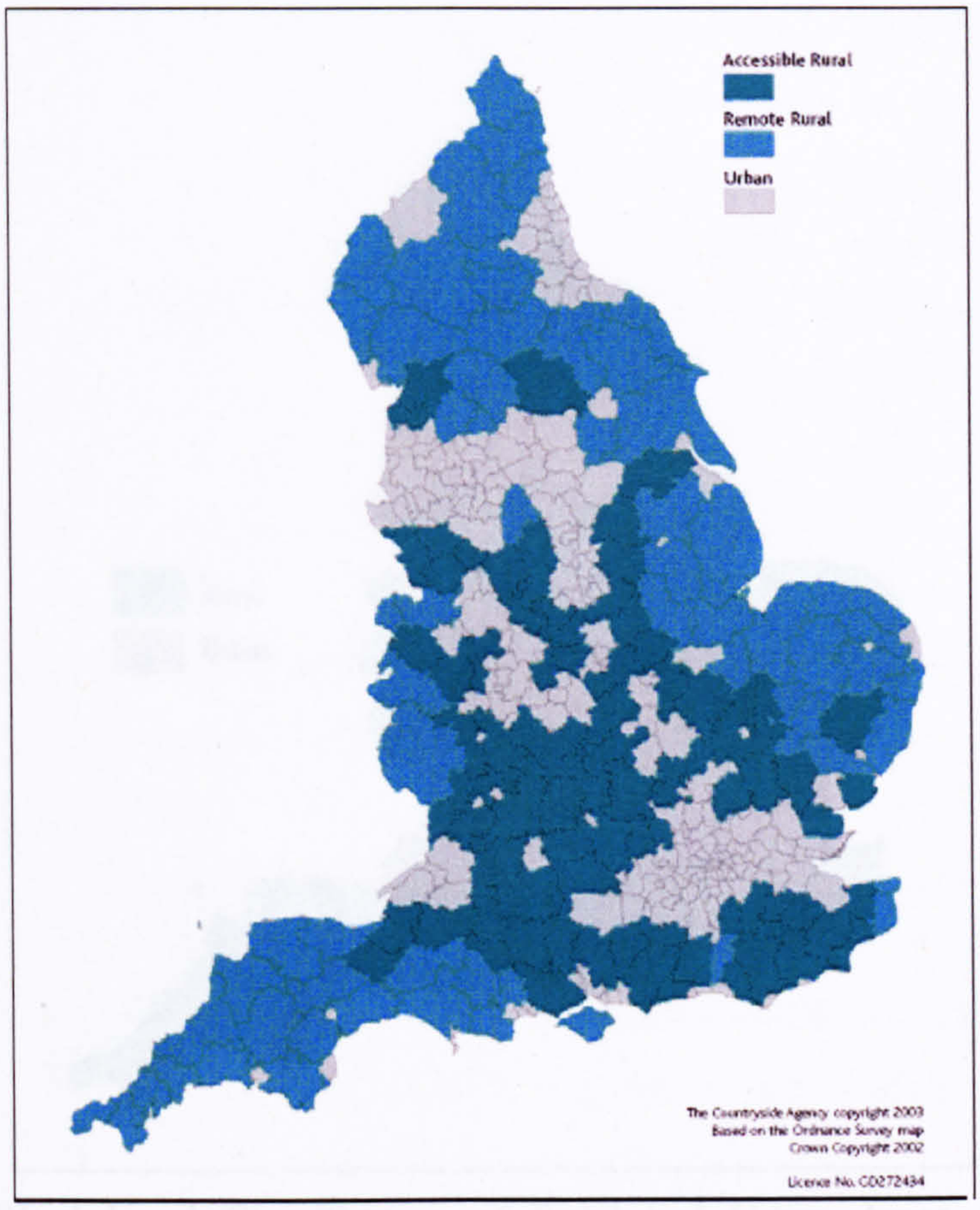

Figure 3.6: The expanded Countryside Agency classification of England's District and Unitary Local Authorities showing Remote Rural and Rural Areas (The State of the Countryside 2003, Annex 3 p151).

3.4.5: Ward Level classification (Oxford-Countryside Agency 2000)

This classification broadly codes all of England's wards as either rural or urban. The Social Disadvantage Research Centre (SDRC) at Oxford University developed the classification in 2000. It was constructed, using the 1998 ward boundaries, by analysing a number of socio-economic variables from the 1991 Census, including population density, to separate wards into an urban or rural category. The following variables were used in the model to predict the presence of rural wards: Population Density; Economically Active Population; Public Transport Use to Travel to Work; Employment in Agriculture/Forestry/Fishing; Employment in Primary Production and percentage ethnically non-white[2].

[2] Population Density: ratio of ward level population size (from IMD 2000) to ward area in hectares

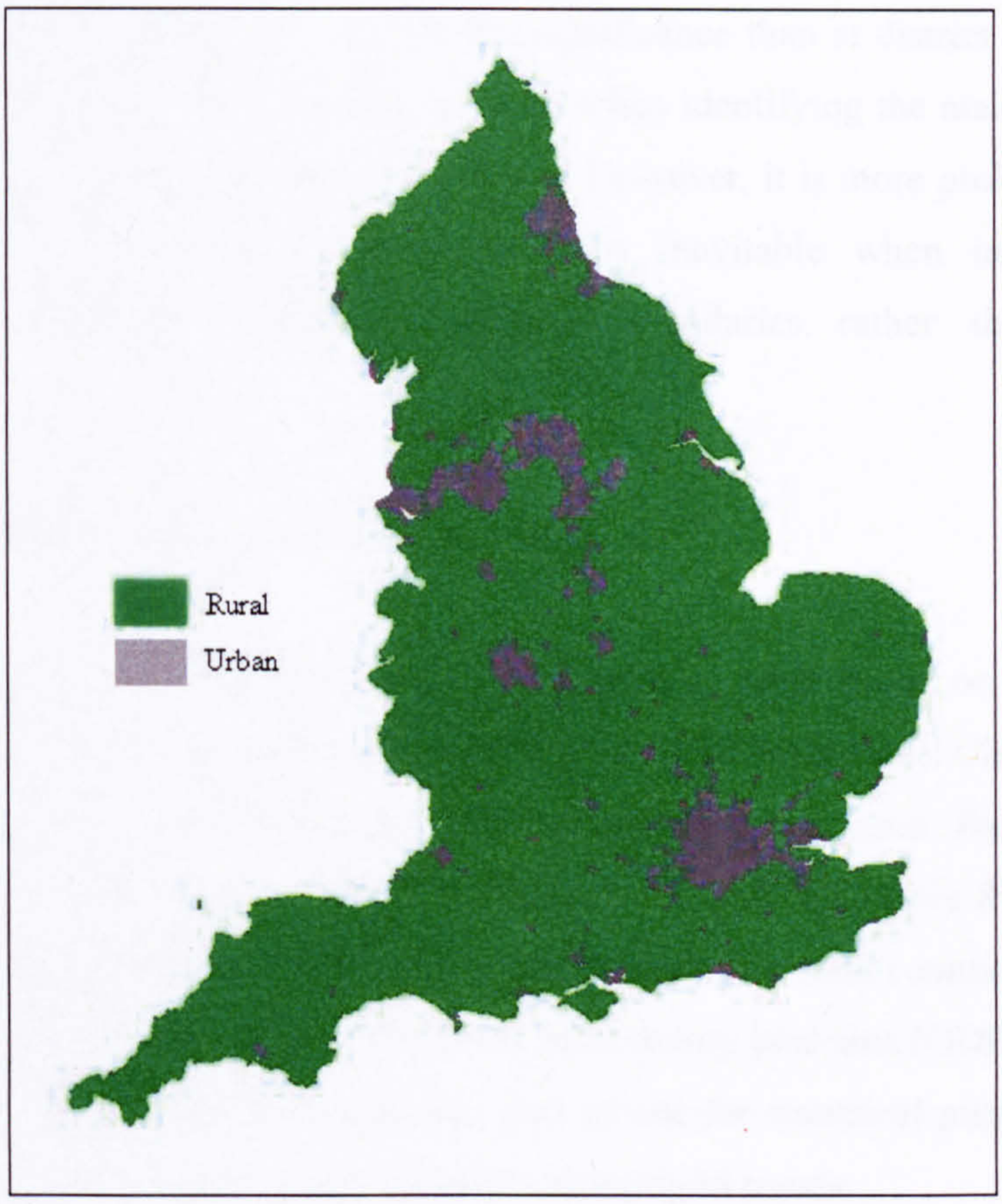

Figure 3.7: Ward Level Classification of Rural and Urban Areas (derived from Countryside Agency 2003)

Under the ward level classification, 4,076 of the 8,414 wards in England are defined as rural (48%). A population of approximately 13.9 million people live in these rural wards, which is over one-quarter (28%) of the total population in England (1998 based population estimates) (ODPM 2004).

- Ratio of economically active population to the economically inactive population: ratio of ward level population aged 16 to 59 to the sum of the population aged 15 and below and aged 60 and over (population estimates IMD 2000).
- Percentage of people who use public transport: ward level numbers of people who use trains or buses to travel to work. The denominator is the ward-level number of economically active people aged 16 and over. (1991 Census).
- Percentage of people in agriculture/forestry/fishing: ward level numbers of people in agriculture, forestry and fishing. The denominator is the ward level number of economically active people aged 16 and over. (1991 Census).
- Percentage of people in primary production (mining/energy /water): ward level numbers of people in mining, energy and water. The denominator is the ward level number of economically active people aged 16 and over. (1991 Census).
- Percentage of people who are ethnically non-white: ward level numbers of people who describe their ethnic group as a category other than white. The denominator is the ward level population. (1991 Census).

At ward level the issue of scale is of lesser significance than at district level but there are still difficulties. The classification is useful when identifying the main conurbations and cities as a collection of many urban wards. However, it is more problematic to use when applied to rural areas. This conflict is inevitable when using a spatial measurement based on traditional political boundaries rather than settlement boundaries.

3.4.6: Countryside Agency County Definition

The 1998 counties were also classified as ether rural or urban based on the number of urban and rural wards they contained (under the CA 1998 Ward Level Classification). A county is classed as rural if more than 50% of the wards are rural. Based on this 28 counties are rural and 13 urban. West Yorkshire is 'Urban' with only 8% rural wards. Devon is 'Rural' with 88% of wards classified as rural. The rural counties contain 41% of the total county population and 78% of the total county land area (ODPM 2004). This scale is only recommended as a guideline and its use for statistical purposes could be misleading as the scale is too large to identify meaningful trends.

3.4.7: The Rural Development Commission

In an effort to target funding at areas in need the Rural Development Commission identified 'Rural Development Areas' by the very simplistic and transparent process of taking all wards outside large Urban settlements with a population less than 10,000 and defining them as 'rural' (based on 1981 census data). Parishes with a population less than 10,000 were defined as rural parishes under the same system. There are currently about 9,600 parishes designated as rural under this definition. Using this ward level form of the definition, 14 million people in England (around 28% of the population) live in rural areas.

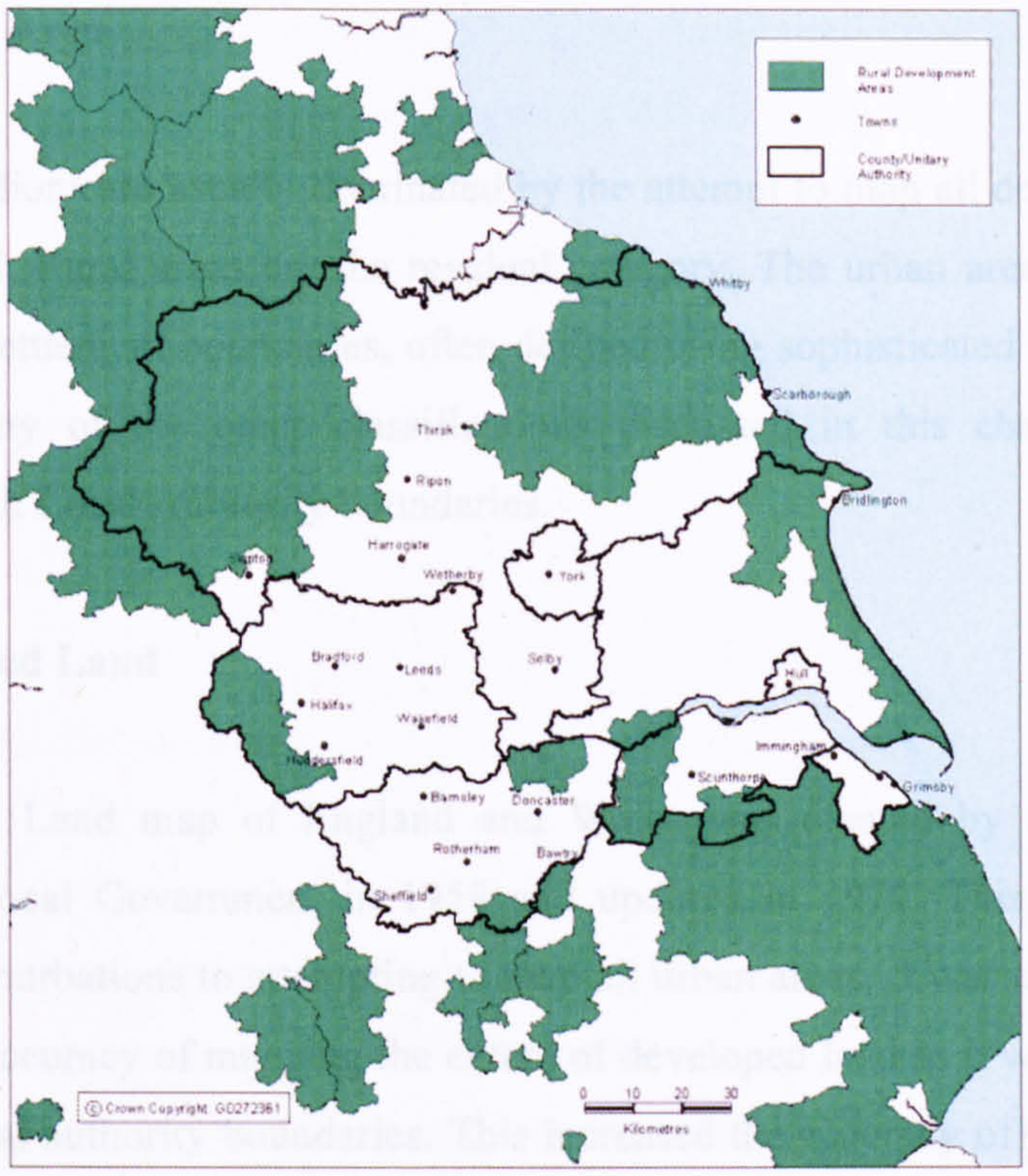

Figure 3.8: The Rural Development Areas in Yorkshire and the Humber Region[3]

The definition of Rural Development Areas was amended following the 1991 Census and indicators of 'need' were introduced rather than simply distance and population variables. Wards were identified that had a high score in a minimum of six out of ten indicators of need. A Rural Development Area was then defined as a group of six continuous wards meeting the criteria (though extra wards could be added to ensure the area was suitably 'rounded'). This need for a continuous rural criteria disadvantages mixed local authorities such as Bradford, which have many areas with strong rural characteristics. The wards which qualify under these criteria are isolated from other rural wards and therefore have no opportunity to seek funding despite the needs of the population. As figure 3.8 shows, West Yorkshire's only qualifying area is to the west of the county and areas such as Ilkley Moor and other rural parts of Bradford are left un-served.

[3] Source DEFRA 2004 http://www.defra.gov.uk/erdp/images/yhgifs/yhrda.GIF

3.5: Built up Area

These classifications are usually dominated by the attempt to map all developed / urban land in England. Rural areas are the residual category. The urban areas identified are based on their settlement boundaries, often defined using sophisticated GIS techniques, and unlike many of the other classifications discussed in this chapter are rarely coterminous with Local Authority boundaries.

3.5.1: Developed Land

The Developed Land map of England and Wales was created by the Ministry of Housing and Local Government in 1958 and updated in 1974. This moved beyond mapping the conurbations to attempting to map all urban areas. It was a step forward in improving the accuracy of mapping the extent of developed land as it was done without reference to local authority boundaries. This increased the accuracy of the definition as urban boundaries rarely tally with administrative ones. Using this definition made sense for defining large areas such as the West Yorkshire conurbation which overlies many political boundaries and is able to show that the area operates as a unit rather than several free standing and independent urban areas. However, the fact that the mapped areas created were disassociated with administrative boundaries made it hard for Local Government to use this definition for policy purposes; it was therefore generally not adopted by agencies. This system only aimed to map developed, and therefore, urban land. It is typical of the time period. Rural areas have risen in importance within political policy development and become defined explicitly only in post 1980s mapping exercises.

3.5.2: Administrative area definition

This was a simple urban and rural definition based on administrative area types. This definition was utilised in some of the early UK Censuses up to 1971. It involved defining a town as urban in terms of its administrative boundary. In England the administrative division of the country into boroughs, urban districts and rural districts provided an approximate urban and rural split with administrative areas falling into the

logical urban or rural label depending on their traditional local government type. Unsurprisingly, given the dynamic and rapid growth of urban areas, this approximate urban and rural division proved to be an inadequate classification. Administrative boundaries changed infrequently prior to 1974. Many administrative boundaries lay beyond the 'built–up' area and often included tracts of countryside or urban areas which developed over the administrative boundary into what would previously been a rural administrative area (ODPM 2001).

3.5.3: 'De Facto' Urban Areas

The 'De Facto' Urban Areas definition was developed by the Department of the Environment (DoE) in 1974 and is not currently in use. It was again an attempt at mapping the physical extent of urbanisation, this time based on population density. However, the search for smaller settlements does highlight some rural areas. The definition was created with the aim of identifying what was a 'true' urban area and, from there, to estimate their populations and to enable analysis of associated characteristics. By looking at these characteristics the DoE hoped to estimate the number of urban and rural settlements. An area was considered urban if the population density was higher than 0.6 persons per acre (equivalent to 0.2 persons per hectare). This was a low density benchmark taken from the 1966 Census. It was raised for later studies due to the increased population of the country and its increasing rates of urbanisation. The current benchmark regards > 4 persons per hectare as urban[4] (Cumbria County Council Policy Unit 2004). This increases the capture rate since the population has increased from 41.6 million since 1966, to just over 52 million in the 2001 census. This means the population has increased by 25% but the ratio to density has increased twenty fold. A minimum population limit was also used in addition to the population density as a measurement criteria, with the minimum population limit for qualification as an urban area under the DoE classification typically set at 3000. However, this did vary and in some research this was set as low as 2000, as it was for the Housing Commission. These criteria resulted in the identification of 1333 separate urban areas in England and Wales. This suggested that 88.3% of the 41.6 million

[4] www.cumbria.gov.uk/briefings/1997/brf9724.htm (01/09/04)

national population in 1966 was urban in character (SERRL, 2002). Where population densities were found to be inadequate for determining urban boundaries under the ward and parish based measurements, these areas were replaced by enumeration districts to try and insure greater integrity of results. Due to the complex nature and overlapping of British urban settlement patterns and the functional criteria that had been attempted to be used, the 1974 De Facto Urban Areas were abandoned as being too complicated to quantify.

By the 1980s a new wave of urban definitions had emerged in replacement. These quantified urban settlement patterns by the actual urban area boundaries rather than in line with administrative boundaries. This led to greater accuracy in the mapping of the urban spread. Another important move forward was the recognition of 'urban land' which may not have an associated high population density but is nevertheless urban in character. After the 1974 local government reforms there was recognition of the need to develop new approaches in defining urban areas for census and other purposes after many former urban authorities merged into the surrounding rural districts. The 1981 urban areas definition was based on land use as discussed below.

3.5.4: Urban Settlements 1981, 1991 and 2001 (also known as Urban Areas)

Census data has been framed mainly for administrative areas and this classification marked a deviation from this. In its most basic form this definition involves drawing a line on a map around built up areas and calculating the number of people in each area using the appropriate census data (Denham 1998). It is technically quite complex to create but has the advantage over other definitions because it is very transparent, in outcome, and illustrates lay people's perception of what constitutes the rural and urban divide.

The demand for a land use approach such as the one used to derive the Urban Settlement definition came in the early 1980s. It was then that the Statistical Office of the European Communities requested a definition of urban agglomerations of 100,000 or more people in relation to the 1980 round of censuses. This definition was originally developed by Department for Transport, Local Government and the Regions (DTLR) and Office of Population Censuses and Surveys, Ordinance Survey. Originally named

Urban Areas it was renamed Urban Settlements to avoid confusion, as it is a definition which maps both urbanised land use and population numbers.

The key advantage for policy makers was that a land use approach offered advantages in terms of comparability between countries (by using an established base in topographic mapping). It also had a successful precursor in the 'developed areas' map produced by DOE and modelled on the National Land Use Classification. However, the issues associated with a strict definition still exist as there are many different classes used during implementation. The suggested cut off is that settlements over 10,000 should be considered urban. However, in some studies a settlement with a population of 3,000+ (as used by the Department of the Environment Classification based on De Facto Urban Areas) is regarded as urban whereas in others any settlement under 25,000 (ODPM) can be regarded as rural. Such flexibility of differentiation of cut-off points can therefore lead to a manipulation of data accordingly, depending on the argument posed by the user.

The start point for the mapping technique involved identifying urban features such as permanent structures, transport routes, mine and quarry buildings, and any area completely surrounded by built up sites such as golf courses and playing fields. These formed the basis of the criterion for qualification as an urban area. Then to qualify for inclusion as an urban area the urban features had to extend continuously for at least a 20 hectare area and then continue until there is a discontinuous area of more than 50 metres.

This definition also saw the distinction between urban areas and urban land refined. Urban areas were based on population density. Urban Land had no associated population figure. To find Urban Areas, Ordinance Survey maps were overlaid on Enumeration District (ED) maps; where four or more EDs fell within an urban area (or at least 50% of the ED fell inside the urban area) this land was deemed to lie within the urban boundary as long as the population exceeded 1000. This was then extended, with the result that urban land of 20 hectares or more and less than 50 metres away from land meeting the above ED criteria would be joined together to form continuous urban areas. This failure to recognize small settlements by not assigning a population value has had a significant impact for use in rural policy making as small settlements of a similar size

may be ignored as they are classified as urban land rather than recognised as individual settlements which would have been more appropriate from a policy planning perspective. Certain aspects may also be vulnerable when considering local changes in the pattern of land use as a small settlement growth could be enough to breach the 50 metre contingency and change the mapping dramatically. All areas that were less than 20 hectares, or more than 200 metres from the nearest developed/ built up area, were classified as 'non urban'. When rural populations are measured using this method it is this residual which is measured rather than a specifically designed rural classification.

The 1991 and 2001 Urban Settlements are very similar to the 1981 Census Areas in concept and are regarded as essentially an update of the 1981 definition. The data revealed that, as in 1991 and 1981, nearly nine in ten people in England and Wales live in cities, towns and other urbanised areas (Craig 1984; Denham 1998; ONS 2004). Despite the changing population numbers the absolute ratios look to be fairly constant. The main change in 1991 was that the data capturing process was updated. Population centroids were used (using data from the 1991 census) and an ED was defined as urban if its centre was within urban land or within the 150 metre boundary (buffer zone). This could cause errors because EDs often capture the edge of urban areas and then extend into sparsely populated areas to overlap with, and therefore capture, the outlying population. Many of these EDs have contentiously been classified as urban despite many rural characteristics.

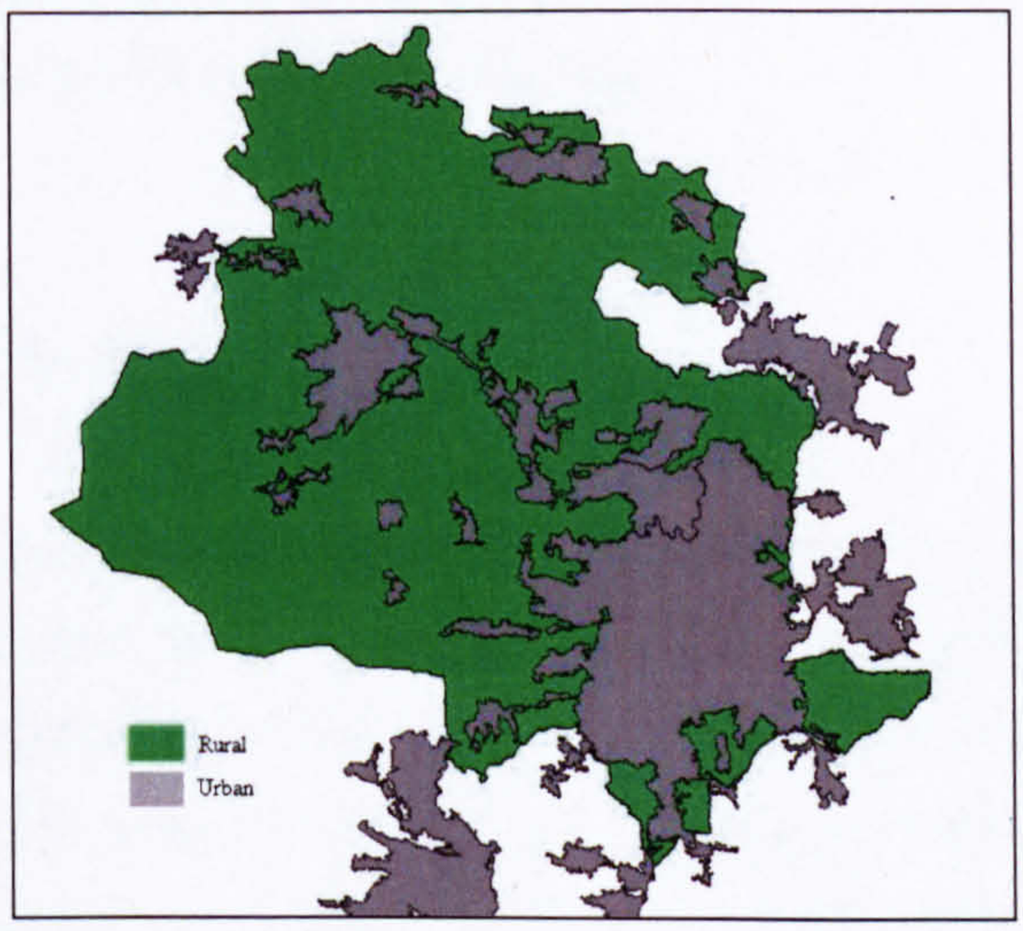

Figure 3.9: 1991 Urban Settlements in and overlapping the case study area of Bradford. The impact of "chaining" can be seen towards the bottom of the image

The 50 metre contiguity rule that combines urban areas together into an agglomeration can produce unclear results. For example the 'chain' of 25 individual areas comprising the West Yorkshire area are in some cases linked by only a very few houses. Where developments are joined by road networks the contiguity rule can produce strange urban patterns. These are especially apparent in the shape of the Bingley and Queensbury (towards the bottom of figure 3.9, above) areas. This is due to uneven urban growth and the common tendency for settlements to extend in a narrow pattern along roads while the surrounding area remains much less densely populated. The pattern of settlement morphology and growth is a feature of the natural geomorphology but the chaining can cause confusion as it looks as though settlements are rapidly expanding and growing when they are merely joining. A significant increase in the size of an urban area can be the result of only small increments in development. Urban agglomerations are therefore an unstable basis by which to measure urban change over time as this 'chaining' can indicate significant variation as a result of only small scale developments.

This definition's strength has been that it is independent of changes in the administrative landscape of an urban area and can be used in central government policies related to land use (ONS 2004). However, unlike the earlier 1956 Conurbation definition, this detachment from administrative boundaries can be a difficulty in terms of funding allocation, which tends to be allocated on an Administrative Boundary Level. It would therefore be an unattractive proposition to local government councils as a guide upon which to base local decision making.

3.6: Population Threshold

These classifications use an arbitrary population threshold within administrative area boundaries to determine if an area is rural or urban. These thresholds vary from 1,000 to 25,000 although 10,000 is the most commonly excepted threshold. These systems are vulnerable to criticism over scientific rigour due to the arbitrary nature both of the threshold choice and the area boundaries chosen, as these can impact the population identified. The strong merit of this system is that is simple and transparent in method which allows easy replication and comparison. However, because these methods use

crude measures within administrative boundaries the areas identified may not tally with what is commonly imagined as 'rural'. Classifications based on population sparsity / density can be viewed as a progression over this method as they contain an element of responsiveness to changing area size.

3.6.1: Countryside Agency Rural Services Survey Parishes

For the Rural Services Survey 2000 (RSS2000[5]) a population threshold of 10,000 was used to define urban parishes and 1,000 to further define small urban areas. However, it was the population within the parish boundary that was taken, rather than using Urban Settlement boundaries and their associated population counts. RSS2000 was based on the 1997 boundaries, incorporating all those parishes surveyed in 1997 that can be traced through to the current set of boundary definitions. The survey does not provide total parish coverage of England as parishes with large populations are excluded - this was partially a politically motivated decision to exaggerate the appearance of poor service provision. This classification is becoming dated as there is little contemporary data collected for it apart from the Rural Services Surveys and Agricultural Returns, the rest of the data is from the 1991 Census.

The parish level classification of rural areas resulted in a rural population of about 15% of the resident population of England, compared to 28% under the Countryside Agency's definition. This is due to the deliberate exclusion of more populous parishes. The rural land area covers approximately 85% of the land area of England. This is similar in land area to the Countryside Agency Ward Level Classification.

3.6.2: Department of the Environment, Transport and the Regions

This definition is a combination of Population Threshold and Built Up Area types. The Department of the Environment, Transport and the Regions developed a classification for regional and local transport and infrastructure planning based on the morphology and size of settlements rather than purely the population. It was based partly on the

[5] http://www.ruralcommunities.gov.uk/files/CA48-RuralServicesin2000.pdf

1991 urban settlements and again rural clearly was the residual category: in this case "Rural Areas (not any urban settlement)" were all areas of less than 1000 population (the cut-off point for an urban settlement) (DETR, 2000, Annex B). This results in a very small proportion of the population being classed as rural but a large proportion of the land area. The main definition has been used for the creation of Local Authority Road Traffic Reduction plans in 1997 and in the creation of Local Transport Plans (table 3.4). As a sub set to this classification the DETR defined areas with a population of 0.5 to 4.0 per hectare as sparse; and those with lower population levels as super sparse (this is definition is used within the Local Government Relative Needs Formula – as discussed in Chapter 7 and 8).

Area Type Classifications

Area Type	Classification
1	Central London (City and Westminster)
2	Inner London (as defined in the London Area Transport Survey)
3	Outer London
4	Centres of other connurbations (West Midlands, Glasgow, Greater Manchester, Merseyside. West Yorkshire, Tyne and Wear)
5	Outer parts of other connurbations (as listed in area 4)
6	Other urban settlements: over 25 square kilometres
7	Other urban settlements: between 15 and 25 square kilometres
8	Other urban settlements: between 10 and 15 square kilometres
9	Other urban settlements: between 5 and 10 square kilometres
10	Other urban settlements: under 5 square kilometres
11	Rural areas (not any urban settlement)

Table 3.4: The tables above shows the Area Type Classifications which are one of the eight key 1997 NRTF definitions for transport planning[6] (DETR 2000 Annex B)

3.6.3: Rural Settlements Gazetteer

This is basically a logical extension of the 'urban land use approach' used for the Urban Settlements classification in that it essentially identifies all settlements below 1000 almost down to isolated dwellings. The Rural Settlements Gazetteer provides a comprehensive list of all rural English settlements: rural in this case being settlements below 10,000 in population. 16,673 such settlements have been identified (Research Source 26: Rural Settlement Gazetteer, 1998). The latest edition of the Gazetteer (1998) uses the most advanced computing techniques relying heavily on GIS and is based upon

[6] http://www.dft.gov.uk/stellent/groups/dft_localtrans/documents/page/dft_localtrans_033304.pdf

information from the 1991 Census and from the Royal Mail's Address Manager Databases[7]. These localities are based on the Royal Mail's 'residential delivery points' which are associated with the traditional six figure National Grid References (NGRs). This 100 metre grid square is attached to unit postcodes. The Gazetteer is used to try to ensure the accurate delivery of rural policies and programmes. The Housing Corporation's rural housing programme is restricted to settlements below 3,000 in population so the definition is further extended to highlight these settlements.

3.7: Sparsity/ Density

Measures of 'sparsity' can serve as relatively simple discriminators between rural and non-rural authorities and often reproduce the classifications determined by methods based on socio-demographic measures. However, no established classification of rurality currently makes use of this measure, although the 1974 De Facto Urban Areas classification (discussed later in this section) did use the technique. It is used as a feature of several government funding formulae such as the Emergency Ambulance Cost Adjustment within NHS funding (see Chapter Six) and the Local Government Finance Settlement (see Chapter Seven). A wide range of classifications of areas could be produced using different types of sparsity measure and different sparsity threshold values. It is, however, difficult to judge which the most appropriate sparsity threshold is for any particular purpose. This exclusion of sparsity continues with the new SERRL classification system (2004) but in this classification remoteness is used as a criteria and it is easy to imagine that a map based simply on remoteness would map in a similar way to sparsity or other rural discriminators.

3.7.1: Organisation for Economic Co-operation and Development (Rural Indicators)

At a European Governance level there is no standardised classification of rural areas. It can be based on differing definitions according to subject. The only standardised international organisation level classification with general acceptance is the OECD (Organisation for Economic Co-operation and Development) two tier local and regional

[7] Data from Source 26: Rural Settlement Gazetteer (31/12/1998) http://www.housingcorp.gov.uk/

level classification.

The classification (OECD, 1994) is based on the NUTS (Nomenclature des Unités Territoriales Statistiques) areas[8]. At the local level (NUTS 5) a rural community is one with a population density of less than 150 inhabitants per square kilometre. At a regional level (NUTS 3) communities are divided into three types:

- 50% of population in rural areas (predominantly rural)
- 15-50% in rural areas (significantly rural)
- < than 15% population in rural areas (predominantly urban)

The European Union has no common definition of rurality as most member states have developed their own definitions of rural areas, such as those based on agricultural patterns or population density, which are the criteria most often used to define rural and urban areas. However, in defining rural areas, the European Union considers population density to be too approximate in nature and therefore not appropriate to guide policy decisions (European Commission Directorate General for Agriculture, 1997[9])

3.7.2: Local Government Finance

This is a specialised definition used only for the distribution of Central Government grants to local authorities. There are some specific notions of rurality incorporated in the definition. However, the definition is mostly based on the government operational definitions of 'sparsity' and 'super-sparsity' which are used in the Local Authority Spending Assessments (SSAs).

Sparsity is measured at the ward level for Children's Services, with areas being regarded as urban if they have a population density of over 4 persons per hectare. Areas with a population density of between 0.5 and 4 persons per hectare are classified as sparse. Those with less than 0.5 persons per hectare are classified as super-sparse

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[8] Level 0 of this Classification is the Member States (15 units). The NUTS 1 level comprises 77 regions like the "*Régions*" in Belgium or the "*Länder*" in Germany. The NUTS 2 level comprises 206 regions equivalent to, for instance, the "*Regioni*" in Italy or the "*Comunidades autonomas*" in Spain. At NUTS 3 level the French "*départements*" and the Swedish "*Län*" make up part of the total of 1031 regions. Finally, NUTS 5 arrives at the level of local municipalities or communes.

9 European Commission Directorate General for Agriculture (1997) Rural Developments CAP 2000 Working Document.

(2007b). The local authority is given a sparsity score based on the number of its population in sparse wards plus twice the sum of its population in the super-sparse districts, (so that super-sparsity is granted twice the weighting of sparse areas). Using this definition results in a 'rural' population 8.1 million (sparsely and super sparsely populated areas combined).[10]

Rather than producing a definition of rural or non rural areas there is a ranking system of the districts in respect to their sparseness. Despite the fact that this system is not intended to map a general urban/rural divide, generally the top 25% of Local Authorities in a class are taken to be rural. A similar pattern is produced by this definition to that of the Countryside Agency's local authority definition with some marginal differences. Carlisle, for example, shifts from a non-rural category into rural. The sparsity measure is therefore a more accurate indicator in defining rural and non-rural authorities if rural is determined by population density. Apart from the use of this for the Local Government Finance funding criteria the definition is not widely used as a measure of rurality. Although a wide range of area classifications could be identified using different types of sparsity measures and threshold values, it would be difficult to judge the ideal measure for any particular situation. The classifications of sparsity and sparse/super-sparse areas have changed with the 2003 reorganisation of Local Government Finance. A full review of the current classifications of rural areas within the Local Government Finance Settlement is given in Chapter Seven.

There is a saying that "old age never comes alone" representing the realism that illness, poverty, disability and loneliness also invariably come with age. A similar concept can be applied to sparsity. Not only are such areas sparse, they are usually remote from major centres. They can also include areas of heavy tourism drastically increasing the resident population, with substantial geographical challenges, such as moors or mountains, estuaries or large expanses of coastline. Access is frequently poor, and the effects of extremes of weather in such areas pose even greater problems. All of these factors have direct impacts on the provision of services. For these reasons a simple measure of sparsity is unlikely to capture the needs of a population. Within Local Government Finance the argument is made that sparsity is only one of a wide range of

[10] Source "Cost of service delivery in rural areas", BRF97/24, www.cumbria.gov.uk/briefings/1997/brf9724.htm (01/09/04)

variables used to capture 'need' and therefore it is irrelevant that this measure of rurality lacks the ability to reflect 'need' sufficiently. However, when, as in this case, that only one measure of rural need is made, there is a strong case for using a more resilient and representative variable. It was an appreciation of this argument that was partially responsible for creating one of the next group of classifications: the Defra Rural and Urban Area Classification 2004

3.7.3: The Rural Services Partnerships

Up until this point the focus was on government departmental definitions based on certain criteria. However there were contrasting ones, based on user needs, constructed by local government which dealt directly with rural areas. The Rural Services Partnership is a 'bottom up' definition where local government identify problems, and form partnerships to deal with it to serve their rural communities. This contrasts with the central government approach which defines a service target and then defines the boundary of the rural areas where this target will apply.

There are several organisations within the local government structure that support rural and sparse service provision. Where the population density of a local authority is less than one person per hectare they are entitled for membership of the 'Rural Services Partnership'. This currently includes 50 English local authorities. The Sparsely Populated Local Authorities Team (SPLAT) is a larger grouping of 'rural' local authorities and contained 140 district councils including 36 shire counties as of July 1996 (SPLAT 2004[11]).

The Sparsity Partnership for Authorities delivering Rural Services (SPARSE) is another group for rural government. It is a coalition of more than 50 local authorities that cover some of the most rural areas in England. The Partnership represents county councils,

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[11] Rural Services Partnership Member Authorities: Cumbria, Devon, Lincolnshire, Norfolk, Northumberland, Shropshire, East Riding of Yorkshire, Rutland, Alnwick, Babergh, Bridgnorth, Chichester, Copeland, Craven, Daventry, Derbyshire Dales, East Cambridgeshire, East Lindsey, East Northamptonshire, Eden, Fenland, Kennet, King's Lynn & West Norfolk, Malvern Hills, Melton, Mid Devon, Mid Suffolk, Newark & Sherwood, North Cornwall, North Kesteven, North Norfolk, North Shropshire, Restormel, Ribble Valley, Richmondshire, Ryedale, Scarborough, Shrewsbury & Atcham, South Hams, South Holland, South Norfolk, South Northamptonshire, South Shropshire, Suffolk Coastal, Stratford-on-Avon, Teesdale, Tynedale, Uttlesford, Wear Valley, West Devon, West Dorset, West Lindsey, West Somerset. http://www.northshropshiredc.gov.uk/docs/Press%20Release%20051102.htm

districts councils, unitary authorities; and other bodies that operate in rural areas. (sparse.gov.uk, 2002)

3.8: Functional Areas

Functional Areas are based around the idea that there are economic linkages between areas which straddle Local Authority boundaries and also that the social and economic function of an area (or conversely the social and economic isolation) is intrinsically linked to the functions and features of the surrounding area. The key point for these classifications is that in an increasingly complex pattern of settlement, linked to socio-economic variation, no single measure can represent all of the distinct aspects of settlement structure that will be of interest to public policy (Coombes and Raybould, 2001). The idea of functional regions started in the 1950s with the English Conurbations classification for the United Nations and was embraced by the academic world with Coombes' work on commuter patterns (Coombes, 1982; 2000). Under this system rural areas are relatively independent of core functions and contain no large urban centres of their own (Ward, 2003).

3.8.1: English Conurbations

The English Conurbations were defined following a recommendation by the United Nations in 1950. This recommended that member states have access to summary census tables for population agglomerations. As a result of this six areas were defined in England; Greater London, the West Midlands, Manchester, Merseyside, the West Riding of Yorkshire and Tyneside. All of these agglomerations are still visible in the English landscape and four have grown so large that they currently have a population over a million people each, accounting for more than a quarter of the total population of England. These are: The Greater London Urban Area (population 8.3 million); West Midland Urban Area (2.3 million); Greater Manchester Urban Area (2.2 million) and the West Yorkshire Urban Area (1.5 million) (Population Trends 117 p2, 2004).

The criteria set for the definition of these areas centred on an early attempt to combine 'uniform' statistical criteria such as land use and population density with 'functional'

criteria such as journey to work and travel to shop. Although the definitions intended to convey functional as well as statistical data this was largely abandoned for a mostly statistical approach. This use of statistical devices, in preference to functional data, was characteristic of official definitions in this time period. As social research developed later in the century functional data was given a more central role. The major weakness with this definition was the fact that the United Nations required each conurbation identified to fit to existing local authority areas. This was to make the definition easier to use for comparative statistical analysis but inevitably the restrictions made it weaker as urban areas frequently cross administrative boundaries, as the West Yorkshire conurbation of Leeds and Bradford shows.

The restriction of this definition being bound to Local Government boundaries (after the demarcation between urban and rural areas had been recognised to no longer be an appropriate basis for local-government) proved to be the limiting criteria that led to it being superseded: plus the abandonment of the functional criteria in favour of a statistical population count limited its usefulness. As Senior put it: ``nothing, indeed, is now more irrelevant to the structure of contemporary society, or to the requirements of public administration, than continuous built-up areas" (page 86, 1965 quoted in Coombes, 2000).

3.8.2: General Registry Office

The General Registry Office defined the largest urban places according to a number of criteria, including population density, land use, and retail catchment areas. Although it is clear that even at this early stage there was a realisation of the importance of both accessibility and remoteness for defining urban and rural areas respectively, the link to administrative areas for statistical purposes remained central in this period. This administrative constriction weakened the General Registry Office definition as it was not able to accurately map urban areas whist still maintaining the link to administrative boundaries. The West Yorkshire conurbation, for example, runs from Hull almost to Manchester crossing numerous administrative boundaries. This made it very hard for this definition to map retail catchment areas and population density within these urban areas whilst maintaining reference to administrative boundaries.

3.8.3: Rural and Urban Area Classification 2004

The Rural and Urban Area Classification (2004) was a joint project between Defra, the Countryside Agency (by then incorporated into the Commission for Rural Communities), ONS, ODPM and the Welsh Assembly developed at the Rural Evidence Research Centre at Birkbeck College. Whilst not a true functional region, such as that of Coombes and Raybould (2001), the Rural and Urban Area Classification 2004 does incorporate the key component of a functional classification, that the contextual characteristics of the surrounding area are as important to the categorisation of an area as the characteristics of the area itself.

This new definition centres upon the desire by Defra *et al* to define rural areas explicitly within government policy. The classification has six rural area types at its lowest geography compared to only two urban. The new measurement hinges upon defining 'sparsity' rather than 'rurality'. It relies upon two aspects of defining settlements, namely, their morphology (physical form) and their wider geographic context (location). In order to maintain compatibility with the ODPM classification (ODPM, Urban Settlements 2001) the threshold for urban areas has been set at 10,000 residents.

The building block of the classification are hectare grid squares which were placed over the whole of England and Wales using postcode information and the ODPM defined settlement polygons from the Urban Settlements 2001 classification (discussed in section 3.5.4). Two criteria were then used to classify the 35 million cells; Settlement Form [each hectare grid square is associated with a settlement type based on settlement morphology: dispersed dwellings, hamlet, village, small town, urban fringe and urban (>10k population)]; and sparsity - each hectare grid square is given a sparsity score based on the number of households in surrounding hectare squares up to a distance of 30 km (Bibby and Shepherd, 2004). The grid squares are then combined to standard geographical scales (output areas, super output areas and wards) so they can be used for policy in combination with other datasets such as census outputs.

The classification of rural areas at the lowest geographical scale, that of the output area, is illustrated in figure 3.11. With 165,665 Output Areas (OAs) in England this is a large and detailed coverage (illustrated in figure 3.11). OAs were built from 2001 census data

and are breakdowns of wards. With an average of 120 households and 250 people per OA (ONS website) they are mostly snapped to whole postcodes but not always. The aim by developing OAs was to identify coherent settlement types and so create homogonous units. Unfortunately this identification has no 'rural' distinction and is instead based on tenure type. The main weakness of this classification is the fact that all settlements with a population of less 10,000 are classified as rural regardless of morphology. All settlements (as defined by ODPM Urban Settlements 2001) with a population of over 10,000 are regarded as urban. Rural areas are further categorised based on their morphology as sparse or less sparse.

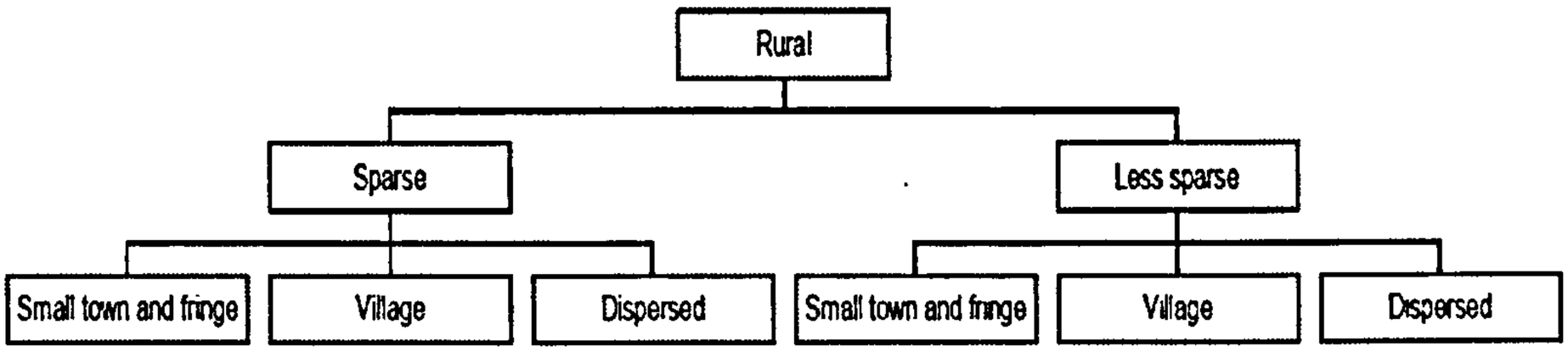

Figure 3.10: Two level classification of rural areas within the Rural and Urban Area Classification 2004 (Bibby and Shepherd, 2004, p3)

Classifications for Super Output Areas[12] and wards by settlement type were built up from the composition of the classified OAs that they contain (the possible classification groups for output areas are shown in figure 3.10). Within this higher level of classification the groups of "village" and "dispersed" are combined.

[12].http://neighbourhood.statistics.gov.uk/dissemination/MetadataDownloadPDF.do;jsessionid=ac1f930cce67bbd1039f3324bbe8cc48f2c222b410b.e38Qa3mPbh4Kai0Ma30Sa3uSchmSe6fznA5Pp7ftolbGmkTy?downloadId=20486&bhcp=1

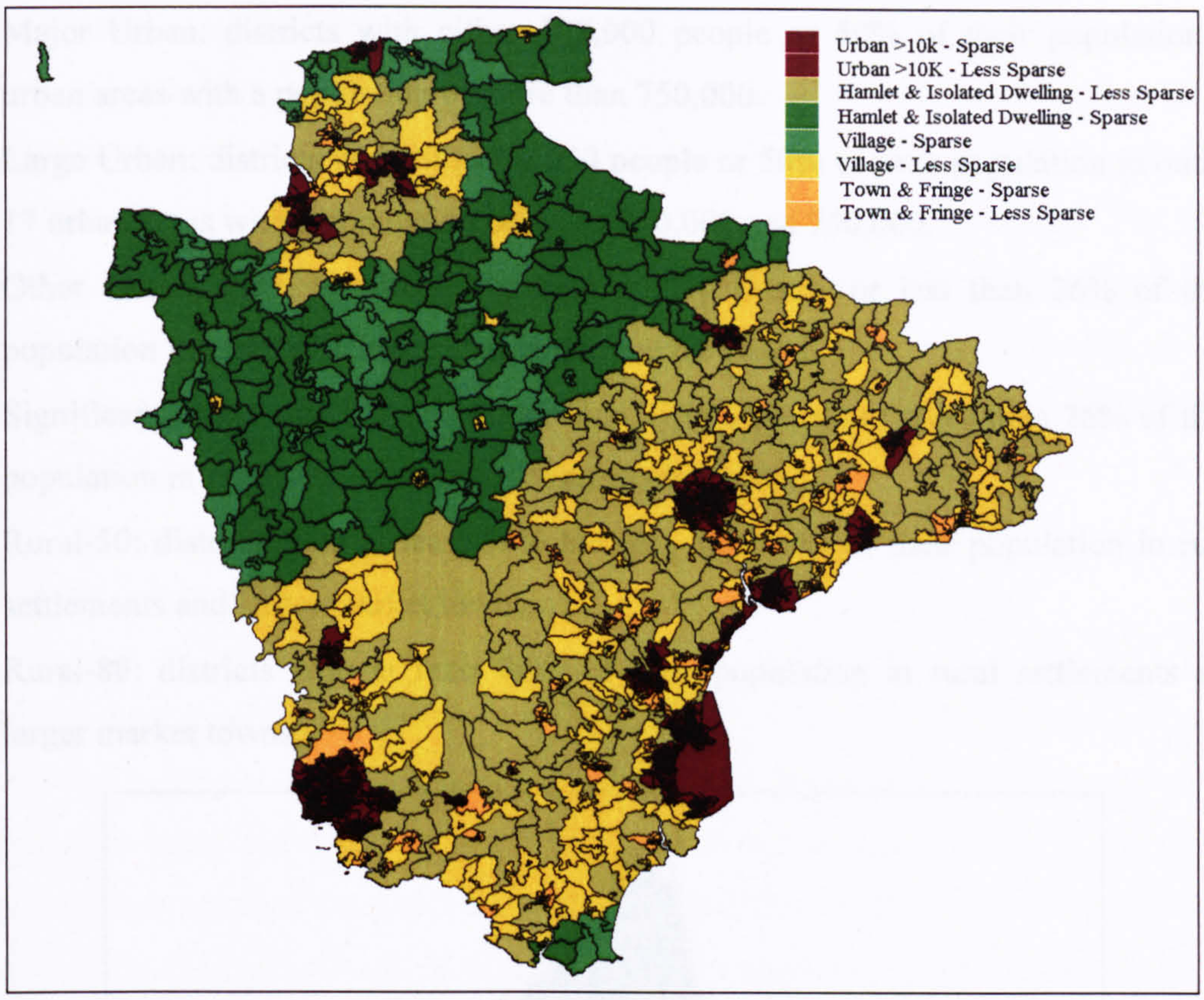

Figure 3.11: Rural and Urban Area Classification 2004 by Output Area covering Devon

3.8.4: Defra Rural/ Urban Local Authority Classification (2005)

In common with the Rural / Urban Area Output Area Classification this was produced by the Rural Evidence Research Centre at Birkbeck College. This was designed to be an administrative distinction, made necessary because many statistics are only available at Local Authority level. The new LA Classification is again a graded system and again it is based on settlement type. The same methodology was also applied to Primary Care Trusts (PCT); this was based on the 2003 PCTs boundaries (illustrated in figure 3.12). The PCT classification serves as an example of how rapidly changing administrative geography can prevent the longevity of classifications. As PCT boundaries changed significantly in 2006 this classification is now obsolete and is only useful for historical reference, for the period 2003-2006.

The LA and PCT Classification again give rise to six Urban/Rural Classifications. According to Shepherd (2006) these are defined as follows:

- Major Urban: districts with either 100,000 people or 50% of their population in urban areas with a population of more than 750,000.
- Large Urban: districts with either 50,000 people or 50% of their population in one of 17 urban areas with a population between 250,000 and 750,000.
- Other Urban: districts with fewer than 37,000 people or less than 26% of their population in rural settlements and larger market towns.
- Significant Rural: districts with more than 37,000 people or more than 26% of their population in rural settlements and larger market towns.
- Rural-50: districts with at least 50% but less than 80% of their population in rural settlements and larger market towns.
- Rural-80: districts with at least 80% of their population in rural settlements and larger market towns.

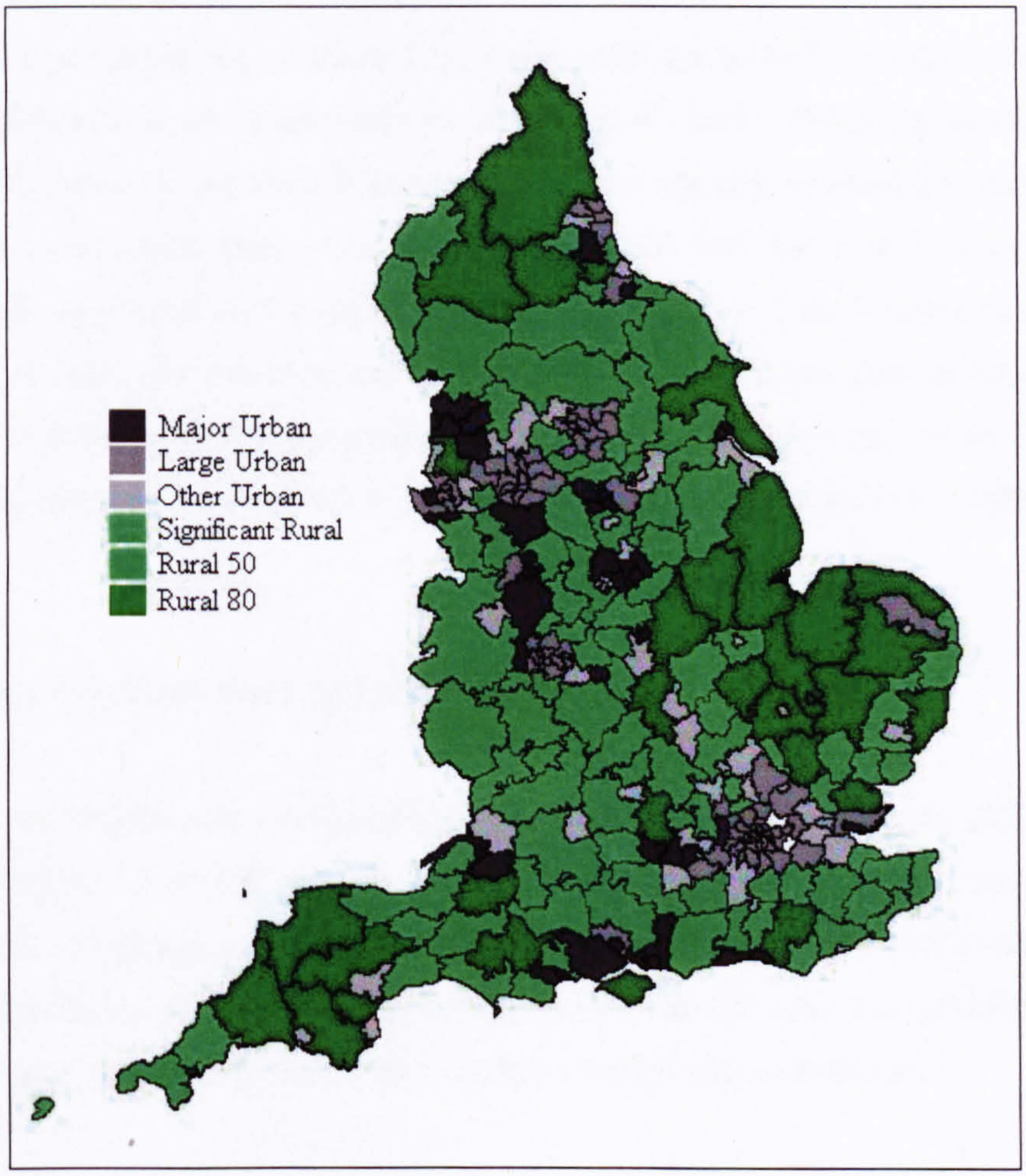

Figure 3.12: Defra 2003 Rural and Urban Classification of PCT areas

As can been seen in figure 3.12 all Bradford PCTs are classified as "major urban" whilst in Devon Exeter (along with Torbay and Plymouth) PCT is classed as 'other urban', the rest of the area is unsurprisingly regarded as rural with East Devon PCT classified as 'rural 50' and the remaining PCTs classified as 'rural 80'. The local authority scale results mirror this outcome. This formula was only designed for use as an illustrative pattern. Shepherd himself stressed that this classification is too generalised to be used within funding formula or for policy decisions (Shepherd, 2006).

3.8.5: Problems with using Density

Measurement of area by population density can be misrepresentative of rural areas when those populations are aggregated into larger areas. This may be especially apparent in peripheral areas where deprivation will not be reflected due to the sparse and scattered nature of the population (Asthana *et al*, 2001). Proximity to services can also be difficult to incorporate. If an area that is very sparsely populated is near to a city, is it more or less rural than a less sparsely populated area that is more remote from a large centre of population? Is an area with a large number of small towns more or less rural than an area of similar overall sparsity but with a single population centre? These and other similar questions are difficult to answer and, hence, it can be far from clear which areas should be compared to test adequately hypotheses about cost differences.

3.9: Some uses and users of Rural Classifications

Government departments use classifications as an aid to service planning and provision. The Department of Health used the 1991 (updated 1999) ONS classification of Health Authorities for strategic planning. The Countryside Agency used classifications within their 'State of the Countryside' Reports to gauge whether services and policies are being delivered appropriately to their areas of interest (in this case rural areas).

Classifications can be used to identify areas / populations with additional needs. The Index of Multiple Deprivation (IMD) identified wards to which regeneration funding should be targeted (Chandola et al. 2000; DETR, 2000). A Home Office report in 1997

into fire risk used classifications to identify areas most at risk from fire using the commercial ACORN classification; these were predominantly group 16 multi – ethnic council estates areas associated with hardship.

The British Crime Survey uses classifications to assess if similar groups of people and types of areas suffered commonalities in their crime levels. It found that classifications could reveal the likely extent of crime. The classification used focuses on socio-economic variables such as gender, employment status and age (Home Office, 2007b, p60).

Recent Labour Government policy offered incentives to universities for taking students from deprived areas as part of the Governments' policy to increase participation in higher education from those with disadvantaged backgrounds. The commercial SuperProfiles classification was used as the means of assessing which areas were deprived.

Academics use area classifications within research such as Openshaw and Cullingford (1982) in their identification of rural deprivation, or Clokes (1977; Cloke and Edwards, 1986) Index of Rurality.

Geodemographic classifications are used heavily in the marketing industry as outlined earlier in this chapter. Consumer profiling is used to target commercial behaviour such as store location or direct marketing campaigns towards target markets. They are also used as a means of stratifying sampling for opinion polling organisations such as MORI (which uses the Experian Mosaic classification) during election periods.

3.10: Conclusions

A common methodological problem in rural research is the level of aggregation chosen. Although many classifications and definitions use the ward and super output area levels even these may be internally heterogeneous with pockets of deprivation and additional health needs. The effect is to bias results so that there is no relation between deprivation and health in rural areas. However, this has to be balanced by the statistical instability

that would arise from smaller areas because of the rarity of health events. In conclusion, this review has demonstrated that, in contrast with urban areas, the needs of rural areas are poorly characterised by generic deprivation indices and by inappropriate classification systems.

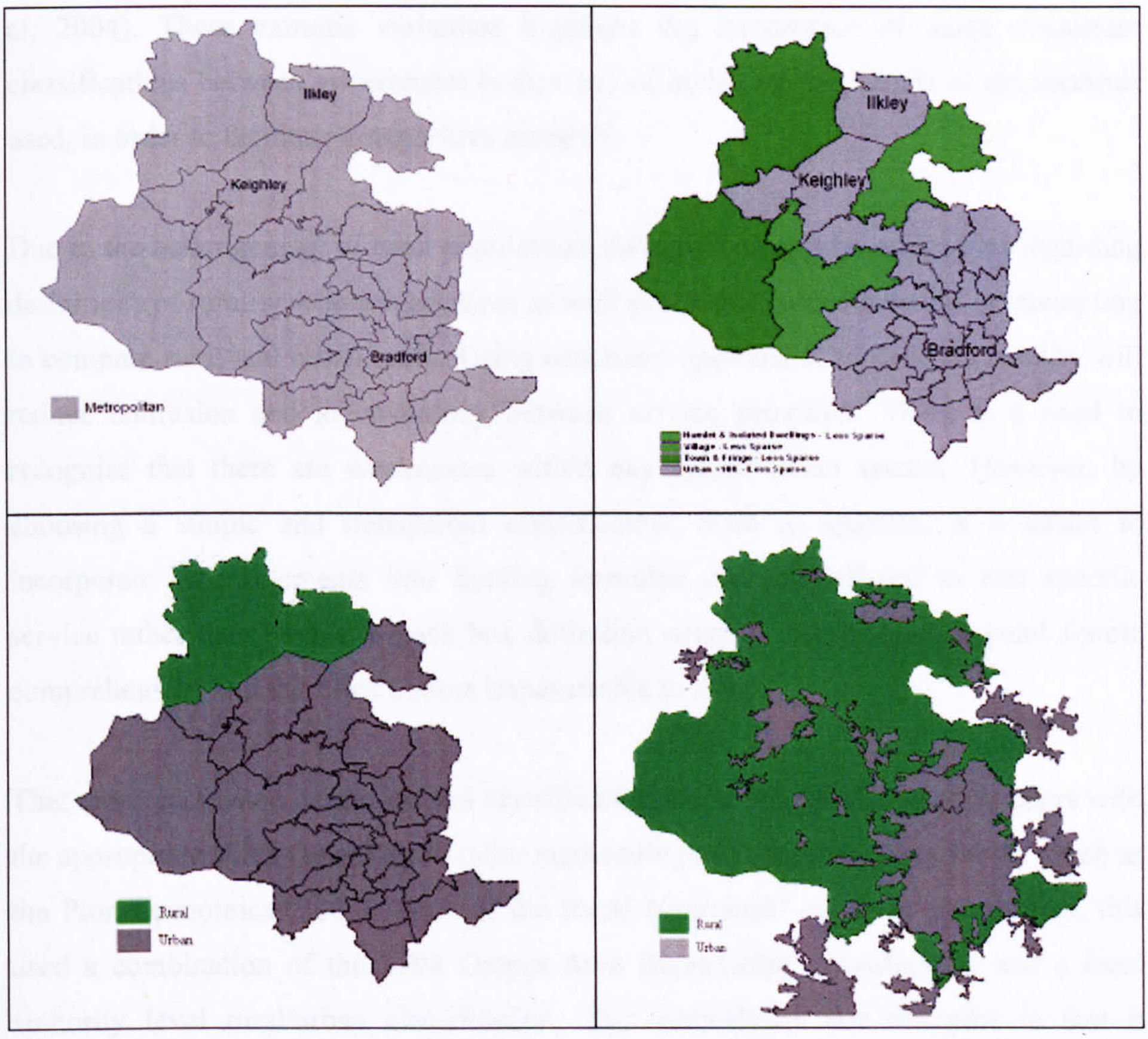

Figure 3.13: The impact to the rural characterisation of Bradford by using different classification methods.

a: The 'Tarling' Classification for the case study area of Bradford

b: Defra Rural / Urban Classification at Ward Level for Bradford (at the local authority level Bradford is classified as major urban).

c: Oxford-Countryside Agency Ward Level classification of rural and urban areas for Bradford (at the District Level Bradford is classified as Urban)

d: Urban Settlements 2001 - in and overlapping the case study area of Bradford.

As discussed at the beginning of this chapter, using different classifications can result in the classification of a geographical area varying dramatically. Figure 3.13 shows four alternative maps of Bradford District with the percentage of rural land area varying from 0% (Tarling, 1993) to 70% (Urban Settlements, 2001) and the population classified as rural in character varying from 0% (Tarling, 1993) to almost 20% (Defra et al, 2004). These extreme variations highlight the importance of using consistent classifications between government bodies and of including full details of the methods used, in order to facilitate comparitive research.

Due to the heterogeneity of rural populations there will always be difficulties regarding definitions of rurality within rural areas as well as the difficulties inherent in attempting to compare rural and urban areas. Using consistent approaches to defining rurality will reduce confusion and inconsistency between service providers. There is a need to recognise that there are weaknesses within any classification system. However, by choosing a simple and transparent classification, such as sparsity, it is easier to incorporate other elements into funding formulae that are tailored to that specific service rather than having a black box definition which is complicated beyond simple comprehension and therefore almost impenetrable to users.

That more accessible definition and classification methodologies have given users with the appropriate skills the ability to tailor methodologies to suit their own needs. Such as the Pion Economics (2005) 'State of the Rural Northwest' report to government, this used a combination of the 2004 Output Area Rural/Urban classification and a local authority level rural/urban classification. This adaptability has strengths in that it encourages the use of consistent base methodologies, and therefore easier comparisons between studies whilst still maintaining the flexibility necessary to meet an extensive range of academic research and policy implementation needs.

Chapter 4: Healthcare in Rural Areas: Problems and Challenges

4.1: Introduction

Arguably the most important question for those involved in rural healthcare provision is whether it is possible to target resources fairly in rural areas, since it is in these areas that deprivation and need are both geographically sparsely distributed and hidden (Wood, 2004). According to Simmons "little substantial research has been done into specific and different health needs in the rural areas" (1997, p80). This chapter explores whether rural definitions can be created and implemented which are able to identify deprivation and heath related needs within rural communities. However, more research is required to better understand and help target resources within rural communities and this research cannot be carried out without functional definitions of rural which are successful in the identification of need. The following section examines the literature on rural health and healthcare, and details how the perceived low levels of both poor health and of need in rural areas are actually open to debate. The chapter moves on to explain the healthcare structure in the case study areas and the needs and demands that could be identified and better met through new rural definitions.

The World Health Organisation's definition of health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (www.who.dk) serves to emphasise the range of factors that influence health. The problems of need and of widening inequalities in health and health care in the UK have been recognised since the Black Report (1980), while the Acheson Report (1999) reiterated the persistence of these inequalities. As a result the government have instigated programmes focused on tackling this issue (such as SureStart or New Deal). While most research and policy making has focused on urban deprivation, there is growing concern about the health and health care problems of deprived rural residents. In spite of the perception in England that it is healthier to live in the countryside, the apparent health advantages associated with rural areas largely disappear once relative levels of deprivation and affluence are taken in to account (Phillimore and Reading,

1992). It is increasingly recognised that the concept of the rural idyll is a myth (Little, 1999) and that many rural communities face particular problems that impinge on health including poor employment opportunities, low pay, lack of affordable housing and inaccessible public and health care services. All these problems are exacerbated by the declining availability of rural public transport. Moreover, those who have most difficulties accessing health services tend to need them most, for example the elderly, disabled, and lone parents.

Health and medical geographers have long been concerned with the relationships between people and environment (Howe, 1972). This 'disease ecology' approach, with its concern of elucidating the environmental and social causes of illness, was the dominant view until the 1970s (e.g. Jones and Moon, 1987). However, since then the disease ecology approach has been complemented by research into the structure and operation of healthcare systems, with particular emphasis on the accessibility and utilisation of health services (e.g. Powell, 1995; Curtis and Jones, 1998). Traditionally, health research has tended to focus on urban environments (Barnett, 2001), since it is in these areas where higher levels of poor health, deprivation and inequality are perceived to occur, although it could be argued that they are simply more visible. Despite this, rural communities often find the affluent and socially excluded living close beside each other. Rural poverty, social exclusion, levels of ill health and need amongst particular groups such as the growing numbers of older people, families with young children and the younger unemployed, are often hidden in rural areas by negative deprivation scores in rural wards. However, the rural poor do not only suffer ill health. Unlike their urban counterparts, they disproportionately bear the consequences of geographical inaccessibility to health services because they are trapped by the lack of personal mobility (Fearn, 1987).

Rural definitions and classifications are important to public services. This is especially true of services like health care provision, which are particularly vulnerable to geographical variations in service and access. Scotland and Wales would generally be considered more 'rural' countries than England. The funding for the NHS in these countries recognises the challenges posed by a sparse and distributed population (as discussed in Chapter Five). England is the only country in the UK that does not make a major adjustment for rurality in its NHS funding formula (Asthana *et. al.* 2003). They

go on to argue against the inconsistency that Local Government provided Social Services attract a rural premium while the provision of NHS treatment does not.

4.2: Equity in Healthcare

Healthcare services in England are provided though a combination of networks ranging from the National Health Service to Local Government, Private Organisations and Voluntary Groups. As this thesis is examining the impact of rurality on service provision only through government organisations, the examination provided will focus only on the first two service providers.

The NHS was established in 1948 with the aim of providing health on the basis of equal access according to need, irrespective of the ability to pay. It currently provides about 95% of healthcare in England. One of the roles of the NHS in England is to provide equity in healthcare (Dixon *et al.*, 2003). Equity in health care can be defined as: equal access to available care for equal need; equal utilisation for equal need; and equal quality of care for all. Equal access reflects the ideal of equal entitlement to the available services for everyone, a fair distribution throughout the country based on health care needs and ease of access in each geographical area (and therefore the removal of barriers to access). The NHS has been reorganised on several occasions in response to political pressure and demographic change (Rivett, 1998). However, both geographical and socio-economic inequalities in health outcomes have persisted, as have inequalities in healthcare provision (Townsend *et al.*, 1992; Curtis and Jones, 1998; Haynes and Gale, 2000). In addition, the cost of the NHS has continued to rise as a proportion of GDP and currently accounts for about 6% of GDP (Mohan, 1995; Gaffney *et al.*, 1999). An overview of the funding structure can be found at the beginning of chapter five and a full examination of the formula used to fund the NHS is provided in chapter six.

Although in theory individuals may have a right to free health care, in practice (at least for some) financial, organisational and cultural barriers exist so that access may be restricted. An obvious example of these barriers to healthcare, especially for ethnic minorities, may be language and cultural barriers. As ethnic minority populations are growing rapidly in rural areas this will become an even greater problem for service

providers in the future. Another one of these barriers are transport costs. These fall most heavily on low-income groups, or those with limited mobility such as the elderly, restricting their access to available services. The difficulties caused by accessibility are a contributory factor in increased health deprivation in rural areas (Phillimore, 1992).

Inequalities in access can also arise when resources and facilities are unevenly distributed around the country, for instance if they are clustered in urban and more prosperous areas and scarce in urban deprived and in rural neighbourhoods. As deprived communities tend to suffer the worst health (DHSS, 1980; Raleigh and Kiri, 1997), such unequal distribution means that medical services are least available where they are most needed: this is the so-called inverse care law. It can also be suggested that the inverse care law operates in many rural areas (Tudor Hart, 1971). Typically, rural areas have a higher proportion of their population over the age of 65; at this life stage the need for medical attention is higher. However the provision of GP surgeries and hospital care within easy travelling distance is frequently unavailable. For example, 83% of rural parishes have no GP surgery, 91% have no day care group for people with disabilities and 91% have no day care groups for older people (CA, 2000: figures from 1997, based on Countryside Agency rural / urban classification of rural parishes).

4.3: Specific Health Issues in Remote and Rural Areas (Demand Side Issues)

Rural areas have the same essential health care needs as urban areas but additionally there are some essentially 'rural' healthcare issues. Rural areas tend to contain a high proportion of elderly people and population projections indicate that this pattern will be accentuated in the next decade (Countryside Agency, 2000). There are a few health issues that are recognised nationally as being a greater problem in rural areas. These include: road traffic accident rates, which are higher in rural areas per journey, as are important mental health challenges such as high suicide rates among agricultural workers. The following section will discuss the characteristic health needs of rural populations and then the chapter will move on to discuss the characteristics and challenges of delivering healthcare services for these communities.

4.3.1: Rural Health Problems

In spite of the perception in England that it is healthier to live in the countryside, the apparent health advantages associated with rural areas largely disappear once the relative levels of deprivation and affluence are accounted for (Phillimore and Reading, 1992). Bentham (1984) found that localised remote rural areas had higher mortality ratios than their urban counterparts. In instances where health is shown to be generally better in rural areas, the case need not be the same in geographically more remote areas. For example, limiting long term illness (LLTI) has been shown to display a strong 'U' shaped relationship, with the highest rates occurring in urban and remote rural areas, and the lowest in suburban and rural fringe areas (Martin *et al.*, 2000). Asthana *et al.* goes so far as to suggest that morbidity might be a better measure than allocating resources based on past uptake. Far from showing that poor urban areas are disadvantaged in health care their paper actually shows that "a morbidity based model would result in a significant shift in hospital resources away from deprived areas, towards areas with older demographic profiles and towards rural areas" (2004 p539).

4.3.2: Mental Health

Families with specific requirements may face considerable unmet health need in rural areas. Those families with mental health problems often face stigma in rural areas, with psychiatric healthcare often poorly resourced, inaccessible and misunderstood (Philo *et al.*, 2003). Whilst people may live at a greater physical distance from their neighbours than in urban areas, paradoxically they are socially closer. This closeness results in a lack of anonymity, which it is believed discourages people from seeking help. An urban-rural gradient for mental health problems has been reported in the UK. Much of this is accounted for by differences in social adversity, stress and deprivation (Paykel *et al.*, 2000). However, distinct from rurality, remoteness may also be associated with a higher prevalence of psychiatric disorders. Saunderson *et al.* (1998) examined data on suicides and undetermined injuries in England and Wales (analysed by local authority). Based on population density male suicides were found to be significantly higher in the most rural areas. This is even higher for farmers; among farmers aged 15-45 suicide is the second most common cause of death (Rural Minds, 1998). A high incidence of

suicide has also been documented in the Highlands of Scotland (Crombie, 1991). This higher incidence has been attributed to the fact that these rural males were socially isolated; and had access to few psychiatric services (Saunderson *et al.*, 1998). In addition farming communities, farmers and vets in particular, have ready access to firearms and drugs, crucial if seeking to take one's own life. Recent additional pressures on rural communities, such as foot and mouth disease, may also have indirect mental health consequences (Deaville and Jones, 2001; Bailey *et al.*, 2003).

Families of children with disabilities are often under enormous stress and may have less social contact with other children (Mullins *et al.*, 2001). The range of professions allied to medicine, for example speech and language therapy, physiotherapy and occupational therapy, may be poorly resourced if staff cannot be appointed (with recruitment and retention being recognised problems). Local Government funding calculations concentrate on the characteristics of the people likely to need social services help but ignore the availability and location of facilities (Hale and Associates, 1996). Services such as hospice provision, locally provided for in urban areas, are often only available at a great distance from rural communities.

4.3.3: Agricultural Related Health Issues

Agricultural employment makes up a very small percentage of the rural workforce and it is important, because of this, not to equate rural simply with agriculture. However, agriculture is the most dangerous of employment sectors (Health and Safety Executive, 2005), and as the vast majority of agricultural employment is based in rural areas it is worthy of discussion. In the ten year period from 1994/1995 to 2003/2004 a total of 493 people have been killed as a result of agricultural work activities and many more have been injured or suffered ill health. An average of 49 people each year are killed in the industry - almost one death per week (Health and Safety Executive, 2005).

There are specific health risks associated with the health of rural communities such as zoonoses[1] and agricultural related injuries. Ringworm and cowpox may affect farmers

1 Diseases and infections which are naturally transmitted between vertebrate animals and man, according to the World Health Organisation this may be a bacterium, virus, fungus, parasite, or other communicable agent (http://www.who.int/zoonoses/en/ accessed 01/05/2006).

and farm-workers. Helicobacter pylori may be acquired from animals; tetanus can be picked up from contaminated soil; and pregnant women who come into close contact with sheep during lambing may be risking their health and the health of their unborn child as infections such as chlamydiosis, toxoplasmosis and listeriosis can be passed on, leading to the potential risk of miscarriage (Mungall, 1999). Farming is also associated with a number of health conditions including an increased incidence of osteoarthritis; organophosphate poisoning (associated with exposure from chemicals used in sheep dipping) and dust diseases such as farmers' lung.

4.3.4: Road Traffic Accidents

Rural roads are characterised by poor quality surfaces and low maintenance. When this is coupled with narrow lanes and excessive traffic speed the resulting risk profile for road traffic accidents is extremely high. In England and Wales 60% of road deaths occur outside built-up areas (BBC News, Wednesday, 9 March, 2005). Excess mortality and morbidity from road traffic incidents is a feature of rural areas in the USA, and the same is true in the UK (Brown *et al.*; 2000; Weiss *et al.*, 2001). This is a reflection both of an increased frequency of accidents and poorer outcomes for accident victims, possibly as a result of longer delays in receiving attention by rescue services and outreach medical facilities. In responding to incidents (such as agricultural accidents, rural RTAs, cardiac arrest, and drowning) additional paramedics, medical teams, equipment, support services and volunteer teams may be required. In rural areas, the distance involved in reaching a casualty usually means response times will be slower. As responses by emergency services typically involve longer journeys, innovative services such as fast response cars, as well as air ambulances, have come into service. In addition to the demand on healthcare providers, these acute events may be associated with high rescue and transportation costs, which may have knock-on effects on the ability of the PCT to afford provision for the area.

4.3.5: Accessibility

The Discussion Document preceding the 1999 Health White Paper (MAFF/ DETR, 1999) argues simply that 'people living in rural areas should have opportunities to receive a wide range of public services such as health care and public transport', that

social exclusion should be reduced and that the 'rural dimension' should be incorporated into national policy. In relation to social services, the Discussion Document observes that 'the sparsity and inaccessibility of rural areas present particular problems'.

Two key issues contained within the Acheson Report (1998) were the requirement to focus on supporting disadvantaged communities and social groups, and the need to make strenuous efforts to ensure equity in access to services based on need (Acheson, 1998). Whilst distance from primary, secondary and specialist services is considered as a supply-side issue of concern, rural access to health services and the needs of deprived rural socio-economic groups are not given separate consideration. The tackling of health inequalities is equally applicable to deprived rural populations. "Rural Proofing" has been implemented to ensure that rural needs are taken into account, yet national plans for health service modernisation and development do not typically consider rural health to require a separate agenda.

There is convincing evidence that distance from services has a direct negative impact on utilisation rates (a distance decay effect), particularly for elderly people, women and low social classes (Rice and Smith 2001; Jones *et al.*, 1998; Higgs, 1999; Deaville, 2001; Gibson *et al.*, 2002). Lack of rural access to a GP could be reflected in secondary care usage levels. For example, a threefold difference has been observed between the ratio of the use of GP services to need for urban residents with a car and telephone, to usage by remote rural residents without (Bentham and Haynes, 1985). However, once a patient is seen by a GP, rural residents as a general rule receive equitable levels of hospital care to urban counterparts (Fearn, 1987).

The distance a patient lives from a GP surgery has frequently been shown to be negatively related to primary care consultation rates, one of very few rural issues recognised within the Acheson Report (1998). The picture is similar for out-of hours co-operative services (O'Reilly *et al.*, 2001), and these findings have wide ranging implications for new GP contracts. One common feature of rural General Practises is the use of branch surgeries, to allow the GP to serve a wide community whilst limiting patient travel. They are popular with those who find geographical distance a barrier (to older patients in particular) as shown by the fact that branch surgeries bring in a

significant number of extra consultations. However, as yet it is unclear whether this represents unmet need for healthcare, with distant patients unable to reach treatment, or, if patients living near to a GP practice attend for less serious complaints. Despite this popularity with patients the branch surgeries are not popular with GPs as opening hours, facilities and privacy are limited and required notes may be unavailable. Mobile services are intensive in staff time and can be costly.

It is not just GP access that can be limited in rural areas. The availability of prescriptions and off-the-counter medications is more limited in rural areas (Williams, 1980). Pharmacies are located for commercial reasons, and rural dispensing practices are often required where no existing pharmacy provision exists (or sufficient demand exists to make a commercial practice economically viable). Dental, ophthalmic and chiropody services can be irregular and non-permanent, resulting in relatively little preventative work being achievable.

Despite this recognition that geographic accessibility is a significant factor in healthcare exclusion, it is also important to recall that "while distance is important, the collective effect of personal, cultural and socio-economic variables are of greater significance" (Heys *et al.*, 1990, p.780). It is not being rural in itself that creates healthcare deprivation but the combination of distance and limited mobility, be that either for financial or physiological reasons.

The consequences of inadequate mobility include reduced use of preventative services, primary care and hospital care due to the costs and inconveniences of longer journeys (Bentham and Haynes, 1985; Haynes *et al.*, 1999) and worse health outcomes later (Jones and Bentham, 1997). The rural poor are doubly disadvantaged, yet they cannot be identified using aggregate census indicators. Neither do they benefit from resource allocation systems which estimate needs from such measures. Smith describes accessibility as "The ability of people to overcome the friction of distance to avail themselves of services at fixed points in space or, more rarely, the ability of a mobile service to reach a fixed population" (Smith, 1977, p179).

The personal cost of accessing distant secondary care services is not evenly distributed amongst rural populations. As with access to primary care and other services, those who

may well have the greatest need such as older people, the disabled, parents with young children, adolescents, cannot as readily travel for treatment. The Rural White Paper (1995) acknowledges that rural residents often face 'difficulty in accessing more specialised hospital services'. Although some health threats are specific to rural areas, and there are differences in the prevalence of some diseases, Campbell *et al.* (2000) argue that the main reason why rural health and health care demands special attention relates to delivery of services and access for patients. For cancer patients, there is evidence that further distance from secondary care is associated with delay in diagnosis and poorer outcomes (Campbell *et al.*, 2000; 2001). Jones and Bentham (1997) examined possible influences on asthma mortality, including the relationship between asthma mortality and geographical isolation from large acute hospitals. Data was studied over 10 years for 401 LA districts. After controlling for social class and lack of private transport, both of which were indicative of higher rates of death, there was still a tendency for mortality to rise the further people lived from a hospital. Jones *et al.* (1999; 1997) also found that asthma mortality has been found to increase with travel time from hospital, this time in rural East Anglia. They therefore concluded that remote rural asthma sufferers may not receive optimal treatment.

4.4: Health Provision in Rural Areas (Provision and Funding issues)

From the service funding and delivery side of healthcare provision, rural areas pose additional challenges. Service provision and funding issues will be discussed in this section beginning with provision challenges.

4.4.1: Costs of Providing Services

For service providers the main issues are firstly accessibility costs (both in terms of time and financial costs) and secondly diseconomies of scale which result in increasing cost. This is often coupled with staff retention and cost issues as well as difficulties affording the range of specialist equipment available to urban medical centres. For funding, the challenges lie within the difficulty of creating formulae funding models that can identify the needs of clients within diverse communities and adequately reflect these with that formula. It has often been argued that the current models do not measure or reflect the needs of rural areas. Some specific weaknesses in the formulae will be discussed in this

chapter. Suggestions for solutions may be contentious which is why the remainder of the thesis will be devoted to the explanation of the current models and potential improvements.

Peripheral areas experience problems of economies of scale, additional travel costs and high levels of unproductive time, additional communications costs, poorer access to training, consultancy and other support services, difficulties of networking, and the slow pace of development work (Woollett, 1990; Rice and Smith, 2001). There is an element of what might be called 'double disadvantage' for the provision of healthcare to rural areas due to the increased costs of providing the services and the fact that, contrary to supporting this increased burden, the funding for the NHS often results in lower funding in rural areas. Whilst some parts of Central London receive over £950 per head, some of the rural areas receive less than £600 (White 2001, 1999 NHS figures).

Rural doctors may have responsibility for a higher number of elderly patients, who often have complex health needs such as nursing home patients, and who need continuing care. This presents funding issues. Domiciliary visits to patient homes in rural areas involve far longer journeys than in urban catchments, with GPs away from their surgery for longer periods which means additional costs in the form of transport and also a lower number of patients are able to be seen during the day. A major issue for rural health services is the widening gap between supply and demand. Demand will increase with ageing of the population and with increasing expectations of health care, which may be greater among incomers (Frier and Peck, 2000). Historically, the local general practitioner was regarded as the primary focus for health care delivery in remote areas and was expected to provide round the clock emergency cover as well as routine primary care services.

Due to diseconomies of scale in rural areas the cost of residential care provision for older people are also higher. Research by Wiltshire County Council showed that the unit costs of residential care homes for older people were in the range of £230–£250 weekly for homes of more than 50 people, typically those in the more urban areas of the county. For the smaller homes (typically with less than 40 residents) in minor centres of population, the corresponding unit cost was £290–370, or approximately 15% higher on average (1999, LGA/ADSS annual social services conference). Although some of the

arguments put forward by rural authorities for increased unit costs of delivering services were based on a limited sample of authorities, based on findings by the DETR suggest that the premium could be higher. They found that there is, for rural shire authorities at least a clear indication, adjusting for deprivation, that sparsity 'had an effect on the actual costs of delivering a unit of elderly domiciliary care, such that it costs about 20% more to deliver the same unit of care in rural areas, because of travel costs' (DETR, 1998).

Within the General Practise funding formula there is recognition of the difficulties of providing rural healthcare within the NHS (Department of Health 1989). The GP contracts of the 1990s contained a system of Rural Supplement payments in recognition of health inequalities and the fact that GPs in these areas experience an increased workload. This replaced the earlier BPA capitation supplement for rural areas. The rural supplement was based on ward population sparsity. In a very sparsely populated area a GP would expect to gain an extra £8.50 per patient which is a substantial increase on the standard capitation fees of £11.85 per patient (Department of Health and the Welsh Office, 1998, p44). Despite the fact that sparsity measures may not adequately capture the additional costs which are incurred in rural areas, the fact that rurality is identified as a legitimate cause of cost variation in the provision of local government services is significant (Asthana *et al.*, 2003). It raises the question of why rurality is not considered to be a legitimate cause of cost variation in the provision of health services.

Health Service providers face a range of rural costs, which result from the need to maintain more District General Hospitals, additional smaller community hospitals and healthcare sites, as well as from lower bed occupancy rates, higher prescribing costs, higher travel costs and long term staff pay grades. Rural PCTs need to provide community hospitals, minor injuries units and clinics within easy reach of relatively isolated populations and, in particular, within ready access of those who are most vulnerable. For example, within the North West, Morecambe Bay PCT funds three costly District General Hospitals alone, at Lancaster, Barrow and Kendal (Wood, 2003). This is a particular burden for rural areas as most urban PCTs have no more than one local District General and no community hospitals.

4.4.2: Travel Costs

There has been a rise in interest in the impact of travel related costs for healthcare service provision (Akerman, 2006; Dixon *et al.*, 2003). As a result many interesting comparisons can be made between the time and financial burden for rural and urban areas. A study of the costs of providing domiciliary care in England found that travel-related unit costs per head varied from £94 in Birmingham to £210 in North Yorkshire (County Councils Network 1998). This unequal amount of travel results in lower levels of care for rural patients as a higher percentage of time is wasted on travel. As a result rural areas need a higher staff to patient ratio, an additional expense. Higher travel costs tend to be incurred in rural areas because service centres have larger catchment sizes and workers going out into the community cover a larger territory than their urban counterparts.

The findings are especially interesting from a policy perspective in that only one of these additional costs identified currently attracts a rural funding premium. Within NHS services, the average mileage of occupational therapists in Dorset has been found to be 3,143 km for urban based therapists, compared with 7,857 km for rural occupational therapists (Galuschka, 1999). A study of assertive outreach in mental health in Devon and Cornwall identified similar rural–urban differences. An average monthly mileage of an outreach worker was 691 km in urban Plymouth. In contrast, the average monthly mileage per outreach worker was 1,834 km in nearby rural North and East Cornwall (Brigham and Asthana, 2002). Research by Wiltshire County Council corroborated that the above findings from NHS services hold true for Local Authority services. They found that a rural team social worker averaged 3,777 miles more per year than an urban team social worker; for the total rural team this equated to an approximately 0.65 extra full-time equivalent posts and additional mileage payments of over £11,000 per annum.

4.4.3: Staffing

During recent years, a number of service delivery problems have become increasingly acute: for example, failure to recruit general practitioners. Recruitment and retention of staff can be a bigger problem in rural areas (Swindlehurst, 2003). It does not help that a smaller pool of trained primary care professionals are available to be employed. Whilst

attractive rural areas (for example National Parks) do not have problems recruiting, staff recruitment can be an issue elsewhere. Rural areas can be perceived as a backwater, with professionals feeling isolated in terms of career development and opportunities (DoH, 2001). In particular hospital consultants are more likely to be drawn to major urban centres where greater technical backup, facilities, academic training and peer support opportunities are found as well as the opportunity to work in the private sector. A striking example of this is GP David Bickles who has a practise in the Hebrides and is unable to find a partner to share his £300,000 a year salary. He blames this on the remoteness of his practise (Jo Revill, The Observer 23/04/2006). There have also been debates over the most appropriate models for delivery of equitable hospital services (DoH, 2001). In Scotland policy makers have begun to address these problems. Resource allocation in NHS Scotland is now weighted by rurality (Arbuthnott, 1999) but the NHS in England is not.

4.4.4: Possible Solutions: Health Initiatives

As with the problems discussed above, solutions to rural healthcare issues can be split between the two issues of supply and demand. Policy and provider side issues will be discussed further in chapters six and seven, using ideas learnt from the experiences of other countries and the findings of this thesis. Chapter eight will suggest solutions for some of these issues. Targeting specific rural health issues, such as agricultural diseases and information poverty, can be combined with programmes to tackle the largest problem for healthcare users in rural areas, that of accessibility. Potential solutions such as mobile services and telemedicine are discussed in more detail below. The following chapter revisits this theme and examines some solutions implemented in other countries which recognise the need to provide targeted services for their rural communities.

If rural patients cannot get to a practice the alternative is to bring primary healthcare services to these rural and more remote communities, for example using branch surgeries, home visiting, and mobile services. Whilst older patients in particular like branch surgeries, they are not popular with GPs, where opening hours, facilities and privacy are limited and required notes may be unavailable. Mobile services are intensive in staff and can be costly (Bentham and Haynes, 1986). Despite this, branch surgeries bring in a significant number of extra consultations. Consideration is now being given

by the Department of Health to alternative models of service delivery (Godden and Richards, 2003), patterns of work and forms of remuneration for health professionals in remote areas. Developments will be required to take account of new technologies such as the internet, telemedicine and telephone-based advice services such as NHS24.

Telemedicine has become increasingly popular in recent years, with advances in technology making it viable. In the rural USA and in Australia many small hospitals have the facilities to send x-rays and test results via the internet for discussion with specialists at larger institutions or to contact patients via the telephone for follow up advice rather than undertake long journeys to visit them. Within England, telemedicine has arrived in the form of NHS Direct. This is a national nurse-led telephone helpline, created as part of the white paper *The New NHS: modern, dependable* (1997). The white paper indicated that the purpose of the new service would be to provide: "easier and faster advice and information for people about health, illness and the NHS so that they are better able to care for themselves and their families". The Chief Medical Officer's report of three months prior had expressed the hope that such a service might help to "reduce or limit the demand" on existing immediate care services (*Chief Medical Officer's report Developing Emergency Services in the Community,* 1997). The usage data suggest no important change in the use of other services, and no change in the mean number of health care services used during an unplanned episode of care (Munro *et al.*, 2003). Although NHS Direct call rates are rising, the service is used in only a small proportion (6% or less) of unplanned episodes of care. Over the last 5 years up to 70% of calls to NHS Direct are returned to the Primary Care Trust concerned so that they paying for the patients treatment twice (Panorama, 26/03/2006). In fact in 2005/06 NHS Direct cost £180 million. There has been criticism of little evidence that this fragmentation of services offers patient benefits rather than duplication of services. Also Munro *et al.*, (2003) states that while 84% of callers are directed onwards to necessary[2] additional contact, 13% of callers receive advice leading to an unnecessary contact with health services. This figure would need to be substantially reduced in order

2 The necessity of a patient's contact with a service in this case was assessed by examining what happened during that contact. If anything occurred which could only be provided by that level of care, or a higher level, the contact is regarded as necessary (though not necessarily sufficient). Conversely, if nothing happened which required that level of care, then the contact was unnecessary, since the patient could have been cared for at a lower level of care (Munro *et al.* 2003).

for NHS Direct to perform its function of reducing unnecessary out of hour's demands on other parts of the healthcare service.

4.5: Health and Healthcare in the case study areas

The rural administrative and healthcare geography case study areas have changed frequently in the last 10 years. Health Service reorganisations through the 1990s, such as Health Authority (HA) mergers, the demise of Regional HAs and the transition from HAs to Primary Care Trusts (PCTs) have brought about numerous changes to the administrative geography in the region.

In Devon there are six Primary Care Trusts. Within the wider overlapping county boundaries of the South West Peninsula area there are: five Acute Trusts (including one Foundation Trust), three Mental Healthcare Providers, one Ambulance Trust and five Social Services authorities: Devon County Council, Plymouth City Council and Torbay Council. For Bradford there are four Primary Care Trusts and one Ambulance Trust (which covers the whole of West Yorkshire) as well as Bradford Metropolitan District Council. The distribution of PCTs within the case study areas is shown in figures 4.1 (Bradford) and 4.2 (Devon). The PCTs in Devon have recently been merged into one 'whole of Devon' PCT, however, the comparisons drawn within this chapter have been maintained using the previous boundaries as the new larger PCTs offer less scope for rural-urban comparisons. This proposal is partly a result of the problems created by the Health and local government boundaries not necessarily being coterminous. This can, and does, result in increased complexity for joint working and understanding. For example, where a PCT has to work with more than one district council on projects, or, in the analysis of rural area health data, where certain data is available at the Local Authority level and then other data at the, often non conterminous, PCT level making it very challenging to combine.

The additional needs of the case study areas in addition to the norm include a higher elderly population in Devon and a higher element of ethnic minorities in Bradford. Both these groups have higher healthcare needs according to the Local Government Formula Funding Share and the NHS funding formulae.

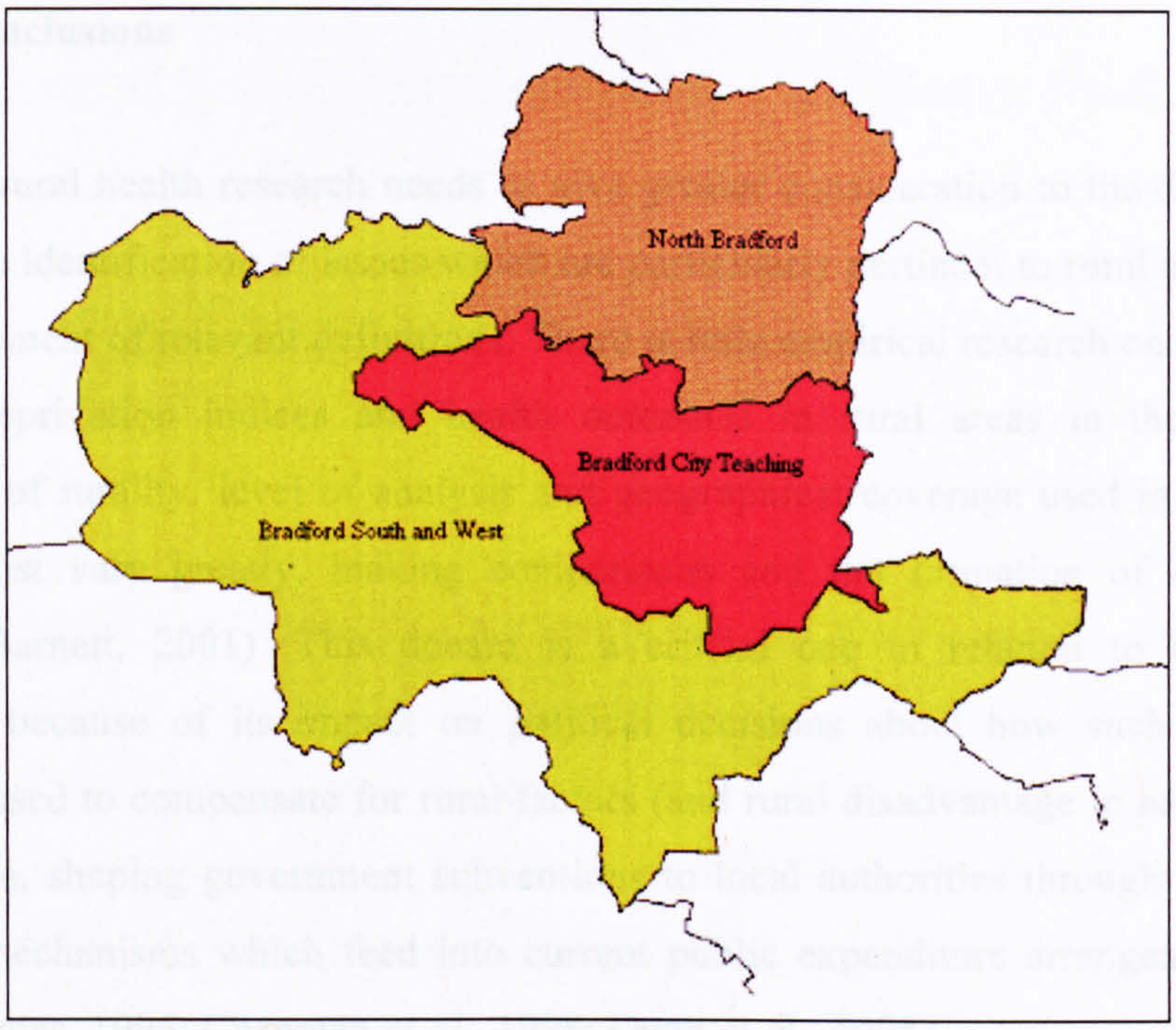

Figure 4.1: Primary Care Trusts within the case study area of Bradford (Correct boundaries as of 2003)

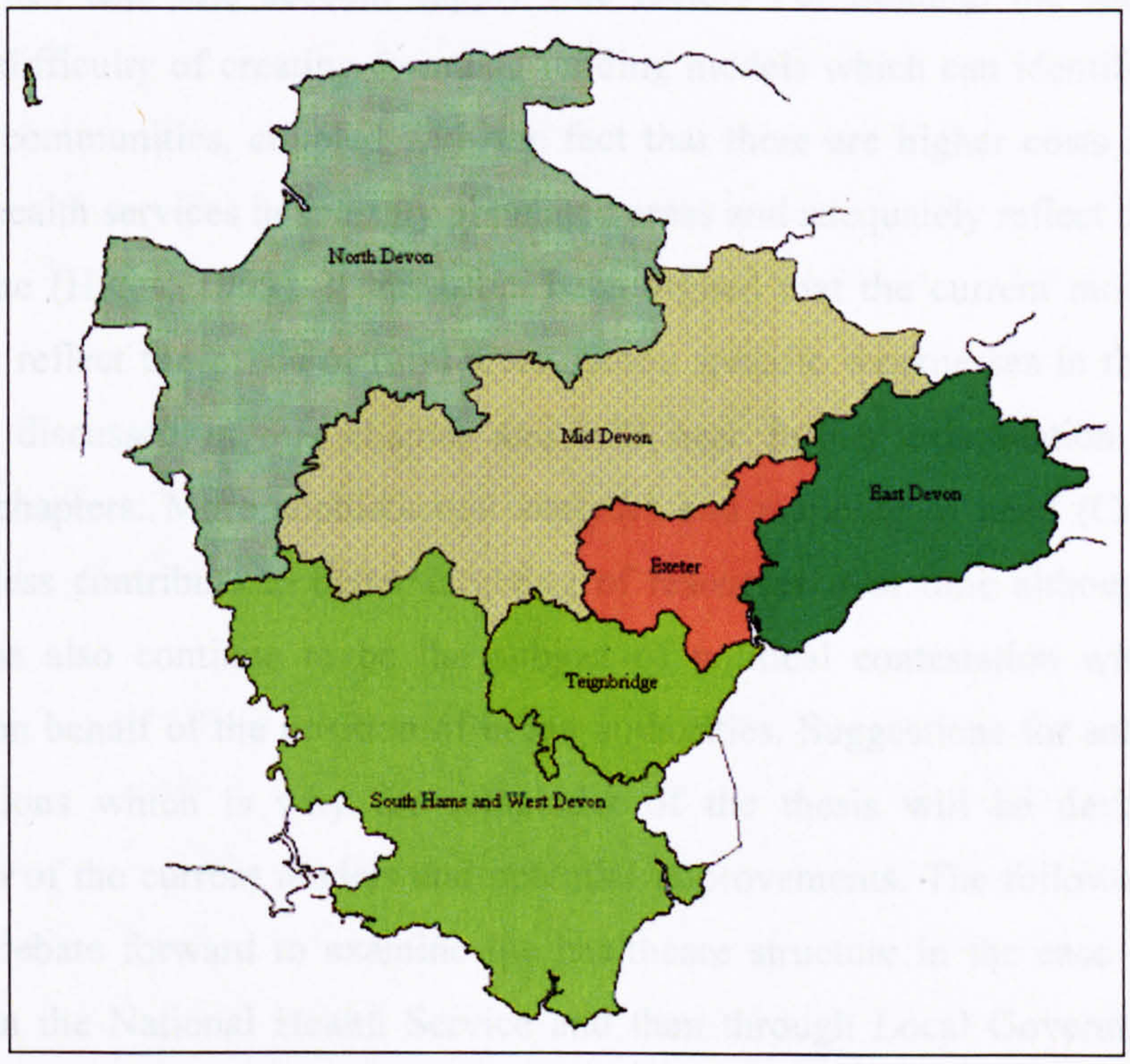

Figure 4.2: Primary Care Trusts within the case study area of Devon (Correct boundaries as of 2003)

4.6: Conclusions

In general rural health research needs to give greater consideration to the definition of rurality; the identification of issues which are particularly pertinent to rural areas allows the development of relevant definitions. There is little empirical research on the relation between deprivation indices and health outcomes in rural areas in the UK. The definitions of rurality, level of analysis and geographical coverage used in the studies that do exist vary greatly, making comparisons and the formation of conclusions difficult (Barnett, 2001). This debate is a critical one in relation to the present discussion because of its impact on political decisions about how such definitions should be used to compensate for rural factors (and rural disadvantage in particular) in, for example, shaping government subventions to local authorities through the various spending mechanisms which feed into current public expenditure arrangements (Hale and Associates, 1996; Chapman *et al.*, 1998; Dunn *et al.*, 1998).

Resource allocation mechanisms have in the past failed to incorporate rural dimensions to need which take into account supply side factors For funding, the challenges lie within the difficulty of creating formulae funding models which can identify the needs of diverse communities, coupled with the fact that there are higher costs involved in providing health services in sparsely populated areas and adequately reflect these within the formulae (Higgs, 1999). It has often been argued that the current models do not measure or reflect the needs of rural areas. Some specific weaknesses in the formulae have been discussed in this chapter and will bear further examination within the following chapters. More sophisticated analyses and mapping of need (Craig, 2000), will doubtless contribute to better targeting of resources over time although resource distributions also continue to be the subject of political contestation with a robust challenge on behalf of the position of urban authorities. Suggestions for solutions may be contentious which is why the remainder of the thesis will be devoted to the explanation of the current models and potential improvements. The following chapters move the debate forward to examine the healthcare structure in the case study areas (first within the National Health Service and then through Local Government Social Services) and the needs and demands which could be identified and better met through rural definitions.

Chapter 5: Lessons from other Healthcare Systems

5.1: Introduction

Health services exist because individuals often require help and support to promote and protect their health and to cope with illness. Over time, healthcare professionals have become organised into operational and administrative systems which aim to deliver these services to the population in an equitable and quality manner. There is no single solution to the question of how to deliver health care services to a population. The differences in national systems are as much the result of political, cultural and ideological decisions as they are the 'best' way to maximise health outcomes.

Since the formation of the National Health Service in 1948, debate about the NHS has been dominated by the ideal that healthcare should be universal and equitable (Rivett, 1998). Although the notion of equity was implicit in the principles of the UK's National Health Service from its origin in 1948, actual annual allocations for its first 30 years were largely based on those of the previous year with (depending on the state of national finances) some increments for growth. Since then however, there have been ambitious attempts to actually attain equity by using statistical or econometric formulae that relate financial allocations to measures of need. The methodology behind the currently employed formulae dates to the mid-1990's, there is a danger within this assumption that there is insufficient discussion as to whether the NHS in the current form is seen as the best way of achieving this.

In England (discussed in Chapter Six), as in the other countries discussed in this chapter, the vast majority of health care provision is State funded and State provided. Equity, in the sense of equality of 'treatment' for individuals with the same health needs irrespective of their geographical locations, or incomes, has been, and is, very much stressed as an appropriate policy objective. However, health care delivery in England (and in the rest of the countries discussed) operates through devolved healthcare providers (in the case of England these are Primary Care Trusts and Local Authorities) responsible for provision in their own regions. The mechanisms for funding allocations

to Primary Care Trusts and Local Authorities are designed to allow for the corresponding regional needs, but the choice of mechanism is not at all a simple or non-contentious topic. Funding is distributed to the PCT level via the DoH Resource Allocation: Weighted Capitation Formula, which is discussed in detail in Chapter Six, and to Local Government level via the Local Government Finance Settlement, which is discussed in detail in Chapter Seven.

This chapter will examine the components of the formulae used both in the rest of the UK and in selected international case study countries (New Zealand, Canada and Australia) and compare the treatment these have for rural areas. These countries were chosen as they use weighted capitation formulae to distribute funding and therefore, allow direct comparisons to the English healthcare funding model. In addition to the comparable funding mechanisms these countries are characterised by large rural areas, therefore containing a substantial rural population. The treatment of remote and rural areas within the funding mechanism was of key interest: both of these selection processes were arbitrary, and given additional time there are many other systems and counties which would offer useful comparisons and examples of best practice which could be applied to the English model. Returning to the focus on English healthcare provision Chapters Six and Seven will discuss in detail two of the funding formulas in use in the UK: the NHS Weighted Capitation formula and the Local Government Funding Relative Needs Formula which contain significant healthcare components.

The chapter argues that there are lessons to be learned from other countries healthcare delivery and funding mechanisms. This chapter does not describe every aspect of the national and international healthcare systems in the manner of a textbook. Rather it is focused on elements of each system from which offer useful comparisons, and which offer lessons for the funding of healthcare within England, specifically in the area of rural service provision. The analysis has been guided by the following main questions:

1) How is healthcare funded? As the scope of examination and analysis offered by this PhD thesis would not allow a detailed debate over the possible merits of an entirely new system of healthcare funding, such as a radical shift to a private insurance model similar to the USA. As such the focus has been limited to countries which use a weighted capitation formula in line with England so that lessons can be drawn from

within comparable funding systems.

2) Does the system offer incentives and encouragement to healthcare providers in relation to standard of service? In Britain, paternalism is the rule, though mitigated by a professionalism which often encourages doctors to put their patients first. The chapter touches on the use of co-payments and locally based (and devolved) healthcare delivery and funding models to see if these produce 'better' outcomes for providers and patients.

3) Does the system produce equity? How are geographical and socio-economic variations in need accounted for within the funding model? As this thesis is concerned primarily with healthcare in rural areas, particular focus will be given to any rural elements within the funding program.

4) What allowances do countries make for rurality? The lessons for England provided at the end of each country profile will highlight any funding mechanisms that could be transferred (as well as general points about the formula used). The use of data and definitions to shed light on the unavoidable extra costs of providing heath services in rural England raises questions about the comparability of various geographical characteristics between the countries. As funding often focuses on the contrasts between urban and rural costs the comparisons cannot be confined to the characteristics of rural areas.

5.2: Healthcare funding in the rest of the UK

Healthcare services in England are provided though a combination of networks from the National Health Service to Local Government, Private Organisations and Voluntary Groups. As this thesis is examining the impact of rurality on service provision only through government organisations, the summary and subsequent analysis provided (within Chapters Six and Seven) will focus only on the first two types of service providers.

The following sections examine the allocation procedures which currently operate in the rest of the UK and then moves on to give a brief comparative overview of healthcare

systems in use internationally. In order to run sensible 'what ifs', it is useful to find out what systems of funding can be found elsewhere. This will allow meaningful comparisons to other systems both nationally and internationally, and also provide alternative methods which could be tested within the current allocation model. There is a wide variation in the overall amount of funding per capita for healthcare services in the rest of the UK. According to Bastin *et al.* (2004) in 2003/ 2004 the average per capita NHS funding for England was £908.56, for Scotland, £1056.07 and Wales, £864.10. Both variations in the overall amount of funding and variations in the formula components will be discussed in more detail in these sections.

England does not have the extremes of population distribution found in countries such as Australia and New Zealand. Closer to home in Scotland, England has little equivalent to the remote island communities such as the Orkneys apart from the isolated case of the Isle of Wight. According to the ONS land use definition using the 1991 census, 18.85% of Welsh residents (534,422 out of 2,834,915) live outside settlements of over 1,000 population (Pion Economics, 1999), for Scottish residents this is 11.05% (552,270 out of 4,998,567)

5.2.1: Scotland:

A distinctive feature of Scotland is the strong contrast between urban and rural areas, from the predominantly urban Greater Glasgow health board (population around 900,000), which exhibits the problems expected of large conurbations, and the remote Highland and Island boards which face completely different problems of accessibility and very dispersed population. Since devolution, healthcare has been the responsibility of the Scottish Executive. It is funded out of United Kingdom general taxation, and arranged locally by 14 geographically-defined Health Boards, with average populations of 370,000. The components of public spending in Scotland are the baseline or inherited expenditure base (i.e. the previous year's budget figure) and incremental expenditure changes (i.e. the element which is in part determined by the Barnett Formula). At present two allocation formulae are used for elements of the Scottish health budget: Scottish Health Authorities Revenue Equalisation (SHARE) Formula for Hospital and Community Health Services and the GP Prescribing Formula.

The SHARE formula was introduced in 1978 to allocate HCHS resources to Health Boards (the equivalent of English PCTs), on the basis of the differing healthcare needs of their respective populations. The formula was extended as a result of the 'Fair Shares For All' report in 1999 and 2000 and is now applied to the HCHS budget, GP prescribing budget and cash limited section of the General Medical Services (GMS) budget (covering premises, equipment, staff, etc): this is around 80% of Scotland's net NHS budget. In a similar way to England, the results of the non-cash limited section of the GMS budget (covering GPs' income) are separate. Healthcare services are divided into six categories: non-psychiatric, non-obstetric (52%); mental illness (15.5%); day and outpatients (12.5%); community (11%); obstetric (5%); and mental handicap (4%). The formula uses four measures in calculating an appropriate distribution of resources: population served by each board; composition of each board's population in terms of age and sex; relative health needs over and above the size, age and sex of the population existing with each board (mainly due to differences in the morbidity of board populations); and the unavoidable excess costs of delivering healthcare in sparsely populated areas (Rice and Smith, 1999).

It has been suggested that Scotland represents current best practice for constructing a resource allocation formula using indirect evidence of health needs (Gordon *et al.*, 2003). However, the approach is very data demanding and requires the use of complex statistical analyses (which hinder transparency and comprehensibility) which took two and a half years to complete. Moreover, the availability of Census data by postcode sector facilitated the Scottish use of post-coded patient data. Premature mortality and a wide range of socio-economic and demographic (indirect) measures of health needs, as well as limiting long-term illness, have been rigorously examined to establish (statistically) their influence on the utilisation of health services (SEHD, 2000). It was found that the use of a large number of proxy need indicators led to instability between care programmes and adjacent years in the significant influences identified. Some concerns have been expressed about the complexity of the methods used in the formula and the difficulties this posed for understanding by health service staff and the wider public. In an attempt to avoid complexity and instability, a restricted number of the more important need indicators have been identified and combined into the composite 'Arbuthnott' index. This helps to make the construction of the formula more transparent, more comprehensible and less time consuming. Additionally, three of the indicators

chosen can be updated between Censuses (they are; under 65 SMR; the unemployment rate; the proportion of elderly on income support). The other indicators are updated with each Census. The Arbuthnott Review was the first major revision of health resource allocation in Scotland for 20 years. The revised allocation formula resembles the English formula in many respects, particularly its use of HCHS, prescribing and general medical services indices. However, 'need' is measured differently, through the Arbuthnott Index. This Need Index is based on indicators of morbidity and deprivation: mortality rates among people under 65 years of age; unemployment rates; the proportion of elderly people claiming income support; households with two or more indicators of deprivation from the census (for example permanently sick head of household; lone parent families; overcrowding) (SEHD, 2000).

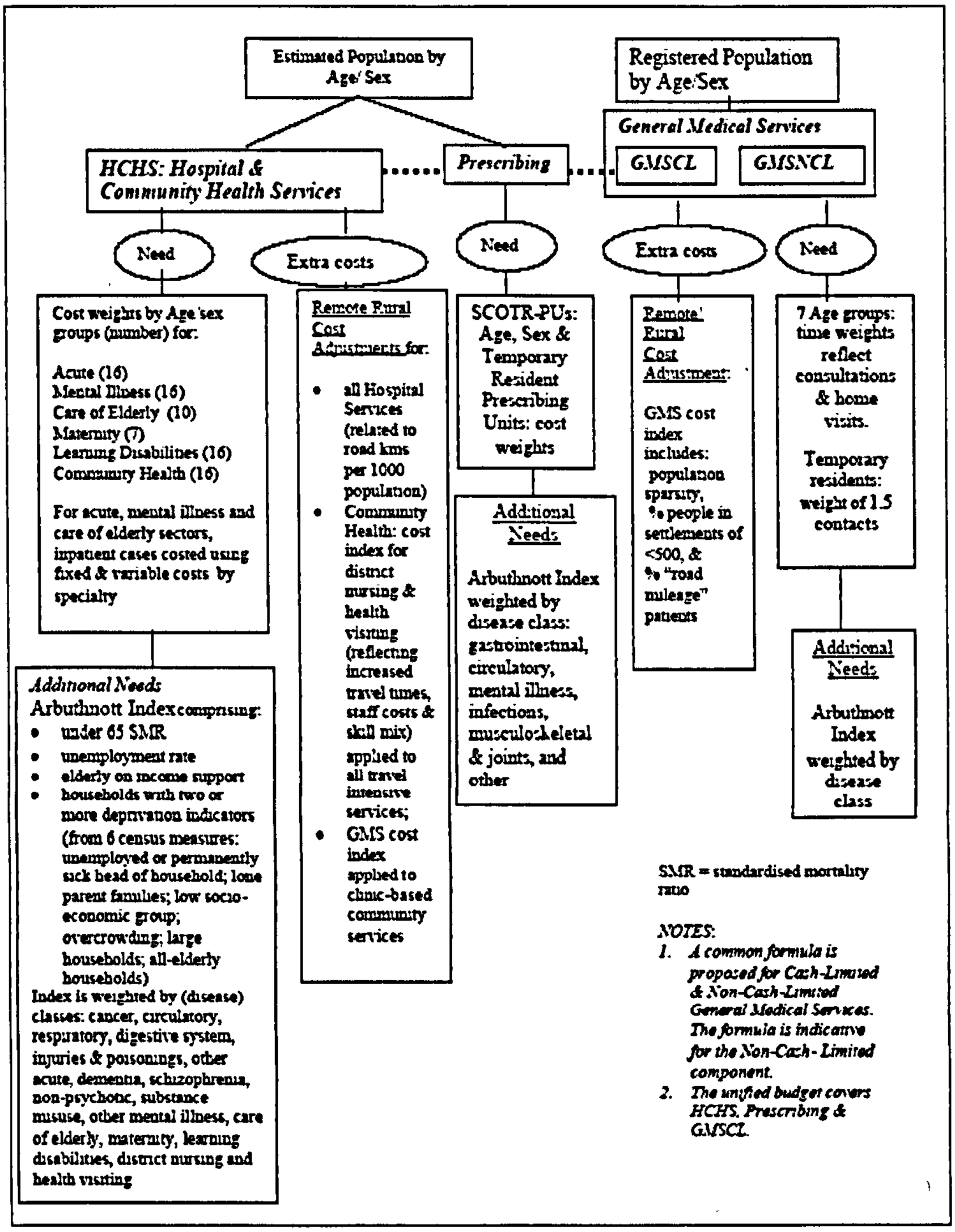

Figure 5.1: The structure of healthcare funding in Scotland (Source: Gordon *et al.*, 2001, p29)

Remote/rural cost adjustments in relation the extra cost of providing services in remote areas are made both for HCHS and General Medical Services within hospital services; travel-related community services; and clinic-based community services. Rural, mainland Health Boards in Scotland are estimated to need up to 10% additional resources per head to cover additional costs of hospital services, and up to 23% for GMS costs (SEHD, 2000). The community health section of the formula contains a

rural adjustment in the form of a cost index. This is to reflect the additional costs of district nursing and health visiting in travel-intensive communities as well as the employment of higher-grade nurses (it is applied to all travel intensive services). All patients are given a score (see table 5.1 for scores) in relation to their proximity to their GP.

Distance	Score
< 3 miles	0 units
3-4 miles	3 units
4-5 miles	4 units
> 5 miles	Plus 1 unit per mile

Table 5.1: Weights for calculating sparsity for Scotland's SHARE formula (Source: NHS Scotland, 1996, Description of methodology for SHARE model).

In calculating rurality, distance along footpaths attracts double weighting and distances across water triple weighting, leading to the Islands receiving a very high score. The sparsity factor ranges from zero in Greater Glasgow, to 10.53 in Western Isles. The factor is then applied with a weighting of 0.3 to all services thought to be affected by sparsity. That is, the adjustment factor used is calculated as (0.3*sparsity factor + 0.7) (NHS Scotland, 1996, Description of methodology for SHARE model). This model provides a useful proxy for additional costs but the use of GP practice areas rather than a more historically stable geographical measure such as wards or the km2 grid map in place in Northern Ireland.

Whereas a cost index is applied for community health, the hospital services element uses road kilometres per thousand of population as the sole remoteness indicator for estimating the extra costs. This indicator is used as a proxy to estimate the extra costs of hospital services (i.e. the lack of economies of scale). Based on road km per 1000 of over 30km Borders; 40km Highlands; and 60km Islands, it is clear that access is difficult and costly in rural Scotland: this compares to road km per 1000 in Greater Glasgow of less than 3km. The Borders and Highlands receive positive adjustments for relative need of around 10% and the three Island Health Boards receive the highest adjustment of

24.2%. Unsurprisingly urban areas such as the Greater Glasgow and Lothian Health Boards lose funding under this adjustment (around 3% in both cases) (SEHD, 2000).

The use of road distance as a proxy measure of additional costs is believed to be more accurate than area sparsity (Hindle and Worthington, 2004). Whilst road distance and population sparsity can be used to proxy additional costs, as can historical expenditure, the challenge for countries wishing to account for the additional cost of providing services to rural and remote areas is identifying which costs are addition to, and which are the result, of non-essential spending. GP practices which are small, therefore suffering from a diseconomy of scale, receive a rural premium. Discussion is underway within Scotland to develop a cost benefit analysis model (based on the Deloitte Report, 2006 and NHSScotland Resource Allocation Committee findings, 2007) based on the financial benefit to the practice and the travel cost to patients (based on additional travel distance) if neighbouring practices were merged. If the 'cost' in terms of patient travel cost to the new practice was more than the benefits of that practice merging, then the practice should not be merged and the practice should qualify for additional cost payments based on these diseconomies of scale.

Health Boards in Scotland cover large geographical areas and cannot easily be described as rural or urban. With an average road km per 1000 population of 32.28%, Argyll and Clyde (population 90,840: 1996 figures) seems very rural. Although most of the population live in populated urban areas a significant proportion live in remote and rural areas in the north, with 3.5% living on the islands. Concern has been raised in Scotland over whether rurality adjustments should be measured over a smaller scale, i.e. within the Health Boards themselves, in order to produce a more accurate measure of cost variation (Godden, 2003).

Scotland's higher per capita healthcare spending, in relation to England, is often attributed to an 'unfair' funding advantage granted to them through the **Barnett formula** (Bastin *et al.*, 2004). Due to these claims it was felt that the formula should be further explained here. The Barnett formula, named after a report written by the then Chief Secretary to the Treasury Joel Barnett, was introduced in 1978 to Scotland, (it was extended to Wales in 1980) to give territorial areas of the UK a proportionate increase or decrease linked to English public spending. Prior to 1978 Scotland had negotiated and

bargained with the Treasury on an annual basis in the same way as other departments such as defence, education, health, etc. The formula was intended as a temporary measure to be implemented during devolution; it has no statutory basis in law and is viewed as a working agreement.

The formula takes three factors into account in determining the change in each territorial administration's spending allocations:

1) The formula is applied only when there are changes to expenditure headings in England. The formula only determines changes to each territory's block and not the overall size of devolved UK expenditure.

2) The extent to which the relevant UK departmental programme is comparable with the services carried out by each devolved administration (the formula does not apply to areas such as defence and social security which are truly UK departments).

3) In these cases, increases are applied to comparable expenditure in the three non-English territories according to the formula which is based on population share. Twigger (1998) states that, in terms of distribution, England receives around 80%; Scotland currently receives around 10%, Wales around 6% and Northern Ireland around 2.5%. The allocation amount is not related to need, or relative need between countries.

An example is useful for illustration: suppose the UK Government decides to increase or decrease a Departmental Expenditure Level by £100m. The comparability factor for this is 99.2% (for health the present "comparability factor" for Scotland is currently 99.2% with spending on EU medical costs and the Medicine Controls Agency being assessed as non-comparable) the population share for Scotland is 10.34% (the latest mid year population estimate from the Office for National Statistics). Thus, in this example, £10 million would be added to or subtracted from Scotland's block. (HM Treasury, 1999, Funding the Scottish Parliament, National Assembly for Wales and Northern Ireland Assembly - A Statement of Funding Policy, p7.). This can be expressed as:

Change to the department of the UK Government's programme *multiplied by* comparability percentage *multiplied by* appropriate population share

£100m x 0.992 x 0.1034 = £10,257,280

Figure 5.2: Calculating the Barnett Formula

Scotland's population is declining over time in comparison to that of England and the government's policy is to now re-calculate the population share on an annual basis based on ONS mid year population estimates. In terms of health funding, Scotland's population share prior to 1992 was 11.76% (mid 1976 population estimate). In 1992 this was amended to 10.66% to reflect the findings of the 1991 Census. The decline in the population share has resulted in Scotland receiving a smaller proportion of the growth of UK departmental spending programmes. However, in the event of a reduction in a UK department's spending, the formula works to Scotland's advantage in that it receives a smaller proportionate decrease.

5.2.2: Issues to highlight from Scotland

In summary, the reason that Scotland is able to provide a higher per capita spend on healthcare is because the funding allocation is not ring-fenced. As a result Scottish Ministers have the discretion to allocate the block as they see fit. The relatively higher levels of deprivation, morbidity and rurality in comparison with other territories in the UK are commonly cited reasons for a higher per capita health spend in Scotland. The main reason is that as rurality and sparsity have far greater political weighting they are funded more generously

- As with the NHS in England the system relies on administrative methods such as GP gatekeepers. In this role The GP determines who is legitimately 'sick' and requires referral to specialist services (Bigger, 2004). The first contact feature implies that patients do not visit specialists without a prior recommendation from

their GP (Starfield, 1994). This restricting of medical resources and manpower can be used to curtail spending whilst offering protection from unnecessary procedures and adverse events.

- Provider choice may not be a priority for patients. Access to care is likely to be most important. Indeed in rural and remote regions there may be effectively no choice of provider. Focusing on providing equitable care and equal levels of service would render patient choice unnecessary.

- It is perhaps surprising that in Scotland the estimated additional cost for rural areas is 10% (SEHD, 2000) whereas research in England has indicated that costs could be up to 20% higher. We suggest this is because Scotland's healthcare delivery system is geared towards serving small populations and the initial strategic planning rewards with reduced expenditure.

- As discussed above, Scotland does include a rural premium within its funding model which is based around the characteristics of the GP Practice population (population density, sparsity, and the proportion of people which attract road mileage payments. While it is true that many health services are not dispensed within GP practices the majority of residents will use the GP route through to further services. England should examine the possibility of using combining variables such as road networks rather that population sparsity in isolation to calculate the rural premium. The use of GP practice areas has been criticised as being arbitrary areas which are subject to frequent change (due to the merger or separation of practices) a more practical and stable solution for England, especially for local government provided healthcare services, may well be to use LSOAs (as research suggests that Output Areas may have too small populations to produce useful results in rural areas – see Chapter Eight).

5.2.3: Wales

The Welsh healthcare system is funded along broadly similar lines to the NHS in England. It is funded out of general taxation, from the 6% budget allocation granted to Wales from the Barnett formula. Since devolution, the Welsh healthcare system has become the responsibility of the Health and Social Care Department in the Welsh Assembly. About 66% of the funding is distributed to the 12 regional health trusts (the rest is held centrally) (Rice and Smith, 1999). The formula is used to allocate the Welsh version of HCHS: in this case hospital and community and family health services (HCFHS). The HCFHS formula is divided into: non-psychiatric inpatient services (62%); community health services (15%); outpatient services (12%); mental illness inpatient services (7%); and ambulance services (4%). This formula is currently under review so the distributions may change (Longley, 2004)

When the Welsh system for resource allocation was reviewed by the Steering Group chaired by Professor Peter Townsend in 2001, the authors of the final report felt that the formula as it had been applied in 2000/01 was inferior in many respects to the formulae being applied elsewhere in the UK and concluded that the current health funding formula was not sufficient to ensure efficient and effective resource distribution. In particular, Standard Mortality Ratios for under-75s were being used as the sole proxy for additional need, whereas other systems were considering a greater range of morbidity and deprivation factors. The RAWG report concluded that there was no evidence to support the use of a staff market forces factor and that a land/buildings factor would make little difference. They recommended that this aspect of resource allocation should probably not be a priority for Wales, especially if staff grade inflation is built into a rural cost adjustment.

Rurality was included in the old funding formula. To reflect additional costs there was a cost adjustment in both community health services and ambulance services. For community health (this method distributed 14% of the HCHS funding allocation) this was on the basis of estimated average mean travel time per visit. This suffered most criticism for using out of date information, in this case service data from 1982/83 (Gordon *et al.*, 2001). In common with most cost indicators this uses indirect costs to

proxy expenditure. For ambulance services the same approach as Scotland was adopted, namely a calculation of road lengths per 1,000 population. Again this calculation was intended to be a proxy of the additional costs involved in serving a rural community, although, the community health adjustment did attempt to proxy direct costs. The rurality factors were then given different weightings depending on whether they were for outpatient or inpatient services (ratio 5:1) (Welsh Office, 1998, Allocation of health authority discretionary resources in Wales). The RAWG report recommended that the new rurality adjustment should be based on sparsity, in a similar manner to England. They recommended that the rural premium index should be based on electoral ward population with densities below 0.25 persons per hectare. This would be likely to create a more detailed map of sparsity than in England, where the measurements are based on old health authority boundaries. However, the omission of cost data and the number of ambulance journeys (which are included in the English formula) will leave this as very much a proxy measure, rather than an indication of true costs.

5.2.4: Issues to highlight from Wales

- In common with the NHS in England and Scotland the system relies on administrative methods such as GP gatekeepers and restricting medical resources and manpower to curtail spending. Despite the introduction of waiting list targets, the percentage of the population waiting has not fallen. Likely reasons for this are well established. One such being that in a system with a strong gate-keeping function GPs refer patients when they know treatment will follow shortly. Equally the greater the likelihood of treatment, the greater the propensity of GPs to refer for additional treatment.

- Wales uses a proxy measure of average distance travelled to calculate the rural premium for community health services, this approach could also be trialled for England although sparsity of output areas might be less subjective, or in indeed subject to less year on year variation, and therefore be easier to calculate from a long term planning perspective.

5.2.5: Northern Ireland

The distribution of health funding in Northern Ireland differs from that elsewhere in the UK in a number of fundamental respects, although it is split into Health Boards in the same manner as elsewhere in the UK (four in this case)..The formula is split into nine blocks: acute services (40%); elderly care (25%); mental health (9%); learning disabilities (7%); maternity and child health (6%); family and child care (5%); physical and sensory disabilities (3%); primary health and adult community (3%); and health promotion and disease prevention (2%) (Department of Health and Social Services, 1997). In Northern Ireland there is no separation of Healthcare and Social Services, so aspects of the resource allocation procedure vary because of the combined demands of health need and social welfare. Elderly services, for example, account for 25% of the formula. This is much higher than the NHS Weighted Capitation formulas but is probably more relevant to the Local Government FSS share. However, it is not actually directly comparable due to the way the formulae are constructed (Bond, 2002). The combination of health and social services into one formula does mean that it is possible to do a very basic comparison against the NHS weighted capitation formula combined with the Local Government funding but the fact that the allocation process is tiered makes any attempts at direct comparison more complex. The formula has been developed incrementally since the mid-1990s (as in England) under the Capitation Formula Review Group (Jordon *et al.*, 2006). A number of distinctive additional needs indicators are used in Northern Ireland, notably receipt of family credit and, for maternity services, no previous births and multiple births. Rather than funding allocations being determined centrally in their entirety by the Northern Ireland Executive, funds are distributed to four Health and Social Services (HSS) Boards who in turn use guidelines to determine allocations to the HSS Trusts under their control. There are 19 HSS Trusts in all, each encompassing a population of approximately 100,000 (Gordon *et al.*, 2001).

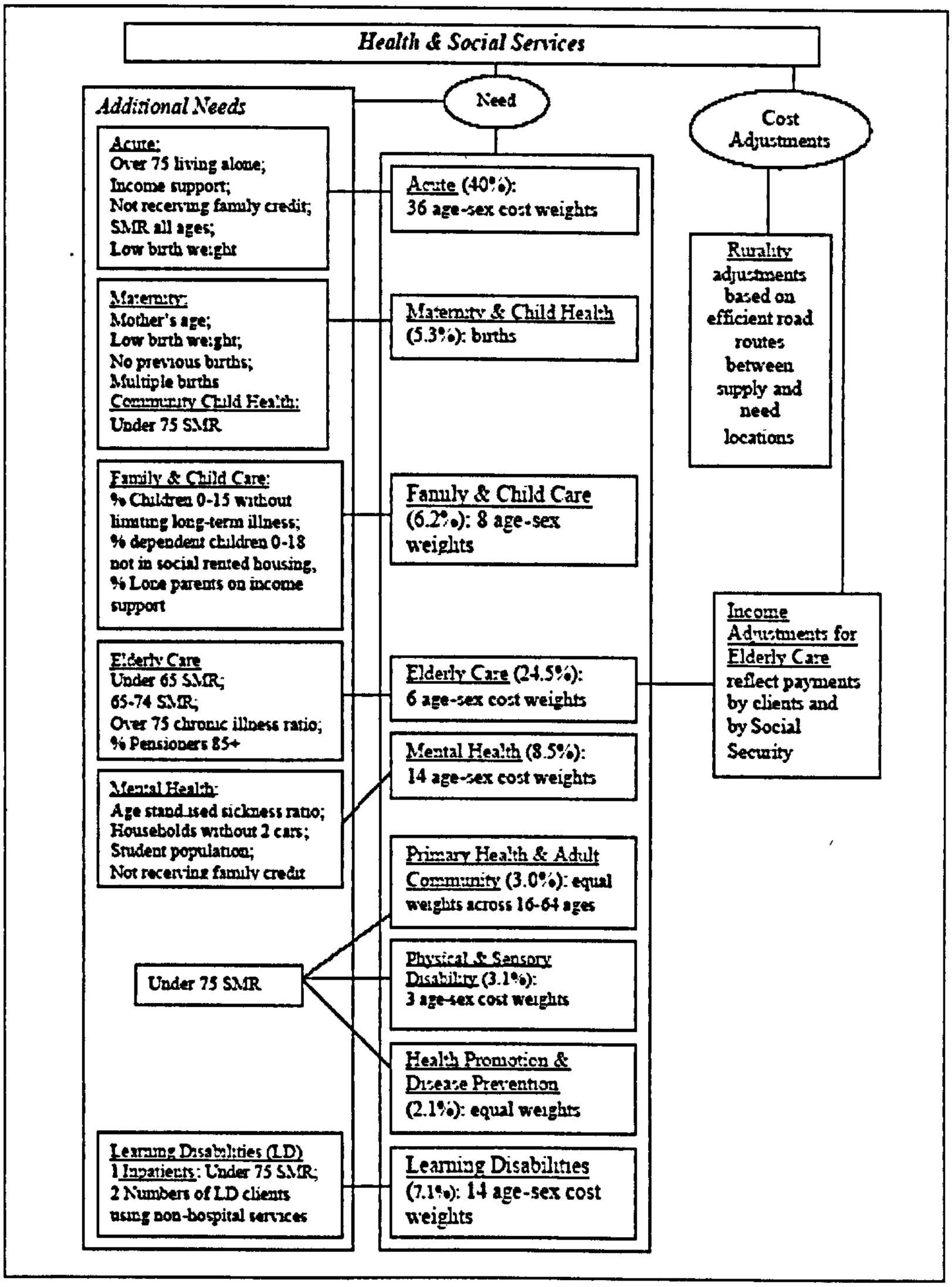

Figure 5.3: Summary of Northern Ireland's health and social services formula, currently under review (Source: Gordon *et al.* 2000, p31).

Like Wales and Scotland, the Northern Ireland formula makes an adjustment for rurality. Alongside the 'need' proportion of the formula the Northern Ireland formula makes two 'Cost Adjustments': Rurality and Elderly Care. For community health NI uses the same system as Scotland. A weighting is given to patients based on their distance from a GP surgery (Rice and Smith, 1999). The cost associated with ambulance service adjustment

is based on the efficiency of road routes between 'supply' and 'need' locations. This network analysis is done through a sophisticated network analysis of digitised roads. Although the formula is more complex than the Welsh and Scottish approach of persons per km, and therefore less transparent, it has the potential to respond in a sophisticated manner to changes in resource locations.

5.2.6: Issues to highlight from Northern Ireland

- In common with Scotland, Northern Ireland operates a "Cost Adjustment" for Rurality within its funding formula. This also uses road networks with a combination of distance and road quality. As the method is more complicated for Northern Ireland the main lessons from this method will be taken from the Scottish NHS model. However, as Northern Ireland operates a combined Local Government health delivery with the NHS model this information gives scope for examining changes to Local Government funding in line with service access distance. In further research this model could inform options about combining the delivery of healthcare services to one provider (probably through the NHS) rather than splitting responsibility between the English NHS and Local Government.

- In common with the points raised about the Scottish and Welsh NHS systems the suppression of competition and diversity leaves consumers unable to escape poor service and reduces commercial imperative to raise standards to retain customers.

- Not separating healthcare into Local Government provision and NHS provision within Northern Ireland allows for more efficient patient transfers between section providers with consistent medical records. In theory, this can increase efficiency and reduce duplication of services.

5.3: International Healthcare Systems:

The financing of health care around the world is incredibly diverse. This section will only focus on the developed world, in order to provide more direct comparisons to the UK healthcare system. Although systems vary considerably in their approach there are many similarities. The almost universal principle among healthcare systems is the action of society to devolve the financing of healthcare to a variety of purchasers. These healthcare systems might take the form of private insurance companies (such as in the USA); local administration (such as PCTs in the UK and Health Boards in New Zealand); sickness funds (used in countries such as Belgium and Germany). Healthcare providers purchase healthcare for set populations (whether defined by employment, geography or fee payment) over a set time period. To this end all providers develop a budget distribution that reflects some concept of fair resource distribution. The provider then distributes the required services to meet the identified needs.

This section focuses on healthcare funding models in three international countries: New Zealand, Canada and Australia. These were chosen as they use weighted capitation formulas to distribute funding. It was felt that this would allow direct comparisons to the English healthcare funding model. These countries were additionally selected as they are characterised by large rural areas, therefore containing a substantial rural population.

5.3.2: New Zealand

The New Zealand healthcare system is funded out of general taxation. The current resource distribution uses a weighted capitation formula known as the Population Based Funding Formula which was developed in 2000. It is based on available data and population projections and will be reviewed every five years to incorporate updated population projections following each population census. It is an aggregate formula that determines the share of funding to be allocated to different areas of the country, based on the population living in each area. It does not, however, determine the overall level of funding (Ashton, 2005).

The aim of the Population Based Funding Formula is to distribute available funding more equitably between District Health Boards according to the relative needs of their populations and the cost of providing health and disability support services to meet those needs. Each District Health Board's share of health and disability funding is determined by:

- Its share of the projected New Zealand population, weighted according to the national average cost of the health and disability support services used by different demographic groups
- An additional policy-based weighting for unmet need that recognises the different challenges District Health Board's face in reducing disparities between population groups
- A rural adjustment and an adjustment for overseas visitors, each of which redistributes set amounts of funding between District Health Board's to recognise unavoidable differences in the cost of providing certain health and disability support services.

The formula is split into the following blocks

- Personal Health – hospital and community services
- Personal Health – primary health care
- Mental Health Services
- Disability Support Services

After these are calculated through a weighted capitation formula there are blocks for unmet need, rural and oversees adjusters.

The relative size of each District Health Board's **population** is the major determinant of its Population Based Funding Formula share of funding. For each DHB, their population share will determine between 83% and 98% of funding. Adjustments for demographic factors account for the remainder (Ministry of Health, 2004).

Cost weights for **personal health (hospital and community services)** are calculated based on the sum of costs divided by the sum of the population for each age, sex and

deprivation quintile. The cost weights are then adjusted for the greater utilisation of Mäori and Pacific peoples.

For **Personal health (primary health care),** data (currently from 2000–02) is sampled from the Royal New Zealand College of General Practitioners' database of individual GP patient management systems. A sample of this data set, covering 200,000 individuals over three years from January 2000 to December 2002, was analysed to gauge GP demand. Forty-three percent of individuals in the dataset had no GP visits in any of the three years 2000–02. Individuals without any consultations over the period were filtered from the data set leaving approximately 113,600 people with at least one GP visit between 2000 and 2002 (Ministry of Health, 2004). The filtered dataset is grouped by age and sex and compared to the New Zealand Deprivation Index 2000. There is a clear correlation between age, deprivation and higher GP utilisation. At present the geographically uneven establishment of Primary Health Organisations prevents these funding changes from being incorporated into the Population Based Funding Formula. The funding for Primary Health Organisations is due to be revised in 2006 and it is anticipated that this component will be added to the central funding formula at this date.

Disability support services (DSS) expenditure is assessed by three service level groups: residential services, community services and specialist assessment, and treatment and rehabilitation (ATR) services. Average cost weights for each age-sex group are calculated for each of the service groups. Rates were then scaled according to devolved DSS budgets to produce a final set of age-related DSS cost weights. Residential care services account for over 50% of Crown DSS expenditure (this includes rest homes for older people, dementia rest home facilities, and hospital continuing-care facilities for people with intellectual or physical disabilities). Disability Services is the only component of the weighted capitation part of the formula not to use the indices of deprivation (NZDep2000), this is due to lack of appropriate data.

Mental health service funding is based on historical cost data which records the numbers of episodes recorded (rather than the number of unique patients) costed against age (0-14, 15-19, 20-64, 65+) and NZDep2000 score. The Mäori per head funding weight is twice that of the corresponding non-Mäori age group. The 15-19 age group

receive the highest funding under this program at $212.95 per person (Mäori aged 15-19 receive $425.50 per head) compared to $68.15 for those under the age of 14. The weighted adjustment for deprivation causes these figures rise to around $350 per person for those aged 15-19 ($550 for Mäori) in Quartile 5, the most deprived, and fall to around $50 for persons under the age of 14 in Quartile 1, the least deprived (Ministry of Health, 2004, p33).

The **unmet need adjuster** is a simple policy based formula that shifts money from the general health budget in order to add a flat rate addition to the cost weights for ethnic minorities believed to have unmet need (Mäori, Pacific Peoples and Others), due to their poorer health outcomes. In 2003 $120 million was allocated to help District Health Boards address health and disability disparities. Counties Manukau received about 15% of this fund and Auckland 11%, reflecting their high ethnic populations (Ministry of Health, 2004, p36).

The **overseas visitor's adjuster** is the component in the Population Based Funding Formula that accounts for the unavoidable differences in costs that District Health Boards face in providing services to eligible overseas visitors. This is added as the basic formula only covers New Zealand residents resulting in an uneven cost distribution for Boards with high non resident numbers. There are five categories of overseas visitor included in the adjuster:

- non-resident New Zealand citizens visiting New Zealand temporarily (accounting for $4.3 million)
- non-resident citizens from the Cook Islands, Tokelau and Niue (accounting for $644,000)
- overseas visitors covered by reciprocity agreements for Australian and British nationals (36.55% of visitors, accounting for $7.5 million)
- all overseas visitors receiving treatment under the Injury Prevention, Rehabilitation and Compensation Act 2001 (accounted for $5.4 million)
- Refugees (accounting for $1.8 million).

The adjustment is based on historic cost data calculated by averaging inpatient costs incurred by each District Health Board. Outpatient and emergency department costs are estimated as a proportion of inpatient costs. The total cost of eligible overseas visitors was top-sliced from available funding and proportionately distributed among the District Health Boards according to costs incurred. The average value of the overseas visitor adjuster over the period 1998/99 to 2001/02 was calculated to be $19.9 million (Ministry of Health, 2004, p37). The popular tourist destination of Auckland received 20.1% of this allocation with Counties Manukau receiving the highest share (28.1%).

The New Zealand funding formula contains an explicit rural component (the **rural adjuster**) which compensated Health Boards for the unavoidable costs in providing or funding some community services to rural communities due to population dispersion. This is currently set at $80 million. The adjustment is based on historic cost data of actual costs incurred. The greatest contribution to the adjustment (just over 50%) is the rurality premium and diseconomies of scale payments to District Health Boards (based on the numbers of people living more than one hour from a settlement of over 30,000 people). These payments recognise the additional costs related to diseconomies of scale for small hospitals in remote/rural locations, and for providing hospital and some community services in rural or remote areas. A variety of community and primary health care-based rural payments, under existing provider contracts, have also been included in the rural adjuster. In particular, payments made to practices in rural areas to assist in GP recruitment and retention has been included. The rural adjuster also includes price paid to rural maternity providers where the volume of births is below the threshold level expected of a metropolitan maternity provider. As figure 5.4 indicates the rural adjuster allocates an extra 11% to Waikato, amounting to $8,800,000 in additional funding with Counties Manukau receiving only 1.5% ($1,200,000) (Ministry of Health, 2004).

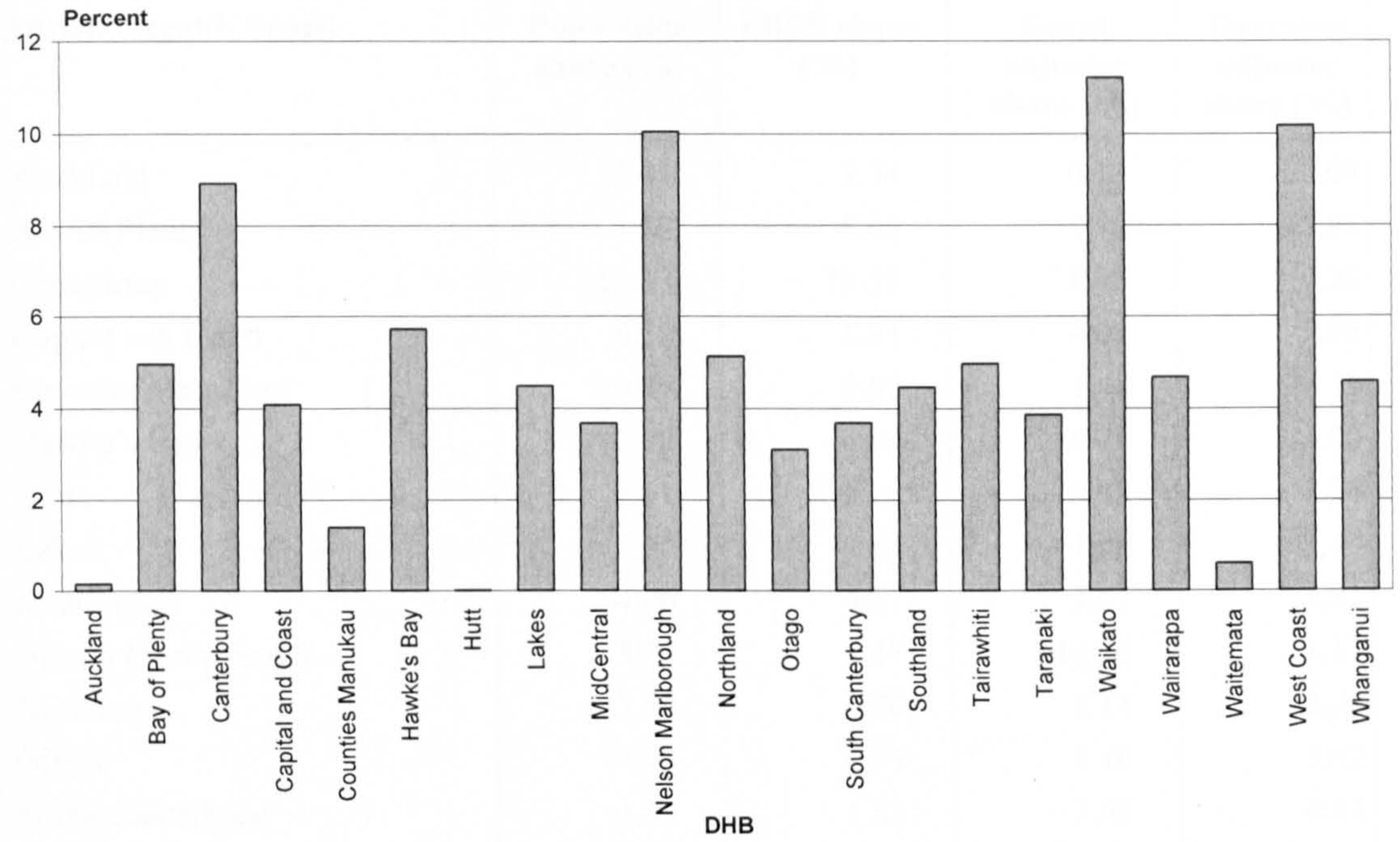

Figure 5.4: Distribution of the New Zealand Population Based Funding Formula 'rural adjuster' by District Health Board, 2003/04 (Ministry of Health, 2004, p46)

The difference the Population Based funding formula has on the distribution of funding is shown in table 5.2. Relative deprivation and need increase the available funding to areas such as West Coast and reduce it for affluent areas such as Auckland. The shift in funding as a result of the capitation formula is not as pronounced as that produced by the English Weighted Capitation formula (Rice and Smith, 1999).

District Health Board	Population share (%)	PBFF share (%)	Rural adjuster share (%)	Overseas adjuster share (%)
Auckland	10.43	9.74	0.15	20.08
Bay of Plenty	4.82	5.45	4.98	2.94
Canterbury	11.33	11.15	8.92	7.26
Capital and Coast	6.59	5.91	4.08	5.95
Counties Manukau	10.45	9.88	1.40	28.13
Hawke's Bay	3.70	4.06	5.71	1.00
Hutt	3.41	3.22	0.02	1.26
Lakes	2.52	2.65	4.49	2.49
MidCentral	4.06	4.27	3.67	1.01
Nelson Marlborough	3.27	3.47	10.06	1.13
Northland	3.64	4.20	5.14	2.76
Otago	4.45	4.57	3.10	5.62
South Canterbury	1.33	1.51	3.68	0.82
Southland	2.66	2.62	4.47	2.18
Tairawhiti	1.12	1.31	4.98	0.40
Taranaki	2.62	2.85	3.86	0.96
Waikato	8.32	8.53	11.21	5.12
Wairarapa	0.97	1.11	4.69	0.27
Waitemata	11.92	10.72	0.61	8.83
West Coast	0.76	0.92	10.19	1.02
Whanganui	1.61	1.86	4.59	0.76

Table 5.2: New Zealand District Health Authorities share of funding in relation to their populations (2003/2004, source Ministry of Health, 2004, p49)

5.3.3: Issues to highlight from New Zealand

- New Zealand's rural premium is based on historic costs. This might not be a good model for the NHS as some argue it would incentivise providers to inflate treatment costs. However, while the NHS remains a single provider public system, this would represent less of a risk. This approach would at least allow healthcare providers to finally quantify what the additional costs of rural services actually are.

- Single funder systems make it harder to move towards systems based on responsible consumers. If someone else appears to be paying, then personal responsibility is diminished. As with the NHS in England the system relies on administrative methods such as GP gatekeepers and restricting medical resources and manpower to curtail spending.

- User contributions towards healthcare funding in New Zealand are more visible than those in the UK (akin to UK National Insurance), but perhaps not as visible as those made under social or private health insurance systems. However, the element that is like other consumer goods is vulnerable to oversupply and over-use when provided at very low cost.

- Although the English model of central provision could be accused of limiting innovation, decentralisation of service provision within New Zealand causes some concerns about efficient resource allocation and priority setting.

- Within the New Zealand funding program adjustments made for under-utilisation (unmet need) of health services. Researchers suspect that lower healthcare utilisation in rural areas could be a reflection of unmet need (Dixon, 2000), and as such an unmet need adjustment may have a place within English healthcare funding.

5.3.4: Canada

Canada's population is almost 32 million. On average the country has 3.33 persons per square km (Klatt, 2000). As most of the population is concentrated in the country's more southern urban centres there are huge areas of land with much lower population density. A relatively small number of Canadians live in the immense rural and northern regions of the country. In terms of distribution of those with additional healthcare needs, most new immigrants live in urban centres, while the majority of Aboriginal peoples live in rural areas (mostly in the Northern Territories).

In Canada, as in Britain, there is no standard definition of "rural" used in policy, research or planning (Office of Rural Health (Canada) 2002). Definitions use different criteria, levels of analysis and methodologies. This is further complicated because how rural is "defined" in research studies and policy documents is often implied and not explicitly stated (Halfacree 1993). This is similar to the policy situation faced in Britain. This report by the Office of Rural Health (2002) was prepared for the Ministerial Advisory Council on Rural Health in response to the increasing realisation in geography and in policy making that standardising definitions are necessary to make policy.

The most common way of defining rural is via the negative: that which is not urban. As a result, the definition encompasses a vast array of geographical, environmental, economic, and social diversity. There are clear attempts to classify rurality and rural in the US and Canada, it is the problem of which classification to use.

The definition problems encountered by writers and policy makers in Canada also begin to highlight a new issue in the defining of rurality: that is the question of whether rurality can be defined as a static definition or does it by its very nature require a fluid, adaptive definition. Should areas of rurality be defined by comparison and at which point or scale should the comparison be drawn?

Canada, like Britain, has a number of overlapping definitions of rural depending on the organisation or project. For example, the Census rural area: individuals living outside places of 1,000 people or more; or outside places with densities of 400 or more people per square kilometre. This is in comparison with the much broader definition used by

the Beale Code Approach: Non-metropolitan regions are any individuals living outside metropolitan regions with urban centres of 50,000 or more population (Office of Rural Health (Canada) 2002).

Within Canada, provision of health care is universal and comprehensive, with funding coming predominantly from public sector resources; it is frequently referred to as the Canadian "NHS" as it is similar in these aims to the English institution. Although Canada's health care system is often referred to as "a national system", it is actually a complex arrangement between the federal and the provincial governments. In 2003, Canada spent around $121.4 billion ($121.4 10^9) on health care, or an average of $3,839 per person. This brought health care's share of the gross domestic product (GDP) to a historic high of 10% (Canadian Institute for Health, 2004, p 91). This is significantly higher in proportion to the 6% of GDP spent in England. In terms of the source of funding, approximately 70% of total health expenditures occurred in the public sector, 40% of this is from the federal government and the rest is through provincial governments. Average per capita spending on health care for 2003 was forecast at $3,839. The per capita spending rate, which varied across provinces and territories, was highest in the sparsely populated Yukon Territory ($4,648) and Northwest Territories ($6,800). The percentage of public funding also varied across the country from a high of 95% in Nunavut to a low of 66% in Ontario (Canadian Institute for Health, 2004, p xiii). The remaining 30% of health expenditure is in the private sector, paid either directly by the patient or through private health insurance. This sector includes the same services that incur a charge within England i.e. most dental and vision care services, some prescription drug care (although these are charged at full cost rather than a prescription fee) as well as virtually all complementary and alternative medicines and therapies. The amount of private healthcare funded treatments is restricted to preserve public healthcare. Insurers are forbidden by law to replicate core services that Medicare already provides. (Klatt, 2000)

Canada has a significant rural population and with a large geographical area issues of population remoteness and sparsity have a large impact on healthcare spending. There is variation in per capita spending among the provinces; examples include age, geography, health status, the unit costs of care such as wage variation, and how services are organised and delivered. The most significant outliers are Canada's sparsely populated

northern territories. Sparsity of population is one reason for this variation in costs. For example, almost 13% of health care dollars spent in the Northwest Territories goes towards medical transportation, compared to the national average of less than 2% (Canadian Institute for Health, 2004). As a result of the normalisation in costs, rural areas receive no premium funding. In common with rural areas in England, rural areas in Canada also experience high costs due to difficulties in staff retention and the need for multi skilled staff resulting in higher wage costs. For instance, according to the Census, in 2000, average nurses' salaries ranged from a low of $39,478 in New Brunswick to a high of $60,943 in the Northwest Territories. (Canadian Census 2000)

Funding from the federal government to the provincial governments flows to the provinces and territories on a purely per capita basis. Although arguments have been made in favour of population needs-based funding, there have been major objections (mostly from wealthier provinces) to the adoption of a "needs" based formula. Federal funding is not ring-fenced and is paid to provinces together with payments for post-secondary education and social assistance allowing greater autonomy but also the potential for areas to reduce healthcare spending in favour of other political priorities. The weighted capitation element of Canadian healthcare funding comes once funding reaches the provincial government, as at this point it is distributed according to their own funding models. Alberta, for example, uses weighted capitation formulae to distribute funding and as such will be examined in more detail below.

Table 5.3: Alberta Global Funding distribution for Regional Health Authorities 2005/2006 (Alberta Health and Wellness, 2005, p2)

RHA	Comparable 2004/2005 Forecast	Population Formula	Import-Export	Funding Adjustments	4% Minimum Guarantee Adjustment	LTC Hours	Province Wide Services	TOTAL 2005/2006 Funding	% Change
R1	226,468	250,539	(11,541)	12,479	(2,064)	360	-	**249,773**	**10.3**
R2	125,583	149,488	(16,876)	7,713	(1,152)	401	-	**139,574**	**11.1**
R3	1,681,432	1,454,442	53,883	148,014	(13,593)	3,084	236,910	**1,882,740**	**12.0**
R4	417,031	420,905	(54,257)	78,740	(3,655)	1,028	-	**442,760**	**6.2**
R5	170,365	182,682	(33,039)	6,283	12,627	761	9,200	**178,514**	**4.8**
R6	1,787,535	1,380,867	160,365	201,238	(14,300)	3,380	262,717	**1,994,267**	**11.6**
R7	185,406	233,267	(66,539)	15,556	10,537	722	-	**193,544**	**4.4**
R8	172,958	164,876	(17,901)	20,757	12,145	264	-	**180,140**	**4.2**
R9	63,255	66,279	(14,095)	14,253	(545)	0	-	**65,891**	**4.2**
Unallocated: ***Mental Health***				25,000				**25,000**	
Total	**4,830,032**	**4,303,344**	**0**	**530,033**	**0**	**10,000**	**508,827**	**5,352,204**	**10.8**

Funding distribution at the provincial level is split between two systems: first it employs a weighted capitation formula known as the Population Based Funding Model. This covers C$4.3 billion (about 80.4% of all health care expenditure); the remaining money is split between non-formula funding adjustments (C£1 billion, 19.6%). The Regional Funding Model distributes funding to the Regional Health Authorities (equivalent to the English PCT); the amounts for 2005 are illustrated in table 5.3 below. The formulae involve six steps: Population Formula (equivalent to the English Relative Needs Formula); Import-Export; Funding Adjustments; 4% Minimum Guarantee Adjustment (equivalent to the English floor and ceiling stage, to give a guaranteed inflationary increase); Long Term Care (LTC); and Province Wide Services. In common with the English local government system, funding is not ring fenced.

The funding model is based on population data from the Population Registry, which includes all residents of Alberta eligible for medicare coverage (Mounties, the Military and Prisoners are excluded as their healthcare is paid directly by the federal government). The registry records details of every resident of the Province including address, sex, age, and some socio-economic elements. This enables the Province to construct detailed population estimates based on the above characteristics on a particular date. There are five items deemed relevant to health care capitations: age, sex, two classes of low income ('welfare' and 'premium support'), and aboriginal status (table 5.4 illustrates this). The methodology gives rise to 124 groups: 28 aboriginal cells (containing 3.3% of the population), 28 welfare cells (3.6% of the population), 28 premium support cells (12.0% of the population) and 40 other cells (81.1% of the population) (Rice and Smith, 1999). The aboriginal, welfare and premium support adjustments are applied only up to retirement age. If a citizen is in more than one socio-economic category, he or she is placed in the highest relevant category, ordered as welfare > aboriginal > premium support.

Status	Regular		Premium Support		Aboriginal		Welfare	
Sex	M	F	M	F	M	F	M	F
Age Group								
<1								
1 – 59 in 5 year bands								
60- 89 in 5 year bands								
90 +								

Table 5.4: Deriving Capitation based weightings to be used in Alberta's Population Based Funding Model (derived from Alberta Health and Wellness, 2005).

In the 2005/06 funding, the capitation rates derived from the above table (table 5.4) vary from a low of C$266 per capita (age 25-29 / Male / Regular) to a high of C$26,165 per capita (age 90+ female) (Alberta Health and Wellness, 2005). The capitations for each cell are built up using empirical utilisation data for each expenditure pool, which is built up using the Population Funding Formula described below. The objective of which is to achieve equity by paying on the basis of observed need regardless of geographical distribution. The use of raw fee-for-service cost data has been not been used in order to avoid influence by local supply conditions. Instead, the costings are based on province-wide standard costs per unit of activity.

In **Acute Inpatient** care, a standard cost is assigned to every episode within a particular diagnosis-related group, in preference to the use of actual costs. This is done by reporting all hospital inpatient episodes (about 340,000 annually). These are then divided into case mix groups. After adjustments for patient transfers, removal of global funding and anonymous patient numbers, this data is used to calculate the Acute Inpatient element using 2003/04 costs. The results of these costs are then compared against the costs incurred in other provinces to limit geographical bias. As in England Acute care is the most expensive care, in Canada it accounts for 40.5% of capitation based funding and, as in England contains no rural premium.

Alberta **Acute Ambulatory Care** is calculated based on the previous years relative values (based on over 6 million trips annually) combined with cost information from Calgary, Crossroads and Edmonton to obtain a balanced sample. A rural cost premium will be evidenced by increased costs in rural areas, due to distance, but because the funding is then averaged between areas, rural health boards will not benefit from any

additional funding. Laboratory service funding is included in the above patient services. However, non-hospital or community lab tests ordered from doctor's offices are not covered by this. **Community Lab** spending is collected from the previous financial year and the average overall cost assigned.

Activity Sector	2005 / 2006 Funding Pool Size (C$m)	Percentage of Total Funding
Acute inpatient	1,744.1	40.5
Ambulatory Care	1,0806.6	25.1
Continuing Care	798.8	18.6
Home care	355.7	8.3
Protection, Promotion, Prevention	169.4	3.9
Community Lab	154.7	3.6
Total	4,303.3	100

Table 5.5: Distribution of health care expenditure between Population Formula Funding programmes 2005 / 2006 (Alberta Health and Wellness, 2005).

Care Facilities, for those unable to care for themselves such as the elderly or mentally incapacitated, are funded under the **Continuing Care** and **Home Care** portions of the Population Formula. Continuing Care is assessed on cost based on a survey of 12,732 residents in 2003, with an inflation factor added each year. The data about clients is placed in seven classification categories (A = C$12,380.77 to G = C$67,883.26) based on increasing levels of resources needed (Alberta Health and Wellness, 2005). For Home Care, "self managed care" is valued at actual reported costs. "Other care" is categorised and then a weighted average across all health authorities using the previous years total is applied. Only direct provider costs are included, which means that indirect costs (such as non medical travel costs and administration) are excluded. Given that rural areas are likely to incur higher travel costs then this is likely to be a large amount of expenditure unaccounted for, as unlike England, funding is distributed on a per capita basis across the province without account for geography the potential benefit for rural area funding would be minimal.

Long Term Care (LTC hours) is a separate calculation based on contact hours between care provider and patient (this is equivalent to the Older Persons PSS adjustment within

English Local Government Funding). Long-term care is provided at centres like auxiliary hospitals and institutional homes. Like England, residents in care facilities are charged for their stay. However, whilst the UK operates an income asset based model, in Alberta patients are charged at a per diem rate, which is based on public pension incomes available, residents are not subject to a means test.

The **Protection Prevention and Promotion** allocation is made up of two programmes: Health Protection (including immunizations, environmental health, dental health etc.) and Community Health Services (including family planning, public health, nutrition, health education etc.). This is allocated on a per capita basis to Health Authorities; due to limited data this sector uses a modified version of the population formula. The Regional Health Authority Funding share is then the relative share of the Alberta population.

In addition to the Capitation formula described above there are the aforementioned Non Formula Funding Adjustments. These are **Province Wide Services** (C$509 million); **Mental Health** (C$255.9 million) and the **Minimum Guarantee Adjustments.** Each Regional Health Authority is guaranteed a minimum 4% rise on the previous years comparable funding. The money for this is redistributed on a proportional basis from the other six Regional Health Authorities via negative adjustments (Alberta Health and Wellness, 2005) using a similar system to the 'floors and ceilings' block of the English Local Government Relative Needs Formula (as discussed in Chapter Seven).

Import-Export Funding Adjustments: to cover the cost of treating patients where treatment takes place in a region of which they are not resident, this is based on the standard cost methods used in the setting of capitations, excluding Province Wide services. Over all nine regions the import-export sums to zero, individual regions get a net adjustment depending on whether they are a net exporter or importer of healthcare. The gains here are in urban centres. Both Calgary and Capital Regional Health Authorities receive positive funding as they are net importers; all other authorities have negative adjustments.

5.3.5: Issues to highlight from Canada

- The strength of local involvement in funding and providing health care in Canada may also lead to (generally accepted) geographical inequalities in access to health care.

- The public/private mix of provision illustrates that the further adoption of market forces in health care is not necessarily synonymous with a USA style healthcare system and that a greater role is possible for private companies without losing the ethos of equity based provision. On the other hand, the Canadian experience also illustrates the dangers associated with private finance. The private companies will only be interested in profitable services, leaving the health service to cover expensive options (such as remote and small treatment centres) without the offset of cost recovery within the potentially profitable areas.

- The fee-for-service payments system encourages doctors to treat patients perhaps more than is medically necessary. Whatever the incidence of this supply-led demand, irresponsible provision only exacerbates spiralling expenditure on health in Canada. In fact despite the introduction of waiting list targets, the percentage of the population waiting has not fallen. Likely reasons for this are well established. One such being that in a system with a strong gate-keeping function, GPs refer patients when they know treatment will follow shortly after.

- Decentralisation of most health care responsibilities to county level plays a key role in the Canadian health care system. The counties are marked by a strong sense of their own autonomy, which means that central initiatives are often resisted at the local level. The resulting tensions foster a consensus approach which has long been a positive feature of politics in Canada.

5.3.6: Australia

Australia operates a devolved healthcare system in a similar way to the UK. There is a central healthcare funding programme and the money from that is distributed downwards for the lower level governmental tiers to distribute as they wish. In the case of Australia, the Commonwealth (as the central/ federal government is known) funds about two thirds of healthcare. This money is raised through an income tax called the Medicare levy (similar to the UK national insurance contributions). The rest of the money in the system comes from patient fees and the private sector. The hospital sector is funded directly from the government; outside of this GPs are reimbursed by Medicare on a fee for service basis. Responsibility for expenditure control lies with individual States (Dixon, 2000). In contrast to the UK, the principal cost control by Australian States is the use of Diagnostic Related Groups (GPs are reimbursed for actual activity, but only on the basis of a set of standard fees and charges). This method of budget control has been criticised as it gives an incentive to minimize costs on individual episodes of care, but no incentive to restrain the number of episodes (indeed it may offer an incentive to maximise the number of episodes, perhaps in the form of readmissions) (Rice and Smith,1999). Given such problems several states, such as Queensland, have experimented with geographical capitation, but only New South Wales currently uses an explicit weighted capitation formula. As a result it is the formula for New South Wales that this section will focus on.

The New South Wales formula is under regular revision, and was last updated in 2005. It seeks to provide fairness in health funding through the distribution of monies to the 17 health area funding services (these are similar in role to UK PCTs). A global annual budget is determined from federal government. The funding for non-population dependant programmes are then removed (programmes such as direct costs of teaching and research, as well as ring-fenced programmes like special health promotion strategies) the remainder is divided between the nine programs shown in table 5.6. Area health services have been able to keep non-patient fee revenue above their budget since 1992 (NSW Health, 2005). Some of the columns total 0% because the income derived is higher than program expenditure and therefore no adjustment is needed.

RDF Component	% of Total Pool, Incorporating all Adjustments (Incl. Total Cost and Revenue)
Acute Inpatient Services	50.80%
Outpatients	12.00%
Emergency Department Services	12.90%
Rehabilitation and Extended Care	7.70%
Primary & Community Based	7.00%
Teaching and Research	4.20%
Population Health	3.60%
Oral Health Services	1.70%
Mental Health	0.00%
Aboriginal Health	0.00%
Total	100.00%

Table 5.6: New South Wales Resource Distribution Formula Components (Source: NSW Health, 2005, based on 2003-04 data).

The Resource Distribution Formula attempts to quantify characteristics of the population which reflect their health needs and impact on the utilisation of health services. It incorporates age and sex adjustments and a Health Need Index to reflect the impact of age, sex, mortality, socioeconomic and geographic factors on the use of acute (general and tertiary) health services. There is also an adjustment for private hospital care (the health service areas ability to raise revenue from private patient fees: this contributes around $200 million per annum). Table 5.7 below shows the distribution of funds to programs. Programmes with a strong rural component are highlighted in bold; the main rural programmes will be discussed further below.

	Acute	Outpatient Services	Emergency Departments	Rehabilitation and Extended Care	Primary and Community care	Teaching and Research	Population Health	Oral Health	Program of Appliances for Disabled People
Population Adjustments	Itinerant workers		Tourism and Itinerant Workers						
Age/Sex Weightings	Age/Sex Weighted	Age/Sex Weighted	Age/Sex Weighted	Age/Sex Weighted	Age/Sex Weighted		Unweighted Population	Children 0-14 and Adults	Age/Sex Weighted
Need Factors	**Health Need Index**	**Health Need Index**	**Health Need Index**	Blended Need Index	**Health Need Index**		**Health Need Index**	**Caries/ Edentulism Rates**	
		Additional Indigenous factor	Additional Indigenous factor		Additional Indigenous factor		Additional Indigenous factor	Health Card Holders	
		Additional Homeless Factor	Additional Homeless Factor		Additional Homeless Factor		Additional Homeless Factor		
Cost Factors	**Dispersion Factor**	HIV/AIDS		**Dispersion Factor**	**Dispersion Factor**				
	Statewide and Selected Speciality Services	Statewide and Selected Speciality Services		Statewide and Selected Speciality Services	Statewide and Selected Speciality Services		Statewide and Selected Speciality Services		
	Severity and Indirect Teaching and Research	**Isolated Patient Travel and Accommodation Assistance Scheme**		Residential Aged Care Eligible Patients	Interpreter and Ethnic Health Workers	High Cost Complex Casemix and T&R related		Indirect Teaching and Research	Risk Pool for High Cost Items
	Small Hospital Factor			Aged Care Assessment Program				Dental Hospitals	Oxygen Expenditure
	Equalisation of interstate flows								
	Public / Private Mix								
Private Sector Use	Substitutable Private Sector Activity			Substitutable Private Sector Activity					

Table 5.7: New South Wales Resource Distribution Formula 2005, bold type indicates programs with rural need components (Derived from NSW Health, 2005).

The **Health Need Index** (HNI) is the most significant rural factor in the New South Wales formula because it is used in all of the major health programmes. The index is based on statistical analysis of the variation in hospital admissions in 154 local government areas. The index varies from a score of 84% of average utilisation in the Northern Sydney Area to 149% of the state average in Far West Area (NSW Health, 2005, p98). The current model is formulated as:

2000 HNI = 95.31 + 0.3 *(SMR < 70)* – 0.3 *(EDOCC)* + 4.0 *(ARIA)* + 1.0 *(%ATSI)*

SMR<70 is the standardised mortality ratio for ages less than 70

EDOCC is the Australian Bureau of Statistics' index of education and occupation, (socio-economic variables).

ARIA is a measure of remoteness (discussed in more detail below)

%ATSI is the proportion of the population which is Aboriginal or Torres Strait Islander.

Figure 5.5: Australian Health Need Index

Rural Area Health Services have higher values in the 2000 HNI than in 1994 (the date of the previous formula update). The main reason for higher rural values is that in developing the 1994 HNI, a decision was taken to reduce the impact of rurality. It was assumed with the 1994 HNI that excess supply was contributing to the high demand seen in rural Area Health Services. Modelling for the 2000 HNI showed that excess supply of hospital beds did not explain the additional needs of rural populations. Age standardised rates of hospital admissions are 23-40% higher in remote rural areas than in large metropolitan areas (Rice and Smith, 1999). It has been suggested that there are more inappropriate admissions in rural areas than in metropolitan areas but research for the 2000 HNI suggested that is was not necessarily the case (NSW Health, 2005). Higher admissions in rural Area Health Services may be driven by the lack of GP and specialist services in rural Areas, and by the distances between the hospital and the home in rural areas that may result in people being admitted to hospital for observation rather than being cared for in the community.

HNI uses the **Accessibility/Remoteness Index of Australia** (ARIA); this index is based on road distance. Localities are scored on the basis of the road distance from centres of population greater than 5,000 persons to four categories of designated "service centres". The service categories are based on resident populations as follows:

A. 250,000 or more
B. 48,000 to 249,999
C. 18,000 to 47,999
D. 5,000 to 17,999

For each locality and category, a score is calculated as a ratio of the road distance to the mean road distance for each category, truncated at 3.0. The scores for each of the four categories of service centre are combined to give an ARIA index ranging from 0 in the inner metropolitan Area Health Services (Central Sydney scores a 0) to a possible 12 in the most remote Area Health Services (the highest score in NSW is for Far West, which has a score of 5.5) (NSW Health, 2005 p99).

The **Dispersion Factor** is also designed to capture the higher costs of providing services in rural and remote areas of NSW. These costs include long distance telephone calls, travel in connection with the provision of services (by motor vehicle and air), freighting goods, or transferring staff and compensating staff for working in remote locations. The NSW Health model calculates (for each cost item), a set of distance-weighted population units, which have been converted to a relative dispersion index for each Area Health Service. Two calculations are used to derive the relative dispersion index for each Area Health Service: one for the distance from the nearest major referral hospital (this is an adaptation of the 'distance from regional centres' calculation described in the ARIA calculation above) and another for the distance from the nearest capital city. The dispersion costs factor has been proportioned across the Acute Inpatient, Primary & Community Based Services and Rehabilitation & Extended Care components of the Formula according to the share of the total health expenditure of these programmes. In the latest allocation the benefit to rural areas is clear as Far West received $321,000 and New England received the highest adjustment $413,000, whereas the areas around Sydney received zero additional funding (NSW Health, 2005, p37).

The acute program contains a **Small Hospital Factor** which is based on an analysis of how per capita expenditures for certain categories of expense increase for more dispersed populations. The factor is designed to ensure that the additional costs of retaining facilities in rural communities and costs of running networks of small hospitals across wide geographic areas are met. This is the broad approach used for determining the extent to which rural Area Health Services operate facilities over and above that which would be expected in metropolitan Area health services. Small rural hospitals costs for 1998-1999 were modelled to estimate costs. An average of 2.0 hospitals per 100,000 residents was considered the desirable norm, in terms of peak efficiency and expenditure. Therefore, any Area Health Service maintaining more than this ratio is eligible for the Small Hospital Factor: this totals $500,000 per additional facility for infrastructure with an additional payment for treatment costs. To avoid double counting of factors already included in the Resource Distribution Formula, a proportion of the dispersion factor and residential aged care eligible patients factor are deducted. However, since it is unclear to what extent having small hospitals increase related costs, only 50% of the dispersion costs factor already included in the Resource Distribution Formula for acute and non acute care have been deducted from the small hospital factor. For 2004-05 all areas around Sydney received $0; Far West received $3,201,000 for its 12 additional facilities; and Macquarie (14 additional facilities) received the highest adjustment of $4,112,000 (NSW Health, 2005).

The **Blended Need Index** is used in the 'Rehabilitation and Extended Care' formula. This combines age adjusted rates of people living alone (weighted by 3), the ABS socio-economic status Index of Relative Disadvantage (weighted by 2); and a rurality variable (weighted by 1). The blended need index is an additional source of rural funding but the literature does not provide details as to how it is calculated. It is, however, less distributive than the Health Need Index. Finally in the **Oral Health** component there is a rurality weighting for dental services on the basis on the National Oral Health Survey. There is a 20% weighting per capita for persons in rural areas who are edentulous (without teeth).

5.3.7: Issues to highlight from Australia

Australia offers many lessons and potential adaptations for the current English healthcare funding model in relation to the recognition of the additional needs of rural areas.

- Australia uses a range of variables to quantify additional rural costs including: Road distance from populations of over 5,000; distance from major hospital; and distance from a major city (a service centre); additionally there is additional funding to enable hospitals in rural areas (which otherwise might not be economically viable) to maintain services. This provides an interesting contrast to the current centralisation policy of the English NHS.

- In the same way that higher council tax bills in some authorities in England can lead to higher public health spending, the strength of local involvement in funding and providing health care in Australia may also lead to (generally acceptable) geographical inequalities in access to health care. This localised autonomous funding potentially disadvantages populations with a high proportion of high cost users, such as a high number of elderly persons or geographically dispersed clients. As such this model would not be recommended for transferral to England.

- Australians have some (limited) individual control over how much of their own money is spent on health care though consumer choice and through the ballot box. Such control encourages the third party payer to serve patient interests, to a degree that may be contrasted with that in Britain where the Treasury takes the taxes and treats the money as its own.

- One factor which clearly distinguishes the Australian system from England is its basis on the regional and municipal levels of government. This could be a strength for England as it would allow areas to make changes to the way funding was allocated based on the specific needs to their residents. Remote and rural areas with their typically older population distribution have understandably different priorities to high density younger adult dominated PCTs.

- Governments should regulate health care. They need not both pay for and provide it. Australian health care demonstrates that Governments need not be the single payer. Governments should not impose a single provider – because consumers cannot escape bad service. There is substantial private ownership of hospitals in Australia as well as a large number of independent GPs and specialists who operate from their own clinics. Through unlimited consumer choice of physician, the system encourages doctors to serve their patients, and so, the quality of medical service supply is guaranteed by the market. Unfortunately, competition would be ineffective in rural areas where there would be little or no choice available. The danger here is that a captive market would force up prices.

- Australia aims with much, though not unqualified success, to make the market serve the needs of all users, whether they are self-supporting through work or in receipt of federal support. However, the element that is like other consumer goods is vulnerable to oversupply and over-use when provided at very low cost. By having more choice of benefits packages and providers, consumers assume even more personal responsibility.

5.4: Summary

This chapter has examined the components of the healthcare funding formulae used both in the rest of the UK, and in selected international case study countries. The chapter has compared the treatment these have for rural areas. Returning to the focus on English healthcare provision Chapters Six and Seven will discuss in detail two of the funding formulas in use in the UK: the NHS Weighted Capitation formula and the Local Government Funding Relative Needs Formula. Chapter Eight will then return to the lessons learned from this chapter and will develop suggested alterations to the Local Government Funding formula for Personal Social Services (the section of the funding formula in which Local Government level healthcare provision is funded) which could improve the identification and funding provision for rural areas.

Chapter 6: Review of Healthcare Funding in England: NHS

6.1: Introduction

In England the vast majority of health care provision is state funded and state provided. Equity, in the sense of equality of treatment for individuals with the same health needs irrespective of their geographical locations or incomes, has been, and still is, heavily stressed as an appropriate policy objective. However, health care delivery in England operates through devolved healthcare providers PCTs (Primary Care Trusts) which are responsible for provision in their own regions. While the mechanisms for funding allocations to PCTs are designed to allow for the corresponding regional needs, the choice of mechanism is not a simple or non-contentious topic.

This chapter will discuss in detail the main government healthcare provision funding mechanism in use in England; the NHS Weighted Capitation Formula. The chapter will explain the components of the formulae and analyse the impacts that the funding outcome has for rural healthcare provision. Arguably, rural communities are disadvantaged by the current system as the funding formula directs funds and services towards urban areas. This chapter debates how, and why, this is the case. It will then examine the operation of healthcare funding within England with a focus on the treatment of rural areas within the funding formulae.

Since the formation of the National Health Service in 1948, debate about the NHS has been dominated by the ideal that healthcare should be universal and equitable (Rivett, 1998). Although the notion of equity was implicit in the principles of the UK's National Health Service from its origin in 1948, actual annual allocations for its first 30 years were largely based on those of the previous year with (depending on the state of national finances) some increments for growth. Since then, however, there have been ambitious attempts to actually attain equity by using statistical or econometric formulae which relate financial allocations to measures of need. The methodology behind the currently employed formulae dates to the mid-1990s. There is a danger within this that

there is insufficient discussion as to whether the NHS in the current form is seen as the best way of achieving equitable healthcare.

The development of the current NHS funding formula has been a long political process. The move to a weighted capitation formula from funding based on historical expenditure was initiated in 1976 with the publication of the Resource Allocation Working Party's first report 'Sharing Resources for Health in England' (RAWP 1). Since this review, NHS funding formulae have been subject to continual development and improvement. It was substantially revised in the mid-1990s following analyses using 1991 Census data by the University of York's Centre for Health Economics. Subsequent work by the Universities of Kent and Plymouth (1996) led to revisions of the formulas for community health. A study of the costs of providing health services in rural areas (MHA and Operational Research in Health Ltd, 1997) resulted in the introduction of the Emergency Ambulance Cost Adjustment (EACA) in 1998; in addition the prescribing formula has recently been revised and implemented (Rice *et al.*, 1999).

In recent years, the resource allocation formula has been kept under almost permanent review, first by the Resource Allocation Group and then, since September 1997, by the Advisory Committee on Resource Allocation (ACRA). There has been a freeze on further changes to the English formula since November 1998, pending a wide-ranging review (under the auspices of ACRA) of the possibilities of reducing health inequalities. The amount of money distributed by the weighted capitation formula is regulated by three issues: the global sum of money to be distributed to the NHS; the factors considered in the allocation formula; and the weightings placed upon these factors. As the global allocation of money provided in England is set by the government budget and is a political rather than a formula-based decision, it is therefore beyond the scope of this PhD. The focus of this chapter will be on the effect that the distribution factors chosen and their associated weightings have on the funding allocation with reference to the needs of rural areas.

In order to cater for all the factors that govern the provision of a fair and equitable health service in a population of over 50 million people, the formula devised to allocate resources to PCTs in England is inevitably complex and involves a myriad of different factors. According to Rice and Smith (1999) the English NHS funding system is

amongst the most complex currently implemented. PCTs receive their financial allocation on the basis of a weighted capitation formula, which takes into account factors including the age and gender structure of the population, geographic and social factors, and morbidity and mortality rates. While the chapter provides an introductory overview of the distribution with reference to rural areas, a detailed explanation of the formulae used in the rest of the NHS funding provision calculations is provided by the DoH in the relevant year's Exposition book.

The allocation to each PCT is to enable them to commission similar levels of healthcare for populations with similar healthcare need (DoH, 2005a). Although a capitation amount may be notionally assigned to an individual, there is no expectation that the PCT should spend precisely that amount on that individual. The formula is designed, rather, to model an expected level of expenditure. The grant is not ring-fenced and in any given year a PCT is likely to cross-subsidise one area of expenditure with under-spends in other areas. Where opportunities for substitution do not exist the trusts will be forced into deficit. The allocation formula also takes account of a political policy of moving the PCT's actual financial position towards its target financial position i.e. PCTs not spending over and above their allocation. This is calculated on the basis of its weighted population. There are four components (as illustrated in figure 6.1) that are used in the funding allocations:

(a) Weighted Capitation Targets to be discussed in this chapter;
(b) Recurrent Baselines - represent the current allocation which PCTs receive. For each allocation year the recurrent baseline is the previous year's actual allocation, plus any adjustments made within the financial year;
(c) Distance From Target (DFT) - this is the difference between (a) and (b) above. If (a) is greater than (b), a PCT is said to be under-target. If (a) is smaller than (b), a PCT is said to be over-target;
(d) Allocations Policy – political decision made by Ministers; this determines the level of increase which all PCTs get to deliver on national and local priorities (such as specific programmes like the Stop Smoking campaign), as well as the level of extra resources given to under-target PCTs to move them closer to their weighted capitation targets. (DoH, 2005a).

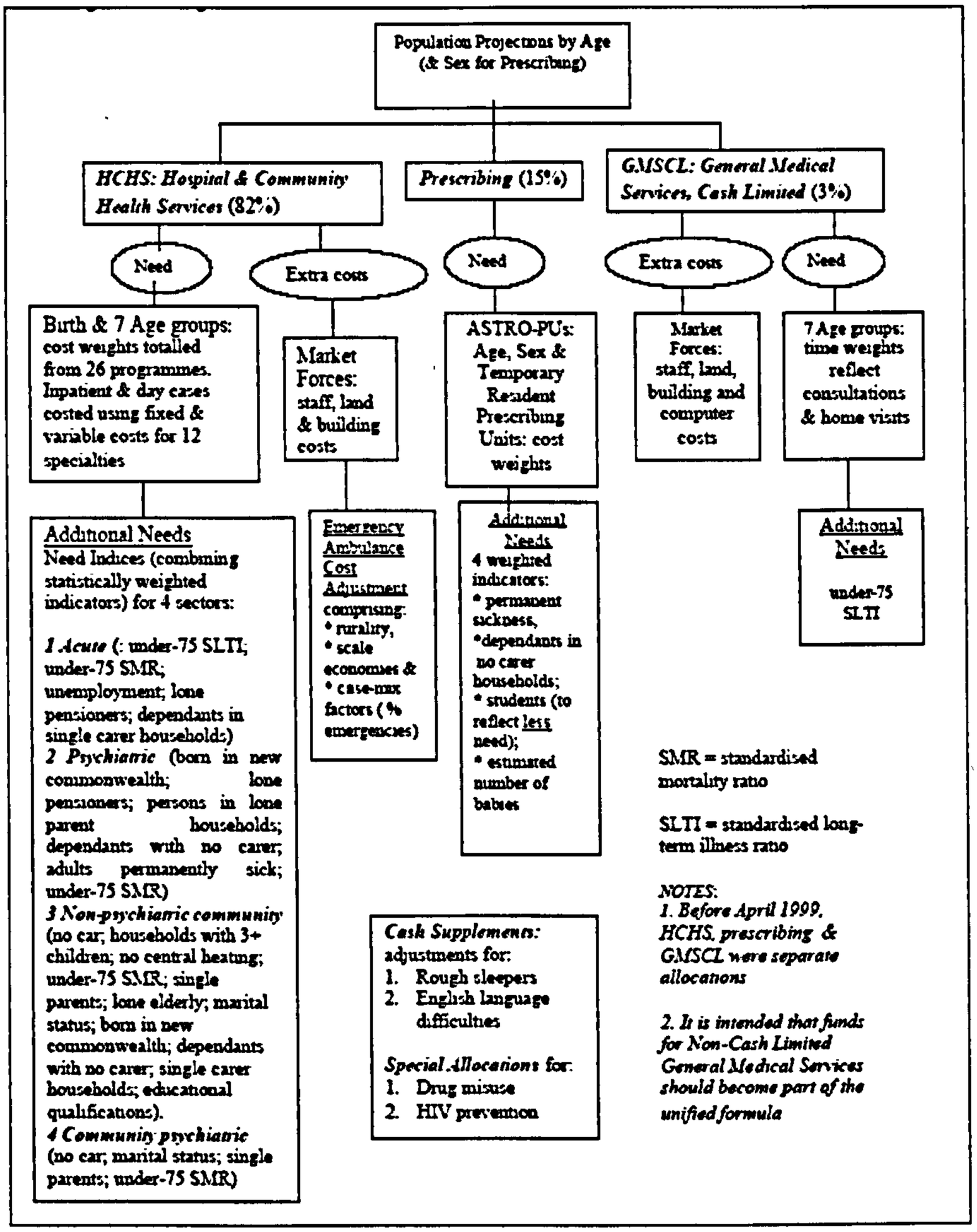

Figure 6.1: Summary of the English NHS weighted capitation formula (Gordon *et al.*, 2003).

In a comparative study of 58 English PCTs (29 in the greatest financial surplus and 29 in greatest financial deficit) Badrinath *et al.* (2006) found that the median population density of the deficit PCTs was almost 7 times lower than that of the surplus PCTs. It was found that surplus PCTs predominantly served deprived urban communities whereas the deficit PCTs tended to be in affluent rural areas. On average these areas were receiving £123 less per head of population than surplus PCTs (Badrinath *et al.*, 2006 p3). Given the reorganisation of many PCTs in 2003 it has not been possible to replicate this analysis as PCT sizes have increased making it implausible to assign rural

or urban labels. In addition the newly formed PCTs have inherited debts from the amalgamation of rural and urban areas and it is, therefore, not practical to try and correlate this further. Given the under-funding of rural areas and the over-funding of deprived urban areas identified by Badrinath *et al.*, it seems likely that the amalgamation into larger PCT areas will serve to reduce debt by evening out the funding between rural and urban practises and also by providing the economies of scale that form such a large proportion of additional rural costs.

6.2: Components of the Formula

The total population of England was estimated to be 50,476,231 in 2006, estimated in turn to rise to 50,695,989 in 2007 (Source DoH, Attribution Data Set adjusted ONS mid year population estimates). The 2006/07 recurrent allocation was £64 billion for England. In 2007/08 this rose to £70 billion, resulting in an average per capita spend of £1274.06 in 2006/07, rising to £1387.78 in 2007/08 (DoH, 2005b).

PCT	Crude population 2007-08	2007-08 recurrent allocation £000s	2007-08 allocation per head £	Distance from National Average per capita £
Bradford City Teaching	143,556	214,724	1495.76	107.98
Bradford South & West	145,508	210,881	1449.27	61.49
North Bradford	90,141	129,248	1433.84	46.06
Exeter	134,322	171,150	1274.17	-113.60
East Devon	116,592	163,974	1406.40	18.62
Mid Devon	106,470	130,402	1224.78	-163.00
North Devon	156,741	207,633	1324.69	-63.09
South Hams and West Devon	102,866	136,088	1322.97	-64.80
Teignbridge	109,265	147,656	1351.35	-36.43
England	50,695,989	70,354,697	1387.78	

Table 6.1: Funding per head for case study PCTs (Derived from: DoH, (2005b) PCT recurrent revenue allocations 2007-08, Table 3.1; and DoH, 2005a).

There is a general trend for urban areas to receive higher per capita funding than their rural counterparts as illustrated by the distance from the national average shown in Table 6.1. Exeter and East Devon PCTs are notable exceptions to this trend. Funding allocated on a strictly per capita basis (as shown in Table 6.14) would gain Devon's rural PCTs £35.7 million whilst Bradford PCTs, in common with the majority of urban PCTs, would lose funding, in this case just over £28 million.

The weighted capitation formula allocations form a significant proportion of public expenditure (just under £135 billion in the 2006/07 and 2007/08 allocations). The four components of the weighted capitation formula, and the proportion of expenditure for each component, are shown in table 6.2 below.

Component	Weighting (%)
Hospital and community health services (HCHS)	77.40
Prescribing (the drugs bill)	13.20
Primary medical services	8.80
HIV/AIDS	0.60
Total	100.00

Table 6.2: Relative Component Weights (Source: DoH, 2005a, p41)

To build on previous discussion, this chapter will use the case study areas of Devon and Bradford (in this case the relevant PCT areas, pre-2003 reorganisation) to illustrate the differing outcomes for PCTs in urban and rural areas. The NHS in Devon incurs additional expense over and above that allowed for by the formula, due to its rural nature and geographic position. Such costs include patient transport, the clinical requirements of satellite hospitals and the operation of small scale maintenance contracts. Rurality and sparsity also make delivery of response targets and staff availability difficult and more costly (these additional costs for rural areas were discussed in the case study analysis in Chapter 4).

For the sake of brevity and simplicity, the explanations and examples given below relate to the Hospital and Community Health Services (HCHS) component of the formula which, because it represents 77.4% of the overall spend, dominates the final allocation. For the purpose of explanation it is necessary to simplify the formula. For example, the

number of people sleeping rough or the additional resources required for non-English speaking clients of the NHS, whilst intrinsically important, has only a minor impact on the overall allocations. The objective of HCHS is to "secure equal opportunity of access to healthcare for people at equal risk" (DoH, 2005a). The funding is distributed on the basis of population size, adjusted according to two criteria: need (perceived geographic differences in the need for healthcare) and cost (unavoidable geographic differences in the cost of providing services). However, as well as factors such as age, need, etc. the HCHS component also makes a small adjustment for any variations in the cost of providing emergency ambulance call-outs (EACA). Although this adjustment does not alter the HCHS component by a significant amount it is discussed below because it is the only aspect of NHS funding to include an explicit measurement of rurality (in the form of a weighting).

6.2.1: Population

For each of the four components shown in table 6.2, the basic or crude population is established from GP practice registration records. This is known as the Attribution Data Set: patients are the responsibility of the PCT where the GP surgery they are registered with is based (rather than their home postal code). The rationale for this being that GPs act as a gate keeper to further healthcare treatment and as such will allocate patient's to the PCT in which the GP is located rather than the patients own home. The data from the Attribution Data Set is then scaled to ONS mid year population estimates: these are based on 2003 population estimates revised to the relevant year i.e. 2006 for 2006/07 funding (note that ONS does not produce PCT populations but the boundaries are currently coterminous with district or shire local authorities so these boundaries are used as a proxy). The scaling is in order to account for populations not registered with a GP such as homeless persons, prisoners, members of the armed forces, as well as those who have been removed from GP lists. There is a recommendation from ACRA to move to only using GP registered populations (ACRA, 2004); however, the problem of GP list inflation, with GP registered populations being on average 7% higher than the census based ONS mid year estimates (Ashworth *et al*, 2005), has prevented this from being implemented. Table 6.3 shows the construction of the 'crude population' (the ONS estimated PCT population prior to population weighting) within the case study areas, and for England as a whole.

Table 6.3: PCT populations for 2006/07 resource allocations (Source: DoH, 2005, Recurrent Revenue Allocations 2006/07 – table 4a.2)

PCT	0-4	5-14	15-44	45-64	65-74	75-84	85+	Total (Crude) Population
Bradford City Teaching	14,236	22,557	69,759	22,576	7,524	4,136	1,389	142,177
Bradford South and West	9,540	18,624	60,305	34,814	10,891	7,739	2,485	144,398
North Bradford	5,487	10,721	36,190	22,404	7,482	5,335	1,804	89,423
Exeter	6,545	13,425	60,581	30,829	10,756	7,969	3,246	133,352
East Devon	4,679	12,185	34,365	32,454	14,628	12,071	5,118	115,499
Mid Devon	5,425	12,688	35,079	30,931	11,139	7,429	2,762	105,454
North Devon	7,390	18,434	51,059	45,668	17,108	11,251	4,309	155,219
South Hams and West Devon	4,634	11,784	32,139	31,578	11,161	7,857	3,241	102,393
Teignbridge	4,938	12,653	36,143	30,598	11,440	8,968	3,661	108,402
England total	2,911,459	6,066,846	20,887,073	12,510,679	4,193,157	2,861,406	1,045,612	50,476,231

For all sections of the DoH Weighted Capitation formula, the PCT relevant population is adjusted by factors relating to additional need and service cost. These adjustments are made for age, need and market forces and are considered in more detail in the following sections.

6.2.2: Age Index

In the Hospital and Community Health Services component, an age weighting is assigned based on the demand on health services (the figures are based on expenditure per head from 23 different NHS programmes). The weightings (shown in Table 6.4) are the normalised average cost per head over the last three years (for 2006/07 and 2007/08 they are for the years 2001-2003 normalised to the 2002/3 cost per head). Not unexpectedly, due to increasing ill health, it is seen that cost burden is highest in the oldest age bands. The estimated cost of healthcare for those aged 85 or older, £2799.22, is almost four times greater than the average per capita spend of £706.7. This is a significant increase from the previous average per capita spend of £600.07 used for the 2002/3 and 2004/5 allocations. The weights are not costs per capita but relative costs in relation to the average spend per capita across all age bands. Clearly this weighting has particular relevance for Devon where the percentage of the population being of pensionable age is significantly higher than the average: 20% compared to 16% in the UK as a whole (see table 6.3). This is even higher in 'rural' PCTs within Devon with 27 % of the population of East Devon and 21 % of North Devon falling into these higher age brackets.

Age Bands	0-4	5-15	16-44	45-64	65-74	75-84	85+	Spend Per Capita
Expenditure per capita (£)	542.04	269.01	525.78	655.41	1,245.37	1,976.50	2,799.22	706.70
Proportion to average spend	0.77	0.38	0.74	0.93	1.76	2.80	3.96	1.00

Table 6.4: HCHS age/cost weights ('Expenditure per capita' data from DoH, 2005, Recurrent Revenue Allocations 2006/07 – table 4a.3)

Using these weightings the crude population figure in an area is increased or decreased by a factor described as an 'age index'. The population figure is scaled upwards where there is a greater proportion in the more costly age bands or vice versa (with the norm for England represented as a score of 1). The data in Table 6.5 illustrate the overall age factor for the case study areas based on the cost weightings in Table 6.4.

PCT	Age Index Score
Bradford City Teaching	0.8503
Bradford South and West	0.9708
North Bradford	1.0056
Exeter	1.0191
East Devon	1.2261
Mid Devon	1.0759
North Devon	1.0902
South Hams and West Devon	1.1137
Teignbridge	1.1238

Table 6.5: HCHS Age Index 2006/07 for Devon and Bradford (Source: DoH, 2005, NHS Revenue Resource Allocation 2006/07 Exposition Books - table 4a.4)

Due in part to the popularity of rural areas as retirement destinations, most rural PCTs have an age weighting factor above the average. The lowest age indices are to be found in inner-city areas such as Bradford City Teaching (0.85). Because of the higher average age of its population East Devon PCT receives 23% more funding for this element of the formula than a PCT with exactly the same crude population level, but with age groupings which were equal to those of the national average.

6.2.3: Need Index

The need index operates in a similar way to the age index and is designed to reflect the relative needs of healthcare 'over and above' that accounted for by age. The need index adjusts the allocation by varying the nominal population figure based on a variety of determinants of relative need (Table 6.6). Whereas rural areas could be said to benefit from the age index, the need index (as it is targeted towards visible and concentrated

deprivation) is considered to be focused towards an urban population. This can clearly be seen in the case of Bradford City Teaching which receives 43% higher funding than the norm whereas rural areas such as East Devon receiving 14% less than the norm (based on 2006/07 figures).

PCT	Crude population	Population adjusted for need	Need index (pop adj for need/ crude pop)
Bradford City Teaching	142,177	203,348	1.4303
Bradford South and West	144,398	171,275	1.1861
North Bradford	89,423	96,549	1.0797
Exeter	133,352	127,480	0.9560
East Devon	115,499	99,679	0.8630
Mid Devon	105,454	92,869	0.8807
North Devon	155,219	148,807	0.9587
South Hams and West Devon	102,393	88,357	0.8629
Teignbridge	108,402	101,042	0.9321
England total	50,476,231	50,476,231	1.0000

Table 6.6: Need Index 2006/07 for Devon and Bradford (Source: DoH, 2005, NHS Revenue Resource Allocation 2006/07 Exposition Books - table 4a.5)

The calculation of the need index is divided into two parts: Acute and Maternity; and Mental Health. Although the complete workings of the weighting process are complex and will not be described in full, listed below are the variables used to calculate the need index for Acute and Maternity (Figure 6.2 a); and Mental Health (Figure 6.2 b). The two indices are weighted together in proportion to their relative share of NHS 'need' expenditure (full weighting calculation is illustrated in figure 6.2c). Acute and Maternity accounts for 85.35% and Mental Health 14.65% in the 2006/07 and 2007/08 allocations.

Standard need variables
ID2000 education domain scores
Proportion of low birth weight babies born
Standardised mortality ratio (SMR) under 75 years
Proportion of aged 75+ living alone
Standardised birth ratio
ID2000 income domain scores
Additional morbidity variables
Nervous system morbidity index
Circulatory morbidity index
Musculoskeletal morbidity index

Figure 6.2a: Acute and Maternity Need Index Variables (Source: DoH, 2005, Weighted Capitation Formula, HCHS Mental Health Need Variables).

Standard need variables
Comparative mortality factor (CMF) under 65 years
Proportion of aged 60+ claiming income support (IS)
ID2000 housing domain scores
Additional morbidity variables
Psycho-social morbidity index

Figure 6.2b: Mental Health Index Variables (Source: DoH, 2005, Weighted Capitation Formula, HCHS Mental Health Need Variables).

Acute and Maternity Need index
-0.152 + 0.0008 *ID2000 education* + 0.013 *proportion low birth rate* + 0.070 *standardised mortality ratio under 75 years* + 0.026 *proportion elderly living alone* + 0.108 *standardised birth ratio* + 0.103 *ID2000 income* + 0.225 *nervous system morbidity* + 0.548 *circulatory morbidity* + 0.375 *musculoskeletal morbidity*
Metal Health Need index
0.385 + *comparative mortality under 65 years* + 0.338 *income support claimants age >60* + 0.034 *ID2000 housing* + 0.636 *psychosocial morbidity*

Figure 6.2c: Need Index Calculation (Source: DoH, 2005a, HCHS Mental Health Need Variables).

The standard variables are derived from small area statistical modelling of utilisation. The additional morbidity variables are derived from the Health Survey for England. These are the ones least likely to benefit rural areas as they are designed to capture the 'needs' of ethnic minority and low income groups who are perceived to have unmet healthcare needs. These groups are predominantly identified in urban areas, as in rural areas they tend to be dispersed within mixed communities. Of the variables used to calculate the need index, the morbidity indices are given the highest weighting in the calculation, and as a consequence, for each PCT a cursory glance at the full calculations reveals a clear correlation between the morbidity indices and the need indices. Self-evidently therefore, morbidity indices significantly influence the final need index value. This element of the formula is frequently criticised (for example Gordon *et al.* 2003) since, as they point out, most NHS services are targeted at people who are alive and not suffering life-threatening illnesses – such as arthritis, food poisoning, back pain etc. – and whilst these do not directly cause mortality they do detrimentally impact the patients' quality of life. A great many people utilise NHS services in any given year but only a very small percentage of those incidents result in death. To focus a need based adjustment on death is to undervalue and potentially under-supply to these non-fatal conditions. That said, treatment is often the most expensive in the last six months before a person dies (Monaghan, 08/09/2006, personal communication) so in terms of cost distribution this focus is possibly justified.

It is interesting to examine the 'need' index in greater detail given the background of deprivation in Devon. 'Need' in the region has been deemed sufficiently acute to attract considerable national and European funding (not available in many other regions of the UK) such as recent Objective 2 funding. The composition of figure 6.2a and 6.2b are crucial to arguments about the inherent fairness (or not) of the English formula, particularly as it applies to rural areas. It is crucial to the funding disadvantage of rural areas that the element of the Index of Multiple Deprivation (DETR, 2000) which most reflects the needs of rural areas, the Access domain, has been omitted from the calculation of the need index. The Access domain is based on geographical access to the following local services: Post Office, Doctors Surgery, Primary school (ages 5-8) and a large food shop (DETR, 2000). This domain might seem to represent the deprivation of access which can occur in rural areas. However, the first three are only measured against recipients of benefits rather than the general population. Given the low uptake of

benefits in rural areas (due to high levels of temporary or low paid employment rather than unemployment) this measure will be unlikely to provide a meaningful measure of rural deprivation in relation to services (Asthana *et al.*, 2003). The inclusion of the Access domain within the Indices of Deprivation demonstrates that there is recognition at Government level of the unique requirements of rural areas. However, at present, the DoH does not consider that this domain should be one of the variables in the 'need index' calculation, although it should be added that within the models which inform the need index, allowances are made for the effect that travel distances have on the utilisation of services.

The relationship between health 'need' and deprivation has been raised in the House of Commons. In a debate on Health Services in Cornwall, Matthew Taylor (MP for Truro and St Austell) argued:

'...Cornwall has not been defined in the rural health budget as such a priority social need area. That relates to the old-fashioned assessments of rural deprivation...If Cornwall received the same treatment as other (urban based) Objective 1 areas, it would get an extra £18 million.'

(Hansard, 12 March 2003)

6.2.4: Market Forces Factor

The next issue in the Weighted Capitation Formula to be considered is the market forces factor (MFF). It contains adjustments for staff, non-pay, and capital (land, buildings and equipment). MFF is felt to be necessary in England (in spite of national pay arrangements) because the geographical variations in the labour market result in some NHS Trusts facing higher "hidden" staff costs due to recruitment and retention difficulties, grade drift, the use of agency staff etc.' (DoH, 2005a, p23). Clearly the costs of providing health services are going to vary in different parts of the country, an obvious example being the effect of allowances to purchase land or buildings in high bid rent areas such as Greater London. The cost of staffing represents 67.6% (the rest comprising of non-pay and equipment 27.3%; land 0.6%; and buildings 4.6%) of Market Forces Factor costs, and as a result every London-based PCT has a MFF well above 1.00. Cornwall has the largest negative adjustments in respect of MFF of any PCTs in

England. In financial terms, the total NHS budget for Cornwall is reduced by approximately £43.6 million, or 9.6% of total allocation, as a result of the MFF (Bastin *et al.*, 2004). The case study areas details of the MFF index are given in Table 6.7:

PCT	MFF Index
Bradford City Teaching	0.9479
Bradford South and West	0.9489
North Bradford	0.9484
Exeter	0.9294
East Devon	0.9268
Mid Devon	0.9272
North Devon	0.9151
South Hams and West Devon	0.9280
Teignbridge	0.9019

Table 6.7: MFF Index (Source: NHS Revenue Resource Allocation 2006/07 Exposition Books)

There is a full discussion of additional expenses for rural areas in relation to higher staffing costs in Chapter 4. In summary, there are a number of contributory factors in rural and remote areas generating additional costs for NHS providers. These result primarily from the need to maintain more community hospitals, minor injuries units, and clinics within easy reach of relatively isolated populations. These are then coupled with other 'economies of scale factors' including lower bed occupancy rates, higher prescribing costs, insufficient account of excessive travel time, higher travel costs and transfer costs. There are also low staff turnover ratios resulting in many staff being at the top of the pay scale (and therefore more expensive) as well as the relatively inefficient duplication of roles due to multiple small sites. It is therefore unfortunate for the trusts which provide services to rural areas that the formula focuses on presumed average wages, based on private sector costs, rather than reflecting the actual market forces impact of rurality.

	A Crude population	B Adjusted staff index	C Population weighted for staff	D Normalised staff weighted population	E Staff cost weight
PCT		Calc from regression analysis of New Earning Survey 2001-03	A x B	C to England A (see notes on normalised method)	D x 67.56
Bradford City	142,177	0.9417	133,890	132,843	89,743
Bradford South&West	144,398	0.9426	136,104	135,040	91,227
North Bradford	89,423	0.9424	84,274	83,615	56,487
East Devon	115,499	0.9037	104,380	103,563	69,963
Exeter	133,352	0.9070	120,945	119,998	81,066
Mid Devon	105,454	0.9051	95,441	94,695	63,972
North Devon	155,219	0.8884	137,901	136,822	92,432
South Hams and W. Devon	102,393	0.9073	92,899	92,172	62,268
Teignbridge	108,402	0.8678	94,070	93,334	63,052
England total	50,476,231	302	50,874,253	50,476,231	34,099,687

Table 6.8: Calculation of the MFF Index (Data from NHS Revenue Resource Allocation 2006/07 Exposition Books, table 4a.7)

Detailed research into wage levels (such as Bastin *et al.*, 2001; Badrinath *et al.*, 2006) suggests that it is unrealistic within the formula to argue that rural PCTs automatically have lower wage costs, which presumption is made by the current formula. The NHS pay formula is weighted to reflect private sector salaries within local communities in order to proxy localised NHS trust pay burdens. As figure 6.3 shows, within the formula there is a smoothing factor intended to isolate the effects of geography on wages:

$$\text{Log (earnings)} = a + Sb_i\,(\text{age dummies}) + Sc_j\,(\text{industry dummies}) + Sd_k\,(\text{occupational dummies}) + e\,(\text{sex dummy}) + g_f\,(\text{area dummies})$$

Figure 6.3: Staff MMF regression equation (Source: DoH, 2005a, p24)

The outcome of the above calculation (Figure 6.3) forms the adjusted staff index for (column B) in Table 6.8. The problem with using private sector wages as a pay rate

proxy is that it ignores the fact that staff are on national scales which will not relate directly to private sector wages and thus results in a skewed allocation in favour of London and of other affluent areas.

Land (illustrated in table 6.9) represents 0.6 % of the MFF weights: It uses a land index calculated on a per hectare value for each PCT using data from the Valuation Office Agency valuation of the NHS estate in 2004. This is then adjusted for any PCTs who lease, rather than own their land: these receive the county average as a proxy. Any London trusts which have significant non-London activity have this land value weighted in proportion to that. Unfortunately, this only operates for London so other multi-site trusts do not get adjustments for additional sites, even if they have higher land values.

The **Buildings MFF** represents 4.6% of the MFF weights (as illustrated in table 6.9) and is based on the rolling average of tender prices for all public and private contracts. This is provided by the Building Cost Information Service and is available by London Borough and by county, rather than individual PCTs. Account is taken for multi-site trusts in the same ways as Staff MFF calculations.

The **Other** index (illustrated in table 6.9) currently represents 'non-pay and equipment' which corresponds to 27.3% of the HCHS MFF weights and is a constant 1.00 weighting per head basis which does not vary by PCT. These are based on the most recent national average expenditure shares and capital charge estimates. The purpose of expenditure weights is to reflect national average spends on each MFF element so that local decisions on the mix of inputs do not affect PCT targets (DoH, 2005a). This section of the index could potentially be used to benefit rural areas by making allowances for the 'economies of scale' possible in large hospitals which result in higher running costs for small rural service provision centres. Research for the DoH (MHA and Operational Research in Health,1997, p32) confirmed this when it found that, all other things being equal, a 1% increase in hospital size leads to a 0.26 % reduction in cost.

Table 6.9: The calculation of the Land; Buildings; Non-pay and Equipment MFF. (data from NHS Revenue Resource Allocation 2006/07 Exposition Books, table 4a.7)

	A	F	G	H	I	J	K	L	M	N	O	P	Q
		Land				Buildings				Other			
PCT	Crude population	Adjusted land index	Population weighted for land	Normalised land weighted population	Land weight	Adjusted building index	Population weighted for builings	Normalised building weighted population	Buildings weight	Other index	Other weight	Population weighted for MFF	MFF index
		Weighted VOA valuation of the NHS estate in 2004	Col A x col F	Col G to total col A	Col H x 0.58	Table 4a.6 col I	Col A x col J	Col K to total col A	Col L x 4.57		Col A x col N x 27.29	Col E+I +M+O	Col P / col A
Bradford City	142,177	0.8630	122,703	68,877	399	0.9015	128,173	127,496	5,827	1.0000	38,806	134,775	0.9479
Bradford South and West	144,398	0.9859	142,355	79,908	463	0.9016	130,185	129,498	5,919	1.0000	39,412	137,021	0.9489
North Bradford	89,423	0.8611	77,002	43,223	250	0.9017	80,631	80,205	3,666	1.0000	24,407	84,810	0.9484
East Devon	115,499	1.2315	142,233	79,839	463	0.9711	112,159	111,567	5,099	1.0000	31,524	107,049	0.9268
Exeter	133,352	1.3434	179,149	100,561	583	0.9709	129,472	128,788	5,887	1.0000	36,397	123,932	0.9294
Mid Devon	105,454	1.0688	112,706	63,265	367	0.9711	102,407	101,866	4,656	1.0000	28,782	97,777	0.9272
North Devon	155,219	0.7496	116,359	65,315	378	0.9723	150,913	150,116	6,861	1.0000	42,365	142,037	0.9151
Plymouth Teaching	248,320	0.6499	161,376	90,585	525	0.9711	241,148	239,874	10,964	1.0000	67,776	233,654	0.9409
South Hams and W Devon	102,393	0.8322	85,210	47,830	277	0.9722	99,544	99,018	4,526	1.0000	27,947	95,018	0.9280
Teignbridge	108,402	0.9625	104,340	58,569	339	0.9708	105,237	104,681	4,785	1.0000	29,587	97,763	0.9019
Torbay	140,394	1.0262	144,076	80,874	469	0.9707	136,279	135,559	6,196	1.0000	38,319	125,991	0.8974
England total	50,476,231	490	89,923,164	50,476,231	292,463	302	50,744,285	50,476,231	2,307,113	303	13,776,968	50,476,231	1.0000

6.2.5: Emergency Ambulance Cost Adjustment (EACA)

There have been a number of ways to define rurality when planning health policies. Some planners have focussed on the distance to be travelled to key health centres and others use remoteness based on the number of miles per 1000 population to allocate resources, as demonstrated in the "Fair Shares for All" report commissioned by the Scottish Executive (SEHD, 2000). For DoH funding, the sole indicator for rural areas is found the form of the EACA. As indicated earlier, a final small adjustment in the HCHS component is made in respect of the requirements in each PCT for emergency ambulance cover (EACA). It was introduced for the 1998/99 allocations. This is of interest not because there is a significant adjustment to the overall crude population, but because each PCT is rated with a 'rurality factor'. It was designed to reflect the unavoidable cost variations of delivering emergency ambulance services in different areas as considered in a report *Study of Costs of Providing Health Services in Rural Areas* (1997) (RARP 14) produced for the DoH by a team of researchers from MHA (a management consultancy) and Operational Research in Health Ltd. A model was developed which related costs per journey to the rural nature of the location. The result is a slight funding benefit to most rural PCTs, as illustrated by Table 6.10.

This report created a rurality index based on the ward based population weighted geometric mean density (using a clustering test to measure population distribution rather than overall density). The consultants deemed this measure to be more appropriate than simply using ward population density as that would not illustrate population clustering. The exact details of the methodology are not clear as it has not been possible to locate Volume 1 of this report for analysis[1] (and this contained the scoping study). The research produced a model that explained or predicted unit costs for emergency ambulance services. The rurality index was based on standard health authority (HA) boundaries and referred to 1991 Census resident populations. Unit cost data and journeys data were based on 1995/96 HA outturn data. Emergency journey proportions (as a percentage of all callouts) are based on data from the current year, as provided by all ambulance trusts (this is the KA34 ambulance return).

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[1] Volume 1 of RARP 14 is missing from the British Library collection and the Department of Health regard the report as obsolete and do not hold a copy.

Three drivers were combined to produce a single EACA index:

(a) A rurality index: a 1 per cent increase in rurality led to a 0.23 per cent increase in costs per journey

(b) A scale effect: a 1 per cent increase in the total number of journeys led to a 0.17 per cent decrease in unit costs

(c) A case-mix effect: a 1 per cent increase in emergencies as a proportion of total journeys added a premium of 0.96 per cent to unit costs.

Perhaps unsurprisingly, the report found that the provision of Emergency ambulance services in rural Health Authorities involved lower operational resource utilisation and higher operational costs both per unit of workload and per capita in comparison with urban Health Authorities (RARP 14 vol. 2). Their research concluded that the national modelling exercise showed evidence of a significant relationship between the rurality index and ambulance journey expenditure. They found that while the relationship was strong when a geometric mean method to measure rurality was used, for a simple density measure it became unreliable. This provided further evidence that a basic density measure of rurality is too simplistic for the complex needs of rural areas and therefore can be misleading and unreliable.

Health Authority	(A) Rurality index	(B) Total number of journeys	(C) Emergency journeys %	EACA need factor $A^{-0.23*}B^{0.17*}C^{0.96}$
Birmingham	37.67	113148	0.69	0.04
Herefordshire	2.50	9791	0.64	0.11

Table 6.10: Creating the EACA values for Birmingham and Herefordshire Health Authorities (DoH, 2005, p27)

The data related to ambulance callouts (table 6.10, column C) is for the ambulance trust as a whole (Ambulance Trusts are not coterminous with PCT boundaries), and has not been broken down into smaller geographical units. The barrier to analysis became even more complex and inaccurate to measure, from a rural area perspective, after the reorganisation of ambulance trusts in 2006. The reorganisation reduced the number of

ambulance trusts to 15.

The differential age of datasets also leads to an incomplete picture of rural needs. The emergency journey proportions are based on the previous years KA34 ambulance return (i.e. the year that the allocation was calculated: so 2005 for the 2006/07 allocation). The rurality index need factors (table 6.10, column A) have not been updated since its original conception. Additionally the resident population referred to is the 1991 census, unit and cost data are based on 1995/96 Health Authority outturn data so the data is not current. This use of old data, as well as old boundaries, creates a disadvantage for rural areas (see further detail in chapter five). Rural districts often have the fastest growing populations in the country. East Devon has seen a population rise of 14% since 1991 Census. The continuing use of data that is up to 15 years out of date results in 14% of the population not being considered and constitutes a large margin of error.

PCT	A Crude population	B EACA need factor	C Weighted population	D Normalised weighted population	E Weighted EACA	F Crude population	G Total weighted population	H EACA index
			Col A x col B	Col C to col A	Col D x 1.8%	Col A x 98.2%	Col E + col F	Col G/ col F
Bradford City Teaching	142,177	0.06	8,397	127,195	2,290	139,617	141,907	0.9981
Bradford South and West	144,398	0.06	8,529	129,183	2,325	141,799	144,124	0.9981
North Bradford	89,423	0.06	5,282	80,000	1,440	87,814	89,254	0.9981
Exeter	133,352	0.08	10,743	162,727	2,929	130,951	133,880	1.0040
East Devon	115,499	0.08	9,305	140,941	2,537	113,420	115,957	1.0040
Mid Devon	105,454	0.08	8,496	128,684	2,316	103,555	105,872	1.0040
North Devon	155,219	0.08	12,505	189,412	3,409	152,425	155,835	1.0040
South Hams and West Devon	102,393	0.06	6,147	93,102	1,676	100,550	102,226	0.9984
Teignbridge	108,402	0.06	6,507	98,565	1,774	106,450	108,225	0.9984
England total	50,476,231		3,332,460	50,476,231	908,572	49,567,659	50,476,231	

Table 6.11: Case Study Areas weighted population after the application of the emergency ambulance cost adjustment (EACA) (data from NHS Revenue Resource Allocation 2006/07 Exposition Books, table 4a.8)

As Table 6.11 shows, the current (2006/07) EACA score varies from 0.04 in areas such as North Birmingham and Heart of Birmingham PCTs (the lowest need) to 0.11 in Herefordshire (the highest need). There is a general trend towards rural PCTs scoring highly on this need factor, but rurality is not the only factor in the calculation and this results in some urban areas gaining as well. Largely urban areas such as North Peterborough and South Peterborough PCTs both score 0.08.

6.2.6: Normalisation Factor

The formula finally uses a Normalisation factor to scale the weighted populations back to the population of England (table 6.12). This ensures that relative shares remain the same whilst also ensuring that the relative weighting for formula components is relevant to the England population as a whole. The normalisation factor for the formula is the population of England divided by the sum of weighted PCT populations. This method is illustrated in figure 6.4 below:

PCT	A Crude population	B Weighted population	C Normalised weighted population A + B
East Devon	115,499	9,305	140,941
Exeter	133,352	10,743	162,727
Mid Devon	105,454	8,496	128,684
North Devon	155,219	12,505	189,412
South Hams and West Devon	102,393	6,147	93,102
Teignbridge	108,402	6,507	98,565
England total	50,476,231	3,332,460	50,476,231

Table 6.12: The Normalisation Adjustment for 2006/07 for the case study areas (data from NHS Revenue Resource Allocation 2006/07 Exposition Books)

The normalisation factor in this example would be 50,476,231 (England total population) divided by 3,332,460 (England total weighted population) = 15.1468. This figure would then be multiplied by the weighted population figure in column C to get the normalised weighted population,

For East Devon: 15.1468 (the normalisation factor) multiplied by 9,0305 (East Devon normalised population) = 140,941.

Figure 6.4: Example calculation of EACA Need Factor

6.3: Summary of Hospital and Community Health Services

The summary table (6.13) shows the population adjustment as a result of the Hospital and Community Health Services element of the DoH weighted capitation formula. This is created by multiplying all of the composite indices by the crude population to create a weighted population. This is then normalised back to the total population of England which is used to determine a final financial allocation. A similar process takes place for the other weighted capitation formula components; prescribing, primary medical services, HIV/AIDS.

PCT	Crude population	2006-07 Weighted population Crude Population * AgeIndex * NeedIndex * MFFIndex * EACA	Weighted population normalised Weighted pop to Crude Pop	Adjustment of Population (%)
Bradford City Teaching	142,177	163,595	165,071	+13.87
Bradford South and West	144,398	157,477	158,897	+9.12
North Bradford	89,423	91,903	92,732	+3.57
Exeter	133,352	121,215	122,308	-9.03
East Devon	115,499	113,728	114,754	-0.65
Mid Devon	105,454	93,010	93,849	-12.37
North Devon	155,219	149,040	150,384	-3.21
South Hams and West Devon	102,393	91,168	91,990	-11.31
Teignbridge	108,402	102,242	103,164	-5.08
England total	50,476,231	50,025,099	50,476,231	0.00

Table 6.13: Resulting 'population' change after the application of the HCHS formula (columns A-C data from NHS Revenue Resource Allocation 2006/07 Exposition Books)

The distance from the national average shown in Table 6.1 and the population 'growth' for urban areas in table 6.13 illustrate the general trend for urban areas to receive higher per capita funding than their rural counterparts. Exeter and East Devon PCTs are notable exceptions to this trend. Areas such as Bradford City Teaching PCT (population adjusted by +13.87%) are gaining at the expense of rural areas such as Mid Devon PCT (population adjusted by -12.37%). This outcome is the result of using factors which are prevalent in urban areas for the weights assessment, such as unemployment and high land values, rather than placing a high weighting on factors which would distribute money to rural areas, such as under-employment or distance to services. The impact of the weighted capitation is dramatic. Funding allocated on a strictly per capita basis (as shown in Table 6.14) would gain rural Devon £35.7 million with Exeter, being unusual for an urban PCT, gaining £15 million. Bradford PCTs, in common with the majority of urban PCTs, would lose funding, in this case just over £28 million.

PCT	Crude population 2007-08	2007-08 recurrent allocation £	Resulting Allocation without 'weightings' £	Change in Funding £
Bradford City Teaching	143,556	214,724,450	199,223,463	-15,500,987
Bradford South & West	145,508	210,881,034	201,933,217	-8,947,818
North Bradford	90,141	129,247,819	125,095,568	-4,152,251
East Devon	116,592	163,973,998	161,803,051	-2,170,947
Mid Devon	106,470	130,402,056	147,756,565	17,354,509
North Devon	156,741	207,632,915	217,521,443	9,888,528
South Hams&W.Devon	102,866	136,088,203	142,754,337	6,666,133
Teignbridge	109,265	147,655,648	151,635,930	3,980,281
Exeter	134,322	171,149,691	186,409,319	15,259,628
England	50,695,989	70,354,697,302	70,354,697,302	0

Table 6.14: The difference in funding allocation between straight per capita funding and the application of the NHS weighted capitation funding formula (Recurrent Allocation data from DoH, 2005b)

6.4: Discussion and Conclusions

6.4.1: Issues with the data used with the NHS funding allocation formula

Information on PCTs is drawn from a variety of sources. Due to this intersection of data sources, not all data sets refer to the same years. For example, in pursuit of the allocation per head of population in the case study areas, the data sets discussed here are: for the resource revenue limit 2006-2007; the ONS mid year populations were for 2003; but the indices of deprivation income and education domains predominantly contain data from 1998. The EACA sparsity domain scores predominantly contain data from the 1991 census.

In considering the data limitations encountered in most systems, it is important to note that, in the ideal situation, the individual user characteristics on which any need factors are based should incorporate only characteristics that are universally recorded (across all

trusts in receipt of funds). These characteristics should be consistent, verifiable, free from perverse incentives, not vulnerable to manipulation, consistent with confidentiality requirements, and plausible determinants of service needs. In practice, this severely limits the choice of variables, as limited information which conforms to such criteria is available on the joint characteristics of individuals. In England, available personal characteristics are confined to age and sex. The decennial Census of Population, the principal source of such aggregate information, presents only a limited number of 'standard' contingency tables, and quickly becomes out of date. Alternative sources of information, such as social security data, homelessness data, school pupil data, morbidity data and so on, may to varying extents be vulnerable to manipulation or inconsistently recorded across health care plans, and therefore may be judged unsuitable for capitation purposes.

The debate above illustrates the difficulties in tackling the detail of the allocation formula in public debate. The complexities of the formula can be confusing to all but the most highly qualified statistician, and informed discussion can be problematic given the detailed analysis required to establish the relative importance of the factors which make up the formula.

6.4.2: Hidden Need: Explaining lower service costs in rural areas

The main reason for lower costs being identified in rural departments (apart from the London cost premium) is the increased specialisation found in larger departments. This means that costs are only lower in rural areas due to a limited range or poorer level of services being available and the cost savings, in specialised staff and equipment, this represented. If rural A&E departments were to provide equitable treatment levels with those in high utilisation areas then the costs would be significantly higher per treatment due to diseconomies of scale. As mentioned previously in the chapter, all other things being equal, a 1% increase in hospital size would lead to a 0.26 % reduction in cost (MHA and Operational Research in Health, 1997 p32).

With cost data unavailable for this thesis study, as it is not in the public domain, it is not possible to check these findings and produce conclusions on the actual case by case

costings to rural or urban departments but further work on this subject would be likely to further the case for a rural premium.

6.4.3: Moving Forward

Chapter Seven moves on to discuss the funding of health and social care through local government, and then Chapter Eight will examine potential changes to healthcare funding formulae that could produce a more equitable outcome for rural areas. Further analysis will focus on the funding of rural areas through Local Government health and social care related services rather than the NHS due to the difficulty in acquiring the relevant NHS episode statistics and the reorganisation of ambulance trusts leading to the limited availability trip data. Despite this, the weighting attached to sparsity, and to other measures of rurality, used to proxy the needs of rural areas are applicable to NHS funding formulae as well.

Chapter 7: Local Government Funding

7.1: Local Government Funding Streams

7.1.1: Introduction

This chapter aims to contribute to the debate about rural funding by acting as a route map to understanding the English funding formula. The chapter analyses the way that funding is distributed to local government for the provision of services, with a focus on the outcomes for rural areas. It will then move on to discuss several problems and weaknesses inherent in the methods chosen to classify rural areas. Chapter Eight will begin to suggest solutions and/or improvements to the formulae.

Approximately 25% of public spending in England takes the form of spending by local authorities on services they provide. The Local Government Green Paper (2000) states that one of the aims of local government funding is that it should "be intelligible and transparent to all stakeholders. There cannot be true accountability unless people understand the system. At present, many do not" (DETR, 2000c, p5). The funding formulae were changed in 2003 in an attempt to improve the process, "However, the system remains confusing and ... needs to be much easier to understand" (Select Committee Conclusions, ODPM, 2003, Cm5753, p5). Much of the attention and controversy surrounding local government funding is centred on how the formulae work, because they play the key role in determining the share of the overall finance pot that each authority is allocated. As local government funding is changing with great rapidity, and this analysis merely offers a snapshot. It is nevertheless hoped that it gives a reasonably balanced view of current practice.

Understanding local government funding is made even more complex by the fact that each section of the capitation formula is calculated differently, partly because they deal with different services and partly because they are built up from research done over a long time period by different institutions with wide ranging remits. In detail, the formulae are complicated, but they all attempt to do the same thing: divide up the resources according to Local Authorities' relative needs and circumstances. To do that,

they look at key factors that determine Local Authorities' predicted expenditure for each service based on estimations of the needs of their residents.

Given the large amounts of money to be distributed to receiving authorities (with a wide variety of roles) the distribution of funding is both complex and politically sensitive. Within the range of potential solutions a 'fair and equitable' distribution methodology was sought. The use of formulae in government grant distribution is traceable back to the 19th Century (local government being developed in a recognisable form to today with the Local Government Act 1888 (51 and 52 Vict. c. 41)). However, until the availability of fast computers in the latter part of the twentieth century the scope for basing grant formulae on detailed statistical analyses was very limited. During the mid 1960s for the first time it became possible to carry out statistical analyses of vast amounts of data on spending of individual local authorities and the attributes of their areas and populations. Regression analyses of past expenditure attempted to find the mix of indicators and weights which could get as close as possible to "explaining" the variation in spending by local authorities. To the extent that local authorities respond to circumstances in broadly similar ways, the present formulae have the potential to reveal these responses and quantify them. However, there remains the risk that a formula will be unable to distinguish reliably between variations in spending because of differences in local preferences and efficiency, and 'legitimate' variations such as the characteristics of the area and its people.

Whilst certain services in the rural community are accepted implicitly as having to be provided subject to constraints (postal services, street lighting, pavements etc.) others are seen as being of such fundamental importance that these difficulties need to be compensated. Health, social care and emergency services clearly fall within this category. As emergency response services (in for form of ambulances) have been covered in the previous chapter, this chapter focuses on the examination of the health and social care services which are provided by local government, with explicit reference to those which are felt to be of key importance. The funding compensations made within the Local Government Finance Settlement (in relation to the additional costs of service provision to rural areas, especially those pertinent to healthcare) will be examined in detail within this chapter.

Service Receiving Authority	Education	Social Services	Highway Maintenance	EPCS	Capital Finance	Police	Fire
Shire County	Y	Y	Y	Y	Y	some	
Shire District				Y	Y		
Shire Unitary	Y	Y	Y	Y	Y		
Metropolitan District	Y	Y	Y	Y	Y		
Greater London Authority	Y	Y	Y	Y	Y	Y	Y
London Borough							
Police Authority						Y	Y
Fire Authority						Y	Y

Table 7.1: Summary of service responsibilities within local government

Local Authorities are responsible for delivering a wide range of services including education; social services; police; fire and rescue services; libraries; refuse collection; and highway maintenance. Table 7.1 illustrates the different types of authorities and their range of responsibilities. Funding for the services illustrated in table 7.1 comes through a mixture of Formula Grants and Special Grants. Only the Formula Grant will be discussed in detail within this chapter, as this is currently the proportion of the formula responsible for funding health and social care.

The funding for the local authority's areas of responsibility (summarised in table 7.1), to provide buildings, material and equipment, and to pay for staff and running costs, currently comes from a number of sources. Government finance supports local councils' revenue expenditure through formula grants and special grants (total government grants) with the remainder coming from councils' other revenues (such as business rates and parking revenue) and their reserves. This total sum of money available is known as total Aggregate External Finance. The weighted capitation formula assessed grants are the Formula Grant and the Police grant, but alongside these are Special Grants. The distribution of funding between these types of grant is summarised in table 7. Figure 7.1 illustrates the steps to distribute Aggregate External Finance (total local government funding) through all types of grant.

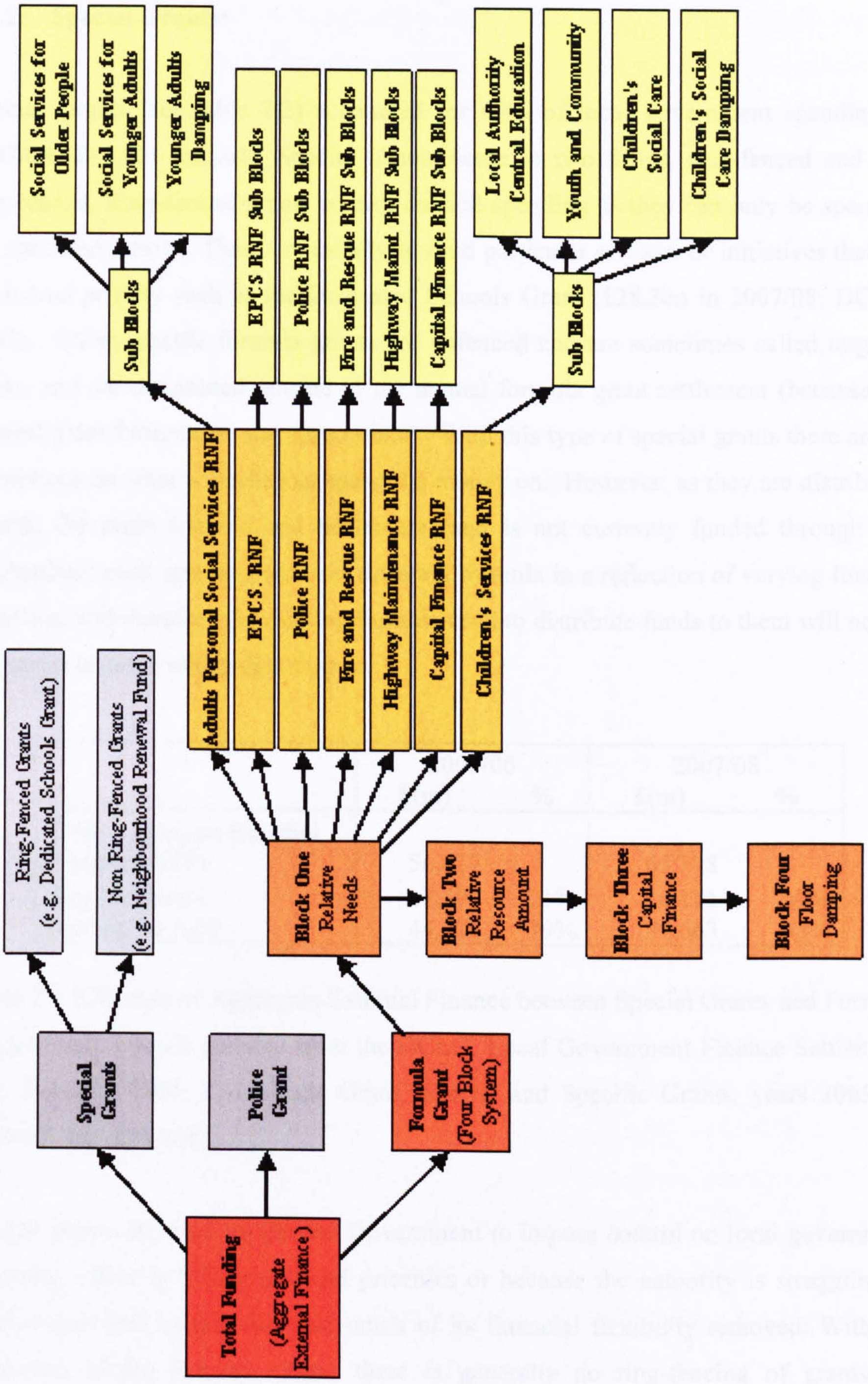

Figure 7.1: The distribution of Aggregate External Finance (total local government funding)

7.1.2: Special Grants:

Special Grants (see table 7.2) accounted for 67% of local government spending in 2007/08 (£44,131 million). Special Grants come in two forms, ring-fenced and non ring-fenced. Ring-fenced grants control council spending as they can only be spent on the specified service. These are usually to fund particular services or initiatives that are a national priority such as the Dedicated Schools Grant (£28.3bn in 2007/08: DCLG, 2007). Other specific formula grants are unfenced and are sometimes called targeted grants and are distributed outside of the annual formula grant settlement (because the general grant formula are not appropriate). With this type of special grants there are no restrictions on what councils can spend the money on. However, as they are distributed outside the main formula and healthcare (and is not currently funded through this mechanism) each special grant uses different formula in a reflection of varying funding priorities, and therefore the funding formula used to distribute funds to them will not be discussed in detail within this chapter.

	2005/06		2007/08	
	£(m)	%	£(m)	%
Total Aggregate External Finance (AEF)	56,417		65,798	
Special Grants	11,691	21%	44,131	67%
Remaining AEF	44,726	79%	21,663	33%

Table 7.2: Division of Aggregate External Finance between Special Grants and Formula Grant (funding totals collated from the DCLG, Local Government Finance Settlement, Key Statistics Table 1: Formula Grant, Special and Specific Grants, years 2005/06; 2006/07; and 2007/08)

Special grants are used by Central Government to impose control on local government spending, either to reflect political priorities or because the authority is struggling to meet targets and as such has had much of its financial flexibility removed. With the exception of the Schools Grant, there is generally no ring-fencing of grants for 'excellent' authorities under the Government's Comprehensive Performance Assessment system. The balance of power between Local Authorities and Central Government has changed dramatically with the ring fencing of the schools grant as table

7.2 illustrates. In the 2005/06 financial year only 21% of local government finance was ring fenced. By 2007/08 this had risen to 67% (the dedicated schools grant accounts for almost two thirds of the ring fenced spending), removing much of local governments' autonomy.

7.1.3: Formula Grant

The remaining Aggregate External Finance is distributed using the local government Finance funding model. This funding model distributes the Revenue Support Grant which is a pot of money provided directly by Central Government (£3,162,930,634 in 2007/08, DCLG, 2007) and the Distributable Amount (18,5000 million in 2007/08, DCLG, 2007). The Distributable Amount is the sum of National Non-Domestic Rates collected in England which are then redistributed to authorities. Prior to 2006 these were distributed on a per capita basis but they are now distributed using exactly the same method as the Revenue Support Grant.

The Local Government Finance funding model (see Figure 7.3) is currently a four block system (introduced in the 2005/2006 allocations) that will be explained in the remainder of this chapter. Despite the changes in presentation, the real impact of the settlement lies in the underlying statistical models of relative need. The distribution of the Revenue Support Grant (direct central government funding) and the Distributable Amount (redistributed business rates) to authorities is based on measuring the perceived needs of residents within authorities using weighted capitation formulae known as Relative Needs Factors (RNF) (previously known as Formula Spending Shares from 2003 to 2006). The outcome of these formulae are an attempt to reflect the needs of the relevant population by including information on the population, social structure and other characteristics of each authority. The Police Grant is distributed using the same formula as the Police Relative Needs Formula (discussed in section 7.3.5). However, is integrated into the Revenue Support Grant formula at a later stage than the Police RNF.

This chapter focuses particularly on potential for change within Children's Services RNF and Adults Social Services RNF as they are the only elements of the Relative Needs Formulae that are related to the delivery and provision of healthcare; they are also the only formulae that have a rural component. Change here could have a dramatic

impact on overall funding as these services represent a significant expenditure. Personal Social Services make up local government's second largest expenditure program. Social services need to work in partnership with other agencies in order to deliver effective services, not only in relation to other local government services such as education but also, in relation to the NHS. In contrast to NHS outreach, social services do not have a uniform model of delivery (Department for Transport, Local Government and the Regions, Modernising Local Government Finance: A Green Paper, 6.18) and as such there are great variations in the level of service.

Formula Grant = [Revenue Support Grant (RSG) *plus* National Non-Domestic Business Rates (NNDR) *plus* Police Grant]
For 2007/08 Formula Grant = 3,105 million + 18,500 million + 4,028 million = 25,633 million

Figure 7.2: Summary of the Formula Grant calculation (data extracted from DGLG 2007/08 local government finance report)

The pool of money used to fund the Formula Grant actually consists of three lump sums of money (as illustrated in Figure 7.2), the Revenue Support Grant (direct funding from Central Government); re-distributed business rates and the Police Grant (the police grant can effectively be viewed as a Special Grant similar to the education grant mentioned about: the funding is not ring fenced within the police authority but as it is only supplied to Police Authorities it is, by default, only spent on police authority functions). However, the system allocates the funds in total.

In order to achieve equity of service between areas the grant assesses two things: the circumstances each council faces (in terms of the socio-economic circumstances of residents and their own debts), and their ability to raise money from council tax. With the exception of the floor damping mechanism (see section 7.7 for an explanation of damping) these blocks equate to the Formula Spending Shares *minus* Council Tax of the old system. This is a four-stage process (illustrated in figure 7.3) which can be summarised as:

1) Relative Needs Block – measures need per head over and above the minimum level to redistribute funding to areas with greater need (explained in section 7.2 – 7.4).

2) Relative Resource Amount – moves to equalise authorities' potential income through measuring the authority's ability to raise income from council tax over and above the minimum level (this is a negative figure) (explained in section 7.5).

3) Central Allocation – the sum of minimum needs and minimum taxable capacity per head of population (explained in section 7.6).

4) Floor Damping Block – protects authorities from large decreases in funding by giving all authorities a minimum grant increase over the previous year (explained in section 7.7). This is funded by reducing the funding of authorities who have been granted more than the minimum funding increase for that year.

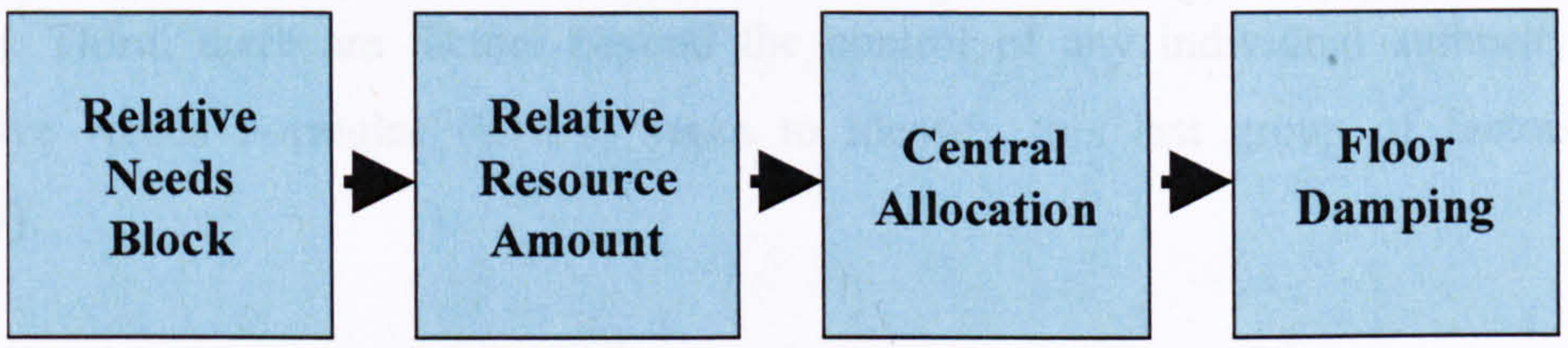

Figure 7.3: Local Government Finance Four Block System

7.1.4: Data Sources

Before moving on to discuss the four block system in more detail it is worth mentioning the large range of data sources used in the model. The sources are, for the most part publicly available. Population data was drawn from a number of sources including the 1991 and 2001 Censuses and primary healthcare data was drawn from the Department of Health morbidity and mortality records. For local government funding the information was drawn predominantly from processed data from the Office of the Deputy Prime Minister (pre 2007 data) and the Department for Communities and Local Government (data for 2007 onwards) in addition to the aforementioned Censuses. A full list of data used in the calculation of the local government funding allocation is provided in Annex Two. For the purpose of understanding the methods behind local

government funding in Chapter Seven and the new calculations explained in Chapter Eight some of this data was added to the model in its raw original published format, such as population age/health/housing tenure from the 1991 and 2001 Census, whereas other data, such as local authority income/debt or the ACORN of residents, was only available supplied in a processed format as the raw data was deemed too sensitive or too high commercial value for release outside government organisations.

7.2: Relative Needs Formulae[1]

In practice, local authority spending levels can vary for three reasons. First there are political priorities: an authority may take a conscious decision to aim for a high or a low council tax or to give one service a higher priority than another reflecting the judgement of politicians about what local people want from their council. Second there are management reasons: this includes the patterns of historical allocation such as under-investment in services, and efficiency, as some authorities are more efficient than others. Third, there are factors beyond the control of any individual authority. The Relative Needs Formulae (RNF's) seeks to identify this last group of factors (see below).

7.2.1: Overview

The purpose of the RNFs is to distribute the Formula Grant. The Formula Grant is compiled from the Revenue Support Grant (£3,104,681,634 will be paid to receiving authorities in 2007/08), the Distributable Amount (2007/2008, is £18,500 million) and the Police Grant (2007/08 £4,028 million). RNFs seek to correct local government Funding allocations for factors which are beyond the control of the authority, such as high numbers of special needs children or the sparsity of population resulting in unavoidable additional service costs. These formulae are similar in structure to the previous Formula Spending Shares. There are seven blocks, as illustrated in figure 7.4. They are formed primarily by looking for statistical correlations in spending and circumstances. Weightings are created on the assumption that, if there is a strong

[1] The RNF element is calculated for applicable authorities: non metropolitan district councils which have the function of county councils; county councils; London borough councils; common council of the city of London; metropolitan district councils; council of the Isles of Scilly.

correlation between the amount that different local authorities spend on a service and a given variable, then the variable has a real impact on the cost of providing the service. Each of these areas has a different formula in operation because there are a wide variety of factors influencing each service area, and one formula could not be devised for local authority services generally. For example, the factors which appear to explain variations in the cost of providing social services for adults are very different from those which appear to explain variations in the cost of maintaining roads. The sum of the RNF elements for individual authorities is constrained to equal the control total for the relevant service block or sub block – to avoid the results of the formula summing to a higher amount than has been allocated for spending on that block.

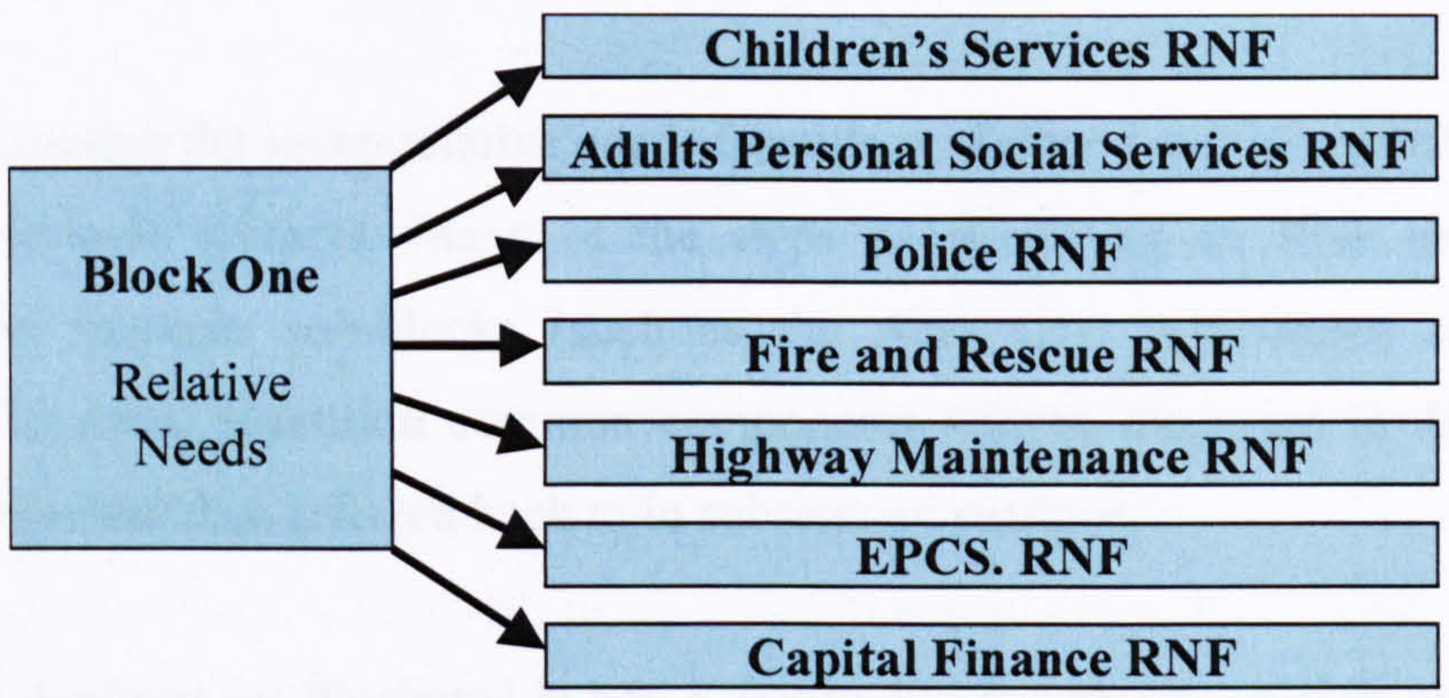

Figure 7.4: The seven relative need sections that make up the Relative Needs Block of local government funding.

Since the changes to the local government formula in 2003 it is no longer possible to form any immediate conclusions about relative funding for areas at this stage. Rather than making the formula intelligible and transparent as suggested in the Local Government Green Paper (2000) the formula is even more confusing and inaccessible to lay people than before (Housing, Planning, Local Government and the Regions Select Committee, 2002). Previously the result from this stage of the calculations would be expressed in monetary terms (these were the Formula Spending Shares of the previous formulae) and as such allowed easier comparison between areas. In the previous formula a section could produce a result, of for example £1000,000, and then this figure could be divided by the number of residents this service was targeted at to get a per capita funding figure. Because the RNF values produced are only intended to reflect the relative differences in the cost of providing services in different areas, they are now

expressed as a proportion, or ratio, of the total RNF. Since the steps of the formula produce only a weighting factor, comparison and comprehension is almost impossible – except by a select few skilled statisticians in government circles. This additional complexity within the formula has been regarded as detrimental by many in local government. According to John Mills (Director of Finance at Devon County Council) "To a large extent this is little more than a cumbersome presentational device designed to obscure the ultimate effect of changes in the measures used" (Devon CC, 2006, Committee Report FI/06/03). Block outcomes are not converted to cash sums until the final stages of the grant calculation.

7.2.2: Key Finance Blocks

Before discussing the seven relative needs formula in further detail it is worth reviewing common formula features. Many of the steps to calculating an RNF use common methods in multiple sub-blocks (such as the Area Cost Adjustment and Scaling Factors). To avoid repetition common components will be discussed in detail in this initial section and then referred back to in subsequent sections.

The **Basic Amount** (as illustrated in box a, figure 7.7) is common amount per capita for the relevant population (within most formulae it is per capita of population but for Children's Services it is per capita for persons under the age of 17). This amount is not need assessed and is therefore common to all authorities.

The Area Cost Adjustment (illustrated in box b of figure 7.7) is a scaling factor, applied to the Relative Needs Formulae in Local Government Finance, calculated to reflect differences in the cost of providing services – mostly pay – in different council areas. The value is greater than 1 for areas with additional costs and set to 1 for all other areas. The factor is given as a look-up table in Annex H of the Local Government Finance Report 2007/08 (DCLG, 2007). For the purpose of calculating children's social care, younger adults' personal social services, and older people's social services, it is based on the total resident population on the 30 June 2004, as estimated by the Registrar General; and employment information which is derived from the 2004 Annual Survey of Hours and Earnings. For the remaining services there are additional factors. For education the additional data is from the 2005 Revaluation of Local Authority Schools

undertaken by the Valuation Office. For the police; fire and rescue services; EPCS; and highway maintenance the Area Cost Adjustment includes the above basic factors plus: rateable values and hereditaments (any property which can be inherited) on 1 August 2005; estimates of office hereditaments and floor space in 2004; gross non-domestic rates and increases and reductions in rate yields, as supplied by authorities in 2005/06.

There are a number of weaknesses within the current system which have prompted calls for change. Major reviews of the ACA and calls for change are based in the most part on the Elliott Commission (1996), and the NERA Consulting report for ODPM (2005). These weaknesses and their potential solutions are examined within the discussion section below. The reviews concluded that, among other things, the Annual Survey of Hours and Earnings should be replaced with the Labour Force Survey. The Labour Force Survey is a survey of households living at private addresses in Great Britain, carried out by the Social Survey Division of the Office for National Statistics. Its purpose is to provide information about the UK labour market.

There are strong arguments in favour of using the Labour Force Survey. Firstly, by the nature of the sampling (Bird, 2004), the Annual Survey of Hours and Earnings (ASHE) excludes employees who logically ought to be included. The Labour Force Survey is a random sample of workers so is more likely to include these people. The ASHE omits people who do not file a tax return such as people who work for companies which are not registered for PAYE; people who earn below the PAYE threshold; or those who work cash in hand. In 2004 ONS took steps to address this by including supplementary surveys of the workers employed by companies registered for VAT but not PAYE. However, as the other two groups are still excluded, this is a powerful bias towards the sampling of well-off workers and against the sampling of poorly paid people.

Secondly, as taxpayers are not spread evenly across the country, this leads to a regional distortion (e.g. in London it is rare for a worker to be a non-taxpayer whereas outside the South East it is more common). This means that the proportion of omitted low-paid people in ASHE data differs a great deal in size from one part of the country to another. Thirdly, the lack of information on qualifications within ASHE makes it difficult, perhaps impossible, to do proper analysis of wage differentials. Educational levels vary significantly across areas of Great Britain, so the use of ASHE data will lead to biases in regional estimates of pay levels. To overcome this lack of information, the ONS uses

occupation dummies as control variables. These are, however, imperfect substitutes. It is unclear at what level occupation dummies should be set. Analysis by NERA (2005) shows these dummies have a substantial impact on the calculation. Fourthly, the ASHE data set comprises only one year of data (2004). It does not have information on qualifications, or race, and it is not clear what to do about the weightings in a regression framework (weightings are needed because the ASHE are not representative of employees as the LFS is).

Finally, the most important argument in favour of no longer using the ASHE is that the data has not been made public to researchers. The ONS has refused to provide researchers with access to the disaggregated data that would allow its calculations to be corroborated (NERA, 2005). The fact that a decision has been made to prevent researchers from checking the government's calculations reduces the credibility of the ACA calculations considerably.

The **Scaling Factor** (illustrated in box c of figure 7.7) is applied to the Relative Needs Formulae in the Local Government Finance Settlement. The sum of the Relative Needs Formulae elements for individual authorities are constrained (via the scaling factor as shown in Figure 7.5) to equal the Control Total (the control total is given in Annex E, DCLG, 2007) for the relevant service block or sub-block (Police; Fire and Rescue; and Highway Maintenance do not have sub-blocks so are calculated at the service block level, the rest are calculated at the sub-block level). In order to constrain the sub-block, or service block, the result for each authority is multiplied by a scaling factor. The scaling factor (is given in Annex F, DCLG, 2007) for each relevant RNF element is equivalent to the ratio of the Control Total for the relevant sub-block, or service block, to the SUM across all relevant authorities of the results of applying the formula to their indicator data (DCLG, 2007). Effectively this means that an authorities' score, after the application of the scaling factor, represents a proportion of the amount of the overall Formula Grant that Government wants to spend on that service area. If the score for one authority increases then the scores for all the other authorities would decrease accordingly so that the overall total would remain unchanged.

The SUM for all auth (for that sub block) * scaling factor (for that function) = control total.

Youth and Community 0.01006945080561 = SUM all auth * 1.00000202286601

Local Authority Central Education Functions 0.04286460694670 = SUM all auth * 0.99999957477842

Children's Social Care 0.07596181809857 = SUM all auth * 1.00000091330908

The overall total for Children's Services in Bradford = 0.12889587585088 = 0.01006945080561 + 0.04286460694670 + 0.07596181809857

Figure 7.5: Calculating the Scaling Factor for Children's Services in Bradford (data supplied from DCLG, 2007, annex E and F)

The purpose of the scaling factor is to ensure that funding is proportional to the needs of authorities affected by that RNF but does not effect authorities funding allocation for other RNF areas. As a result, increasing the funding for Bradford Youth and Community sub-block would be funded by a decrease in funding across all other authorities affected by this RNF sub-block. The scaling factor constrains this impact to just other authorities within this sub-block so that relative increases in Bradford's Youth and Community Funding would not impact the funding for other RNF blocks (such as Adults Personal Social Services).

Other factors which are common throughout some or all of the RNFs are population, density, sparsity, deprivation. Although these are common themes within weighting factors they are measured in a wide variety of ways and given different weightings within the sub-blocks, making an over-reaching description impractical. The first of the RNF service blocks to be discussed is that of Children's Services.

7.3: Relative Needs Formulae

The relative needs formulae (RNFs) are the sub components which make up the Relative Needs Block (Block One of the four block funding calculation, described in section 7.4). There are seven RNFs Children's Services; Adults Personal Social Services; Highway Maintenance; Fire and Rescue; Police; Environmental, Protective and Cultural Services and Capital Financing. The total weighting scores allocated to these RNFs for each authority are then summed together to form an authorities Relative Needs score in Block One.

7.3.1: Children's Services: Youth and Community

Funding here is to meet the needs of 13 – 19 year olds. The funding is used to pay for a variety of services including youth clubs, vocational training, mentoring, counselling, and mobile outreach units. The formula allocates a basic amount per person aged 13-19 with top-ups for deprivation, ethnicity and area costs. There is no sparsity (or other rural) top-up for this section. Social services provide vital support to a wide range of people, including children affected by poverty and deprivation, as well as those with physical and learning disabilities. There are four sub-blocks within the Children's Services service block (Figure 7.6): Youth and Community; Local Authority Central Education Functions; Children's Social Care and Children's Social Care Damping. The calculation of the RNF elements for each of these sub-blocks is described below.

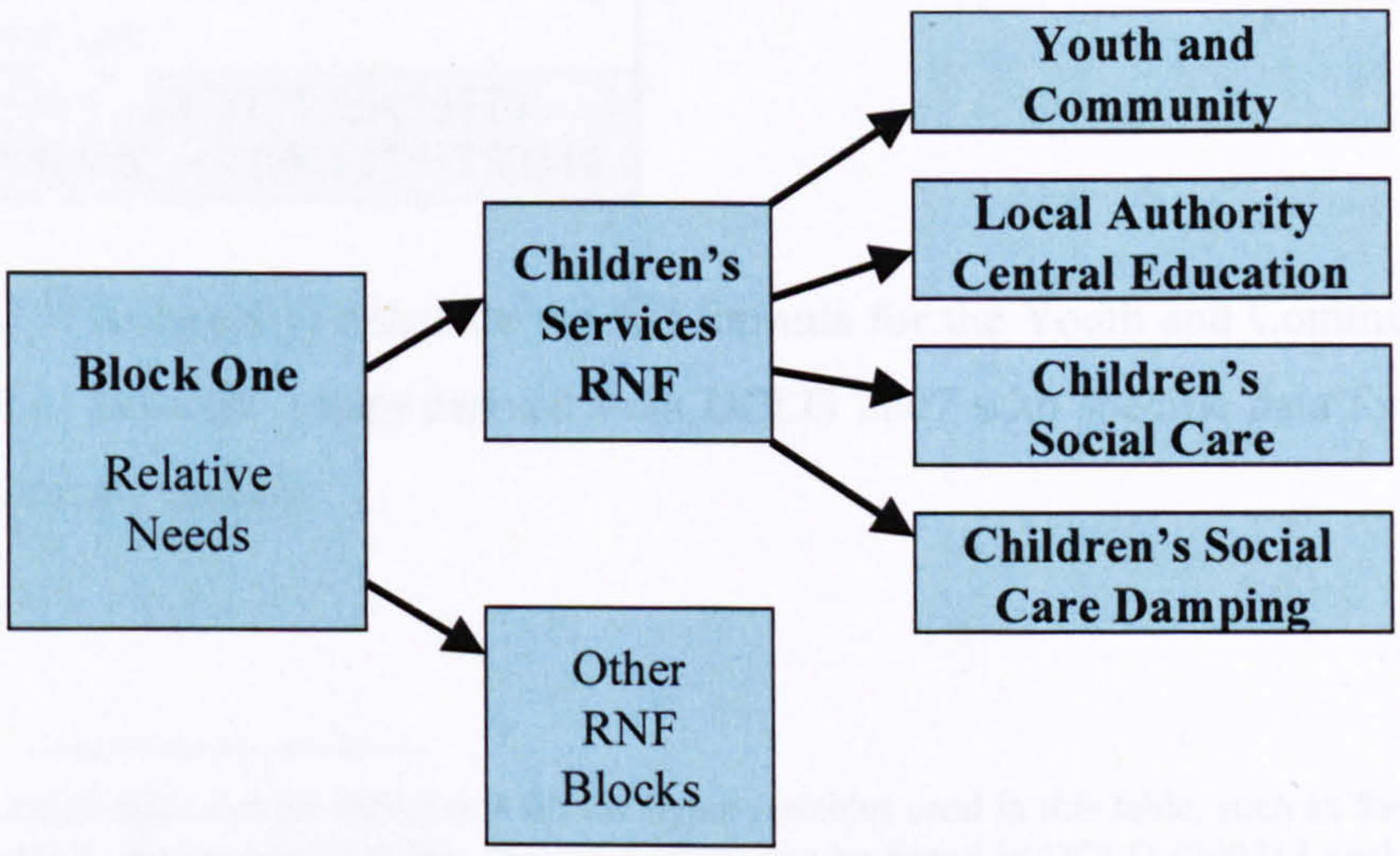

Figure 7.6: The structure of the Children's Services RNF

(a) PROJECTED POPULATION AGED 13 TO 19 IN 2007 (**48,139**) *multiplied* by the result of: YOUTH AND COMMUNITY BASIC AMOUNT (14.0735); *plus* YOUTH AND COMMUNITY DEPRIVATION TOP-UP (**9.22122741**); *plus*	YOUTH AND COMMUNITY DEPRIVATION TOP-UP = 53.2711 *multiplied* by CHILDREN OF INCOME SUPPORT/INCOME BASED JOBSEEKER'S ALLOWANCE CLAIMANTS ABOVE THRESHOLD (**0.1731**)
	= 53.2711 * **0.1731** = **9.22122741**
YOUTH AND COMMUNITY ETHNICITY TOP-UP (**5.0621298**)	YOUTH AND COMMUNITY ETHNICITY TOP-UP = 16.6244 *multiplied* by SECONDARY LOW ACHIEVING ETHNIC GROUPS ABOVE THRESHOLD (**0.3045**)
(a) = **48,139** * (14.0735 + **9.22122741** + **5.0621298**) = **1365070.74923219**	= 16.6244 * **0.3045** = **5.0621298**
(b) The result of (a) is multiplied by AREA COST ADJUSTMENT FOR EDUCATION (**1.0074**)	See section 7.2:ACA for an explanation of how the Area Cost Adjustment is calculated
(b) = **1365070.74923219** * **1.0074** = **1375172.27277651**	
(c) The result of (b) is then multiplied by the scaling factor for the Youth and Community Services sub block (1.00000202286601)	See section 7.2:Scaling Factor for an explanation of the scaling factor
(c) = **1375172.27277651** * 1.00000202286601 =1375175.05456576	
(d) The result of (c) is then divided by 10,000,000,000.	
(d) = **1375175.05456576** / 10,000,000,000 = 0.00013751750546	

Figure 7.7: The stages to calculate the full formula for the Youth and Community RNF for Bradford 2007/08[2] (steps derived from DCLG 2007 with specific data for Bradford generated by the model)

[2] For reasons of space not all definitions for the input variables used in this table, such as Resident Pupils and Deprivation, are explained in this chapter. Details can be found in DCLG (2007) Local Government Finance Report 2007/08, Annex D.

Figure 7.7 uses the data from Bradford to illustrate the steps involved in calculating this part of the Relative Needs Formulae (the components of this funding mechanism have been explained in the previous section).

The result of the Youth and Community sub-block is a weighting factor (illustrated in box d of figure 7.7). In Bradford (2007/08) it is 0.00013751750546. This weighting factor is then added to the weighting factors for the other sections of the Children's Services Relative Needs Formulae to give an overall weighting.

7.3.1: Children's Services: Local Authority Central Education Functions;

This section of the formula covers school related expenditure such as meals, facilities and special needs services provision. Until 2006 it covered all education services but the vast majority of this money is now directed to local government via the dedicated schools grant which is a ring fenced grant (discussed in more detail in section 7.1.2). This ring fencing has removed the flexibility from local government to be able to cross subsidise education from other areas or to use part of the funding allocated to central education functions to fund other services.

(a) PUPILS AGED 3 TO 18 (**85446**) *multiplied* by the result of: PUPILS BASIC AMOUNT (19.3170); plus PUPILS DEPRIVATION TOP-UP (**5.67522198**)	PUPILS DEPRIVATION TOP-UP = *32.7858 multiplied* by CHILDREN OF INCOME SUPPORT /INCOME BASED JOBSEEKER'S ALLOWANCE CLAIMANTS ABOVE THRESHOLD (**0.1731**)
(a) = **85446** * (19.317 + **5.67522198**) = 2135485.39930308	= 32.7858 * 0.1731 = 5.67522198

(b) RESIDENT PUPILS AGED 3 TO 18 (**94930**) *multiplied* by the result of: RESIDENT PUPILS BASIC AMOUNT (19.2022); *plus* RESIDENT PUPILS DEPRIVATION TOP-UP (**3.7456465086**); *plus*	RESIDENT PUPILS DEPRIVATION TOP-UP = 32.7858 *multiplied* by 0.6600 *multiplied* by CHILDREN OF INCOME SUPPORT/ INCOME BASED JOBSEEKER'S ALLOWANCE CLAIMANTS ABOVE THRESHOLD (**0.1731**)
	= 32.7858 * 0.6600 * **0.1731** = **1.71286752**
SPARSITY TOP-UP (**1.71286752**);	SPARSITY TOP-UP = WARD SPARSITY (**0.0672**) *multiplied by* 25.4891
	See section 7.2.2 for an explanation of the Sparsity Top-up
(b) = **94930** * (19.2022 + **3.7456465086** + **1.71286752) = 2341041.58256412**	= **0.0672** * 25.4891 = 1.71286752

(c) The result of (a) *plus* (b) is *multiplied* by AREA COST ADJUSTMENT FOR EDUCATION (**1.0074**);
(c) = **(2135485.39930308 + 2341041.58256412) * 1.0074 = 4509653.28153302**

(d) The result of (c) *plus* the Central Education Function FIXED COST AMOUNT (69335.8505);
(d) = 4509653.28153302 + 69335.8505 =4578989.13203302

(e) The result of (d) is then *multiplied* by the scaling factor for the Local Authority Central Education Functions sub block (0.99999957477842).	See section 7.2:scaling factor for an explanation of the scaling factor
(e) = **4578989.13203302** * 0.99999957477842 = 4578987.18494803	

(f) The result of (e) is then *divided* by 10,000,000,000
(f) = **4578987.18494803** /10,000,000,000 = **0.00045789871849**

Figure 7.8: The stages to calculate the full formula Local Authority Central Education Functions RNF sub-block for Bradford 2007/08 (steps derived from DCLG 2007 with specific data for Bradford generated by the model)

The Local Authority Central Education Functions RNF sub-block (illustrated in Figure 7.8) contains an allowance for Sparsity. The sparsity top-up method shown in figure 7.9 below. In common with most metropolitan areas Bradford receives a score of 0.00 for sparsity, and as such receives no additional funding from this top-up.

WARD SPARSITY = The sum of: (i) 3.5 *multiplied by* the resident population of those wards within the area of the authority at the 2001 Census with 0.5 or less residents per hectare, *divided* by the total resident population of the authority, calculated using information from the 2001 Census; *Plus* (ii) The resident population of those wards within the area of the authority at the 2001 Census with more than 0.5 but less than or equal to 4 residents per hectare, *divided* by the total resident population of the authority, calculated using information from the 2001 Census.
= 0.00 + 0.00

Figure 7.9: The Sparsity Top-Up in the Local Authority Central Education Functions RNF sub-block for Bradford 2007/08 (steps derived from DCLG 2007)

7.3.1: Children's Services: Children's Social Care

Funding here covers the provision of social care for children. The formula allocates a basic amount per person aged under 18 with variations for socio-economic conditions, variations in foster costs, ethnicity and area costs. There is no sparsity top-up for this section. Figure 7.10 uses the data from Devon to illustrate the steps involved in calculating this part of the Relative Needs Formulae. For Devon the outcome of the Children's Social Care RNF for Devon is 0.000654686333534. Table 7.3 shows the outcome of all Children's Services RNF's for case study areas.

(a) PROJECTED POPULATION AGED 0-17 IN 2007 (143891) multiplied by the result of:
CHILDREN'S SOCIAL CARE BASIC AMOUNT (17.94440); plus
CHILDREN'S SOCIAL CARE DEPRIVATION TOP-UP (27.227608130);

CHILDREN'S SOCIAL CARE DEPRIVATION TOP-UP = 217.5863 *multiplied* by CHILDREN WITHOUT GOOD HEALTH (0.0884); *plus* 123.2583 *multiplied* by INCOME SUPPORT/INCOME BASED JOBSEEKER'S ALLOWANCE CLAIMANTS AGED 18 TO 64 YEARS (0.0587); *plus* 153.7177 *multiplied* by CHILDREN OF INCOME SUPPORT/INCOME BASED JOBSEEKER'S ALLOWANCE CLAIMANTS (0.1265); *plus* 82.9345 *multiplied* by CHILDREN IN BLACK ETHNIC GROUPS (0.0011); minus 18.7788

(b) The result of (a) is *multiplied* by FOSTER COST ADJUSTMENT (1.05290);

(c) The result of (b) is *multiplied* by AREA COST ADJUSTMENT FOR CHILDREN AND YOUNGER ADULTS PSS (1.00);

See section 7.2:ACA for an explanation of how the Area Cost Adjustment is calculated

(d) The result of (c) is then *multiplied* by the scaling factor given in Annex F for the Children's Social Care sub block (1.000000091330908).

See section 7.2:scaling factor for an explanation of the scaling factor

(e) The result of (d) is then *divided* by 10,000,000,000.

Figure 7.10: The stages to calculate the full formula for the Children's Social Care RNF for Devon 2007/08 (steps derived from DCLG 2007 with specific data for Devon generated by the model)

7.3.1: Children's Services: Children's Social Care Damping.

Damping is used as a buffering measure so that changes in the formula can be gradually introduced without causing huge change in an authority's grant amount from one financial year to another. As the children's social care formula has been recently updated the changes are being phased in using a floor and ceiling damping scheme. In 2007/08 the children's social care RNF for every authority will be at least 2.7% higher than in 2006/07. The result of the formula update without the application of damping would be dramatic. Funding, for this section in the formula, would range from a loss of 41.8% to a gain of 17.7% (DCLG, 2007b, p10). With the introduction of damping these ranges are reduced as all authorities gain funding of at least 2.7%, to fund this increase the maximum increase drops to 7.2% (DCLG, 2007b, p10). To pay for this floor, all authorities whose children's social care RNF increases by more than 2.7% will have the increase scaled back almost 30% (the methodology is illustrated in figure 7.11 with a worked example from Bradford in figure 7.12). More precisely the RNF is scaled back by 0.2996190600, which represents the exact amount needed to bring all authorities up to their guaranteed increases, this figure will vary if other stages in the formula are changed (as they will be in Chapter 8). For Devon the outcome of the Children's Social Care Damping RNF for is -0.00002401267282 and for Bradford it is -0.00011429964263 (the calculation for which is illustrated in figure 7.12), Bradford therefore, losses a larger proportion of the authorities 'need' calculated funding than Devon. Table 7.3 shows the outcome of all Children's Services RNFs for case study areas.

$$(a) = \frac{(b)}{(c)}$$

If (a) is less than 1.027, (d) = 0,

Otherwise:

$$(d) = (a - 1.027) \times (e)$$

Where (b) = is the Children's Social Care RNF 2007/08 for that authority

Where (c) = the sum of: the Children's Social Care RNF 2006/07, after adjusting for transfers in funding and function *plus* the Children's Social Care RNF 2006/07 for that authority.

(e) = The ceiling increase for authorities in 2007/08 = 0.165008113

(f) = Children's Social Care after Damping for that authority

(g) = (f) – (b) = Younger Adults' PSS Damping RNF

Figure 7.11: The calculation of the Children's Social Care sub block after the application of "Damping" (information derived from DCLG 2007).

(b) = 0.000797392034512

(c) = 0.000760211865802 + (-0.000117071744149) = 0.000643140121653

$$(a) = 1.23984184420425 = \frac{(b)}{(c)} = \frac{0.000797392034512}{0.000643140121653}$$

(e) = 0.165008113

(a) is <1.027 therefore (d) = ((a) – 1.027) × (e) = 0.035120631079 58

The damped Children's Social Care after Damping RNF is therefore:

((d) + 1.027) × (c) = (0.035120631079 58 + 1.027) × 0.000643140121653

= 0.000683092391 88

The Children's Social Care after Damping for Bradford is therefore;

0.000683092391 88 – (b) = -0.000114299642 63

Figure 7.12: Children's Social Care Damping; worked example for Bradford. (steps derived from DCLG 2007 with specific data for Bradford generated by the model)

7.3.1: Children's Services: Summary

Youth and Community	0.00012991179976
Local Authority Central Education	0.00044390129917 5
Children's Social Care	0.00098594396693 3
Children's Social Care Damping	-0.00007509444613 3

Table 7.3 shows the outcome of all Children's Services RNF's for case study areas (Data generated by the model)

The new needs formulae for Children's Social Services results in gains for many rural areas including Devon County Council. However, this gain has been limited because the results of the new formulae have been significantly dampened by the Government, in order to restrict the movements in grant between Councils that would otherwise have resulted (Devon CC, 2006, Committee Report FI/06/03). The overall the sum of the sub-blocks within the Children's Services RNF results in a total weighting score of 0.12889587585088 in Bradford. Sparsity has had a very small impact on the formula; less than 1%.

7.3.2: Adults Personal Social Services: Overview

The second of the Relative Needs Formulae to be examined is that of Adults Personal Social Services. Social services provide vital support to a wide range of people, including disadvantaged adults, those with physical and learning disabilities and vulnerable older people. There are three sub blocks to the RNF: Social Services for Older People; Social Services for Younger Adults; and Younger Adults Damping (see figure 7.13). These sub blocks are calculated for all relevant authorities (i.e. not fire or police) and are used to fund health related services such as domiciliary care, day care, meals service and the provision of specialist equipment. The calculation of these sub blocks will be discussed in this section.

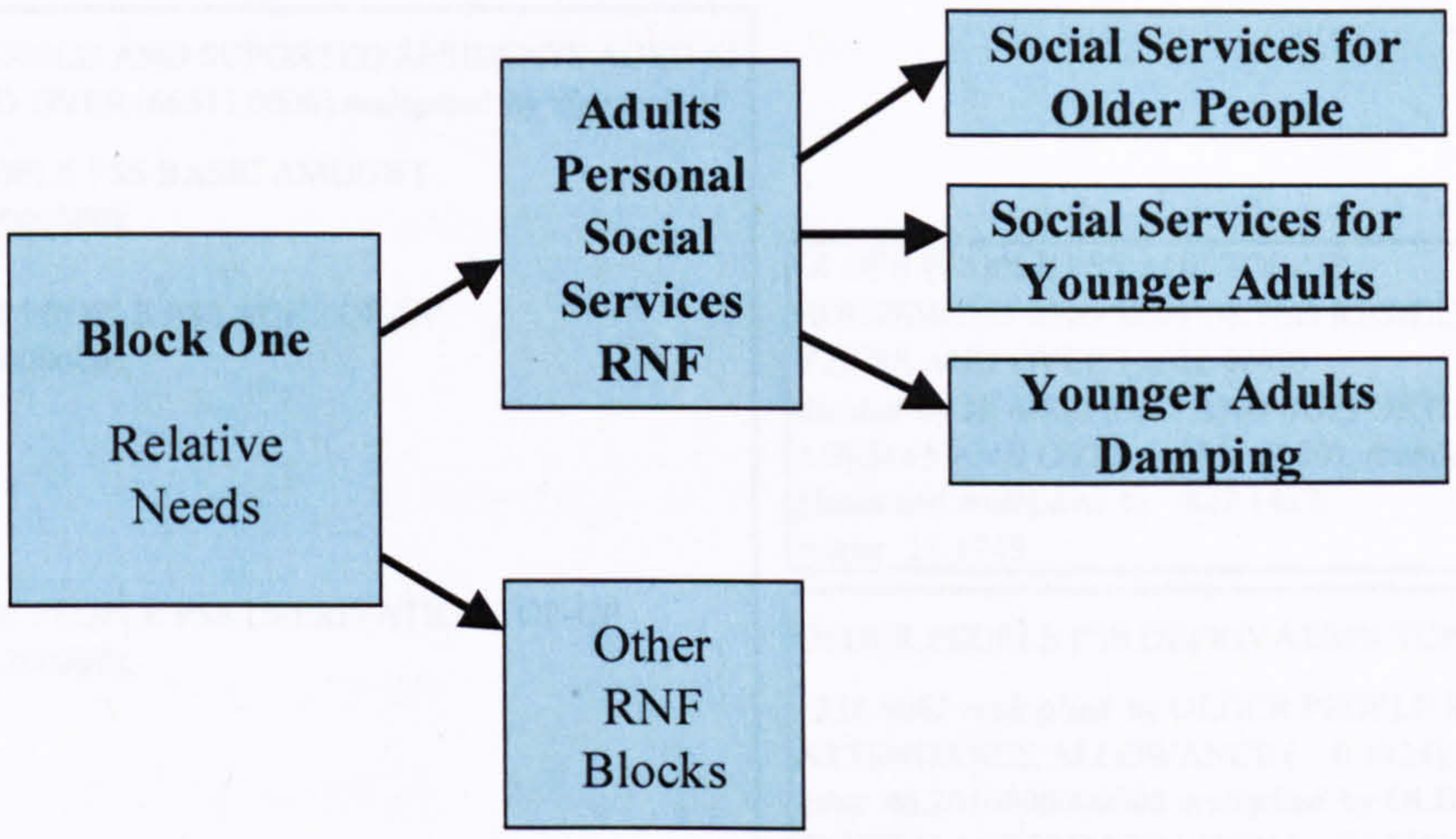

Figure 7.13: The structure of the Adults Personal Social Services RNF

7.3.2: Adults Personal Social Services RNF: Social Services for Older People

The Social Services for Older People sub block covers the provision of personal social services for all residents over the age of 64 over in care homes, day care, home care and home help services, and meals, together with the associated social work and administration costs. There is a differentiation between those resident in local authority care homes and those resident in households due to the higher costs to the relevant authority associated with the former (associated assessment, care management and administration costs). The sub block consists of a basic amount per capita for those aged over 65 and above with top-ups for socio-economic conditions, sparsity, and area costs.

(a) HOUSEHOLD AND SUPORTED RESIDENTS AGED 65 YEARS AND OVER (66511.0000) *multiplied* by the result of:

OLDER PEOPLE PSS BASIC AMOUNT (68.7732000000000);

plus OLDER PEOPLE PSS AGE TOP-UP (10.2565226000000);

plus OLDER PEOPLE PSS DEPRIVATION TOP-UP (57.6678351200000);

OLDER PEOPLE PSS AGE TOP-UP =
HOUSEHOLD AND SUPPORTED RESIDENTS AGED 90 YEARS AND OVER (2532.0000)
divided by HOUSEHOLD AND SUPPORTED RESIDENTS AGED 65 AND OVER (66714.0000), rounded to 4 decimal places and *multiplied* by 827.1427;
minus 21.1749

OLDER PEOPLE PSS DEPRIVATION TOP-UP =

238.9062 *multiplied* by OLDER PEOPLE RECEIVING ATTENDANCE ALLOWANCE (0.1424);
plus 46.2010000000000 *multiplied* by OLDER PEOPLE IN RENTED ACCOMMODATION (0.2529);
plus 61.8815000000000 multiplied by OLDER PEOPLE LIVING IN ONE PERSON HOUSEHOLDS (0.3474);

plus 185.809600000000 *multiplied* by OLDER PEOPLE RECEIVING PENSION CREDIT GUARANTEE/INCOME BASED JOBSEEKER'S ALLOWANCE (0.2819);

minus 61.914

(b) The result of (a) is *multiplied* by LOW INCOME ADJUSTMENT (1.02200000000000);

(c) The result of (b) is *multiplied* by SPARSITY ADJUSTMENT FOR PEOPLE AGED 65 AND OVER (1.00170000000000);

SPARSITY ADJUSTMENT FOR PEOPLE AGED 65 AND OVER = The sum of:

(i) 2 *multiplied* by the resident population aged 65 years and over of those Lower Super Output Areas within the area of the authority at the 2001 Census with 0.08 or fewer residents per hectare, *divided* by the total resident population aged 65 years and over of the authority;
and

(ii) The resident population aged 65 years and over of those Lower Super Output Areas within the area of the authority at the 2001 Census with more than 0.08 but less than or equal to 0.64 residents per hectare, *divided* by the total resident population aged 65 years and over of the authority;

The sum is then *divided* by 0.203006, *multiplied* by 0.0043, and then *added* to 0.9957.
The indicator is the result of the above calculation *divided* by 0.9957, calculated to 4 decimal places.

(d) The result of (c) is *multiplied* by AREA COST ADJUSTMENT FOR OLDER PEOPLE'S PSS (1.00790000000000);

(e) The result of (d) is then *multiplied* by the scaling factor for the Social Services for Older People sub block (0.99999982179034).

(f) The result of (e) is then *divided* by 10,000,000,000.

Figure 7.14: The stages to calculate the Social Services for Older People sub block using data for Bradford (data from the DCLG 2007 and top-up data extracted from DCLG 2006 table R365 (1))

Figure 7.14 above shows the method and data sources for calculating the Social Services for Older People (the weighting result is shown in (f) = 0.00093812383514) while Figure 7.15 below illustrates this for the case study area of Bradford. Part c (of figure 7.15 below) of the formula shows the impact of the Sparsity Adjustment.

(a) = 66511.0000 ×(68.7732000000000 + 10.2565226000000 + 57.6678351200000)

(b) = $(a)\times 1.02200000000000$

(c) = $(b)\times 1.00170000000000$

(d) = $(c)\times 1.00790000000000$

(e) = $(d)\times 0.99999982179034$

(f) = $\frac{(e)}{10{,}000{,}000} = 0.00093812383514$

Figure 7.15: The Social Services for Older People sub block worked example for Bradford (constants from the DCLG 2007 and totals data generated by the model).
Summary of Figure 7.14 (previous page)

For 2007/8 the basic amount is 68.7732. It is calculated as the constant from the regression used to determine the age and deprivation top-ups, plus the element of age and deprivation that is common to all authorities (i.e. the minimum values of the age and deprivation top-ups).

The weightings used within the Age and Deprivation top-ups are the result of a multi-level regression model developed by the Personal Social Services Research Unit in 2005 (DCLG, 2007). The research analysed the cost per head of older peoples' social services in around 784 wards in 17 local authorities in 2005. This identified the factors with a strong association with the cost of older peoples' social services clients between wards within each local authority. A benefit of using this technique was that the impact of differences in policies and levels of efficiency across local authorities was minimised.

The indicators chosen, as a result of and included in the formula, are the proportions of people aged 65 and over with the following characteristics:

- aged 90 years and over;

- In receipt of Income Support or Pension Credit;
- In receipt of Attendance Allowance;
- living in rented accommodation;
- living alone in a household.

The element of the age and deprivation top ups that is common to all authorities can be considered to be part of the basic amount. The minimum values of the age and deprivation top-ups are therefore subtracted and added to the constant in the regression.

The low income top-up (part b of the sub block) recognises the ability of different authorities to raise income from charges for services. It is an estimate of an authorities' relative ability to raise income based on characteristics of their elderly population. The updated low income adjustment is based on research by the Department of Health (DCLG, 2007). Having applied the regression coefficient to the proportion of older people living in rented accommodation and added the regression constant, the low income adjustment is derived in the following way. It is divided by the area cost adjustment and then subtracted from 1. The result of the above calculation is then divided by its minimum value so that the minimum value becomes 1.

For part (c) of this sub block the result of (b) is multiplied by the Sparsity Adjustment. The sparsity top-up reflects the greater costs of providing domiciliary services for older people in rural areas. The measure is based on the proportion of residents in each area living in sparse or super sparse lower super output areas calculated using 2001 Census data. At the time of the last formula review, expenditure on domiciliary services accounted for 43% of expenditure on social services for older people. The sparsity adjustment is set in proportion to 1% of this; it is therefore applied to 0.43% of the total RNF for older people's social services. The quantum was determined judgementally by the Department of Health as a result of research into domiciliary costs by the Personal Social Services Research Unit (SWG/05/06). The sparsity adjustment is derived as follows. Each council's sparsity indicator is first divided by the national average value for the population sparsity of those aged over 65 so that it has an average of one. It is then multiplied by the 0.43% weighting, and added to 0.9957 (1-0.0043). Finally, the result of the above calculation is divided by its minimum value so that the minimum value becomes 1.

There has been pressure from within local government both for the initial inclusion and subsequently for an increase in the Sparsity Top-Up. The County Council Network (Local Government Special Interest Group) called for 'the adoption of a 1.5% sparsity factor to be included in the SSA formulae (the predecessor formula to the RSG) for domiciliary care from 1999–2000' and later argued (SSA Sub Group report for 1999/2000) that similar adjustments might be appropriate for day care, meals service and equipment provision. The result of part (c) of this sub block is subject to the area cost adjustment for older peoples PSS. The methods used for the Area Cost Adjustment as explained in section 7.2.2.

7.3.2: Adults Personal Social Services RNF: Social Services for Younger Adults

The Social Services for Younger Adults sub block covers the provision of social services for people between the ages of 18 and 64. These services include mental health services and for those with disabilities, services such as Home Care, Day Centres and Community Meals. The sub block consists of a basic amount per capita aged 18- 64 and above with top-ups for deprivation and area costs. Unlike the Social Services for Older People sub block there is no additional funding in relation to area sparsity. The formula used to calculate the Younger Adults sub block is illustrated in figure 7.16. The Basic Amount is an amount per resident adult aged 18 to 64 that is the same for all authorities. For the 2007/08 allocation it is 8.4103. It is calculated as the adjusted constant from the deprivation top-up calculation, plus the element of deprivation that is common to all authorities (i.e. the value of the deprivation top-up for the least deprived authority).

The deprivation top-up recognises that adults aged 18-64 in certain circumstances are more likely to be in need of social services. These deprivation factors are the result of research for ODPM by Tribal SECTA Consulting in 2005. The research analysed the number of younger adult social services clients in around 800 wards in 18 local authorities in 2005. This research identified the factors with a strong association with the distribution of younger adult social services clients between wards within each local authority. By measuring distribution within authorities the intention was that the impact of differences in policies and levels of efficiency across local authorities was minimised.

The top-up is calculated using a weighted regression including the following factors:

- The proportion of people in receipt of Disability Living Allowance aged 18-64;
- The proportion of people who have never worked or are long term unemployed
- The proportion of people in routine occupations
- The proportion of households with no family3 (all households that do not contain either a lone parent family, a married couple, or cohabiting couple)

The element of deprivation that is common to all authorities can be considered to be part of the basic amount. The value of the deprivation top-up for the least deprived authority is therefore subtracted and added to the amended regression constant. As all authorities have this lowest level of deprivation in common, this is only presentational and does not affect the distribution in any way.

The source and effects of the Area Cost Adjustment and of the Scaling Factor have already been discussed in the Children's Social Care section (section 7.31)

$$(a) = 302065 \times (8.41030000000000 + DEP)$$

$$\begin{aligned} \text{DEP} = 17.8068621200000 = {} & (251.046700000000 \times 0.0514000000000) \\ & + (67.9234000000000 \times 0.0868000000000) + (22.9762000000000 \times 0.2651000000000) \\ & + (19.2000000000000 \times 0.3106000000000) - 13.0472 \end{aligned}$$

$$(b) = (a) \times 1.00690000000000$$

$$(c) = (b) \times 0.99999876955482$$

$$(\text{d}) = \frac{(\text{c})}{1{,}000{,}000} = 0.00079739203451$$

Figure 7.16: Social Services for Younger Adults sub block worked example for Bradford (data from DCLG 2007, DCLG 2007/08 table R365 (1) specific data for Bradford generated by the model)

[3]. This is derived from Table UV68 "Household type" Census 2001. The sum of cells 0008, 0009 and 0010. (One person household; Multi person household all student; Multi persons household all other) 2001 Census, National Report for England and Wales.

7.3.2: Adults Personal Social Services RNF: Younger Adults Damping

Using the same method as the Children's Social Care Damping (section 7.31), the new Younger Adult's formula is being phased in using a floor and scaling factor damping scheme. To recap, damping is used as a buffering measure so that changes in the formula can be gradually introduced without causing huge changing in an Authorities grant amount from one financial year to another. The Younger Adults PSS RNF for every authority will be at least 2.7% higher than in 2006/7, on a like for like basis. The result of the formula update without the application of damping would again be dramatic, funding, for this section in the formula would range from a loss of 41.2% to a gain of 58.0% (DCLG, 2007b, p10). With the introduction of damping these ranges are reduced, as to funding this increase the maximum increase drops to 11.8% (DCLG, 2007b, p10). To pay for this floor, all authorities whose younger adults social care RNF increases by more than 2.7% will have the increase scaled back by 0.1650081130 (as illustrated in figure 7.17 and 7.18).

$$(a) = \frac{(b)}{(c)}$$

If (a) is less than 1.027, (d) = 0,

Otherwise:

$$(d) = (a - 1.027) \times (e)$$

Where (b) = is the Social Services for Younger Adults' RNF 2007/08 for that authority

Where (c) = the sum of: the Social Services for Younger Adults' RNF 2006/07, after adjusting for transfers in funding and function *plus* the Younger Adults' Damping RNF 2006/07 for that authority.

(e) = The ceiling increase for authorities in 2007/08 = 0.165008113

(f) = Younger Adults' Social Services after Damping for that authority

(g) = (f) – (b) = Younger Adults' PSS Damping RNF

Figure 7.17: The calculation of the Younger Adults' Damping sub block after the application of "Damping" (constants from DCLG 2007).

(b) = 0.000797392034512

(c) = 0.000760211865802 + (-0.000117071744149) = 0.000643140121653

$$(a) = 1.23984184420425 = \frac{(b)}{(c)} = \frac{0.000797392034512}{0.000643140121653}$$

(e) = 0.165008113

(a) is <1.027 therefore (d) = ((a) – 1.027) × (e) = 0.0351206310795 8

The damped Younger Adults Social Services RNF is therefore:
((d) + 1.027) × (c) = (0.035120631079 58 + 1.027) × 0.000643140121653
= 0.000683092391 88
The Younger Adults Damping for Bradford is therefore;
0.000683092391 88 – (b) = -0.000114299642 63

Figure 7.18: Social Services for Younger Adults Damping; worked example for Bradford (constants from DCLG 2007 variables for Bradford generated by the model).

The new needs formulae for Younger Adults Social Services would result in a loss in funding for many rural areas including Devon County Council. However, this has been limited because of the new formulae have been significantly damped by the Government in order to restrict the movements in grant between Councils that would otherwise have resulted. (Devon CC, 2006, Committee Report FI/06/03)

This chapter is only focusing in detail on the funding for local government healthcare related services covered under the Children's Services RNF and the Adults Personal Services RNF. However, as the sum total of the Revenue Support Grant is a pre determined finite amount and is distributed in relation to the needs of all the local government funding areas, it is worth providing an outline of the funding delivery mechanism utilised for these other areas.

7.3.3: Highway Maintenance

The main determinants of the RNF for the Highway Maintenance block are the lengths of road of each different type for which each highway authority is responsible and the estimated unit costs per kilometre of these roads. This takes account of traffic flows, population, visitors and commuters and the likely severity of winter weather conditions. Additionally, there is also an area cost adjustment.

There are no rurality allowances within the formula. Rural areas are likely to receive proportionally less funding from this RNF as lower category roads such as B and C roads attract less funding than A roads or motorways. However, rural roads will also generally have a lower traffic flow. Clearly these characteristics should also result in lower maintenance costs for local government but surveys of rural roads generally suggest a lower quality of maintenance (as rural roads have substantially high fatality rates than urban roads, as discussed in Chapter Four). It can be concluded that this funding reflects traditional spending patterns rather than the actual funding investment necessary to reduce fatalities (SPARSE, 2005).

7.3.3: Fire and Rescue

Fire and Rescue funding covers services provided for the community such as emergency response and community safety. The main determinant of the RNF for the Fire and Rescue service block is projected population with top-ups for the length of coastline, relative deprivation, community safety, and 'high risk sites' in terms of fire cover (DCLG, 2007). In addition to this there is an adjustment for area costs (see section 7.2.2 for explanation of area costs). There is no sparsity indicator in the Fire and Rescue Sub-Block even though there have been some strong arguments for its inclusion.

There are many factors in rural areas that can contribute to increased costs such as distance, topography and lower utilisation per fire station. An indicator of the additional needs of sparse areas could be seen in the inclusion of a Coastline top-up. The coastline top-up is calculated by dividing the length of coastline (to the nearest 1000) metres by the resident population (in 2004) per authority. The top-up recognises the fact that Fire Authorities with coastal boundaries will have demanding topography, often requiring a higher number of stations per head, and may also be unable to rely on support from neighbouring forces for incidents near to their area boundaries. Rural proponents argue that sparsity in non coastal areas warrants a similar top-up (Devon Fire and Rescue, 1997).

There is conflicting evidence about the variation of costs between rural and urban areas,

which has made the possible introduction of a sparsity component questionable. Research by Devon Fire and Rescue (1997) found that settlement patterns had a large impact on fire station location. In a rural area (characterised by dispersed small villages) a central station might be ruled out by journey times meaning that response standards could not be maintained. The impact of distance is compounded by demanding topography (a frequent feature of areas of sparsity) and poor quality road networks (often coupled with restricted access) resulting in actual travel distances being increased for practical purposes.

Essentially, services may have to be provided locally at smaller dispersed stations at disproportionate cost to their utilisation. Lower utilisation rates leads to a higher reliance on retained fire fighters. Retained fire fighters are more expensive per episode than regular fire fighters. This leads to even greater per episode costs for these areas. Earlier research by Salford University[4] suggested that sparsity does not have a significant impact on costs for fire services based on their regression based analysis. Sparse (2005), and Devon Fire and Rescue (1997), have argued that this is because the analysis was based on regression which used past patterns of expenditure to reflect need, and that expenditure has been kept relatively low in rural areas by providing a much-reduced level of cover rather than reflecting the existence of lower operating costs. The argument that the current formula does not reflect the needs of rural authorities (by not allocating sufficient funding) was recognised by the Audit Commission through their 1995 report "In the Line of Fire". The Commission concluded that the formula does not accurately reflect the cost for all authorities of providing fire cover to meet the national standards. They felt it could "hardly be a coincidence that all rural counties deem it necessary to exceed their spending assessments, some by over 40%" (Audit Commission, 1995, p40).

On the basis that rural areas have additional needs which are not recognised by the current formula possible changes are discussed in outline below. In summary rural areas are disadvantaged financially by the current formula as factors such as areas of high fire risk, numbers of incidents, population issues and area cost adjustment act as multipliers

[4] Twomey J, Tomkins J, Howard G, Topham N (1996) "Sparsity and local authority costs (Stage II)", report MZ787 by Salford University Business Services to Department of the Environment, London [Settlement Working Group paper SSASG (96) 52]

to the overall funding position of more densely populated areas. The sparsity measure in the form of a top-up could be added to the formula to compensate for the needs of rural areas but this is not without its problems. When a basic sparsity factor is included (as in Twomey *et al*, 1996) it produces perverse results. This is for two main reasons: firstly, a number of sparse authorities actually seem to loose out due to sparsity being measured at the county scale. Counties with urban clusters and a large rural hinterland will be unfairly represented in simple measures of density based need assessment. Secondly, the research used past patterns of expenditure, and expenditure in rural areas has been kept relatively low by providing a much-reduced level of coverage. A solution to this could be to measure sparsity at a lower scale and then weight the sparsity against only these areas, using a method similar to that utilised in the Social Services for Older People sub-block[5] (see section 7.3.2).

7.3.5: Police

The Police Authority Funding comes through the local government Finance. It is made up of the: Police Grant; Revenue Support Grant; National Non-Domestic Rates; Council Tax; and Reserves and Other Income (Simper, 2001). The funding mentioned here is common to all local government functions apart from the Police Grant. Rather confusingly Police Authorities receive two sets of funding within the local government Finance Agreement. As part of the four block funding model they are allocated funding based on the Police Relative Needs Formula. Secondly they receive a unique block of funding known as the Police Grant. The police grant can effectively be viewed as a Special Grant (similar to the Education special grant mentioned in section 7.1.2). The funding is not ring fenced within the police authority but as it is only supplied to Police Authorities it is, by default, only spent on police authority functions. The total Police Grant in 2007/08 for England and Wales is £4,432,973,642 (Home Office, 2007). The Police Grant is allocated using the same weighted capitation method as the Police RNF. There is a Sparsity top-up within the Police RNF this uses the same methodology as the sparsity measure in the EPCS RNF in section 7.3.6 (figure 7.20 illustrates the method). Sparsity represents 0.5% of the Police RNF (Simper, 2001).

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[5] According to Devon Fire and Rescue (1997) the coverage area of a fire station is closer to the size of an electoral ward than to a super output area (these being the two smaller geographical density measures already in use within the RSG formulae), as such it would be logical to use a ward based sparsity measure.

7.3.6: Environmental, Protective and Cultural Services

The Environmental, Protective and Cultural Services (EPCS) formulae include a range of socio-economic indicators intended to reflect variations in need. These indicators include: population density and sparsity, socio-economic conditions, and area costs. This block covers a wide range of services - basically all services not covered elsewhere in the RNF calculations. These include: Environmental Services (such as waste collection and disposal, recycling); Housing Services (apart from Council Houses); Community Management (such as economic development and regeneration, emergency planning, tourism, trading standards); Cultural Services (including libraries, museums, archives, parks and open space, leisure facilities). The EPCS is calculated within five sub-blocks (figure 7.19). The first two cover a wide range of services not met within other elements of the formula and the remaining three cover environmental services.

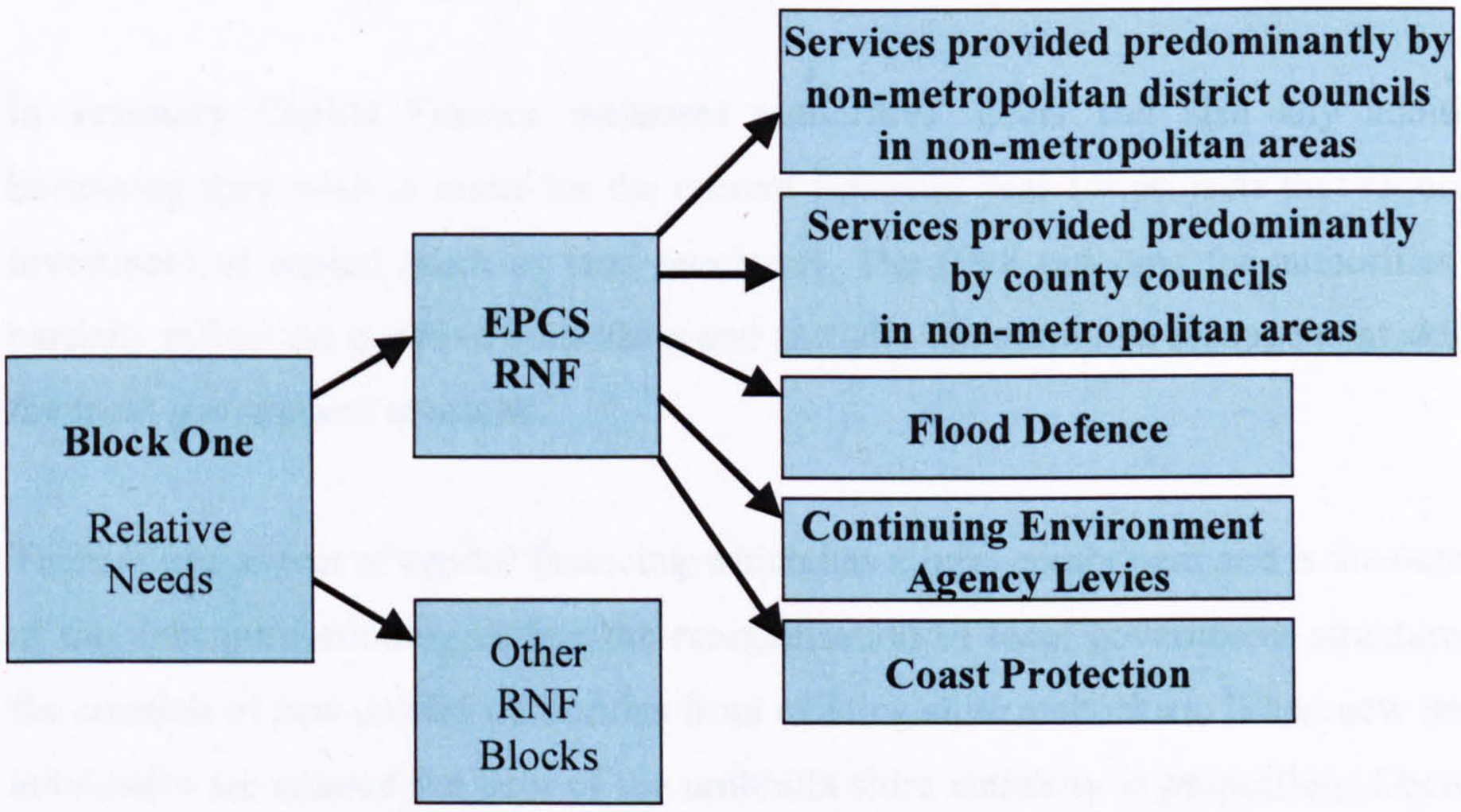

Figure 7.19: The structure of the Environmental, Protective and Cultural Services RNF

Again, as these services are not concerned with healthcare provision the formula is not discussed in full. There is an adjustment for population sparsity within this RNF which is calculated at the Output Area level (figure 7.20 outlines the sparsity top-up for EPCS). Sparsity accounts for less than 1% of EPCS funding.

2 *multiplied* by the resident population of those Output Areas within the area of the authority at the 2001 Census with 0.5 or less residents per hectare, *divided* by the total resident population of the authority;

plus

The resident population of those census Output Areas within the area of the authority at the 2001 Census with more than 0.5 but less than or equal to 4 residents per hectare, *divided* by the total resident population of the authority.

Figure 7.20: The sparsity top-up for the EPCS and Police RNF (information from DCLG, 2007)

7.3.7: Capital Financing

In summary Capital Finance measures authorities' debts and also any additional borrowing they wish to make for the current financial year for projects that require an investment of capital (such as land purchase). The RNF outcome for authorities will partially reflect the needs of authorities and partially the economic management skills of the local government involved.

There is one aspect of capital financing which has a rural component and is the outcome of the debt proportioning during the reorganisation of local government structure, i.e. the creation of new unitary authorities from existing shire authorities. When new unitary authorities are created the debt of the umbrella shire authority is proportioned between the new shire area and the unitary authority receives a smaller per capita proportion of the original debt. For example, when Hampshire Authority was split in the 1997 reorganisation into Hampshire, Portsmouth City and Southampton, Portsmouth City UA had only 10.78% and Southampton UA had only 9.74% of the outstanding debt proportioned to them (DCLG, 2007, p75) despite having 11% and 13% respectively of the original Hampshire authority's population.

7.4: Block One: the Relative Needs Amount

After all seven Relative Need Formulae have been calculated using the steps, outlined throughout the previous sections, the weighting factors produced are combined into six groups to be used in the next step in block one of the local government funding formula. This is to work out the distribution of the Relative Needs Amount (block one of the four block calculation, as shown in figure 7.2). The Relative Needs Amount (RNA) accounts for the bulk of Local Authority funding as it represents 70.99% or £15,337,163,492 of the Formula Grant (DCLG, 2006). The outcome of the RNA calculation expresses the fraction of the money that will be granted to a receiving authority (as a share of the Formula Grant) with respect to the relative needs of all authorities.

The calculation of the Relative Needs Amount (RNA) in figure 7.21 is carried out six times for each receiving authority, once for every relevant RNF, for x 1 - 6:

For x 1-6:
RNF 1 = Upper Tier
RNF 2 = Police
RNF 3 = Fire and Rescue
RNF 4 = District level EPCS
RNF 5 = Mixed Tier
RNF 6 = Capital Financing

To explain in more detail these RNFs are composed of:

RNF 1 = Upper Tier: The sum of Children's Services RNF; Adults' PSS RNF; Highway Maintenance RNF; County-Level EPCS RNF; and Continuing Environment Agency Levies RNF

RNF 2 = Police: the result of the Police Relative Needs Formulae.

RNF 3 = Fire and Rescue: the result of the Fire and Rescue Relative Needs Formulae.

RNF 4 = District level EPCS: This covers the Environmental, Protective and Cultural services which are delivered at the district level.

RNF 5 = Mixed Tier covers local authority services which are not funded specifically at the upper or district level. These are components of the Environmental,

Protective and Cultural Services RNF sub-block: Coast Protection; Other Flood Defence; and Fixed Costs.

RNF 6 = Capital Financing: the result of the Capital Financing Relative Needs Formulae.

$$RNA_{x,\,auth} = \frac{RNF_x \times 1{,}000{,}000}{\text{projected pop in 2007}} - \min\left(\frac{RNF_x \times 1{,}000{,}000}{\text{projected pop in 2007}}\right)$$

$$RNA_{auth} = £15{,}337{,}163{,}492 \times \left[\frac{\left(\sum_{x=1}^{6} RNA_{x,auth} \times \frac{\text{projected pop in 2007}}{1{,}000{,}000}\right)}{\sum_{\text{all auth}}\left(\sum_{x=1}^{6} RNA_{x,auth} \times \frac{\text{projected pop in 2007}}{1{,}000{,}000}\right)}\right]$$

Figure 7.21: The calculation of the Relative Needs Amount in the Local Government Finance Settlement (steps derived from DCLG 2007)

In the first part of figure 7.21 the authorities own weighting score is subtracted from that of the poorest scoring authority. The min value represents the score of the lowest ranking authority for that specific RNF e.g. the authority with the lowest allocation for Fire and Rescue. The second part of the equation calculates the authorities' share of the overall funding pot, in this case £15,337,163,492, by working out the share of this money that their score entitles them to (in relation to the sum total scores of all the receiving authorities). This is done in relation to both their relative needs allocation and their projected populations in 2007. The outcome of the Relative Needs Amount for Bradford is £162,479,219. The figures used in this calculation are shown in figure 7.22a and figure 7.22b.

$$RNA_{upper\ tier,\ Bradford} = 0.00273095993278 = \frac{0.00415472648697 \times 1{,}000{,}000}{494{,}177} - \frac{0.00872730270 \times 1{,}000{,}000}{153{,}744}$$

The minimum upper tier RNF per head is $\frac{0.00872730270 \times 1{,}000{,}000}{153{,}744} = 0.00567640521569$ and is for Wokingham

$$RNA_{lower\ tier,\ Bradford} = 0.00067004919950 = \frac{0.00124639188486 \times 1{,}000{,}000}{494{,}177} - \frac{0.00049623691 \times 1{,}000{,}000}{86{,}656}$$

The minimum district -level EPCS RNF (lower tier RNF) per head is $\frac{0.00016049623691 \times 1{,}000{,}000}{86{,}656} = 0.00185210760840$ and is for Gosport

$$RNA_{mixed\ tier,\ Bradford} = 0.00001596676529 = \frac{0.00000970300424 \times 1{,}000{,}000}{494{,}177} - \frac{0.00000509386676 \times 1{,}000{,}000}{1{,}388{,}766}$$

The minimum mixed tier RNF per head is $\frac{0.00000509386676 \times 1{,}000{,}000}{1{,}388{,}766} = 0.00000366790860$ and is for Kent

$$RNA_{capitalfinancing,\ Bradford} = 0.00171467012697 = \frac{0.00085253430645 \times 1{,}000{,}000}{494{,}177} - \frac{0.00000796256133 \times 1{,}000{,}000}{759{,}084}$$

The minimum capitalfinancing RNF perhead is $\frac{0.00000796256133 \times 1{,}000{,}000}{759{,}084} = 0.00001049969723$and is for theCambridgeshire Fire Authority

Figure 7.22a: The first part of the Relative Needs Amount calculation (which finds the RNA for each service that Bradford has responsibility delivering. The receiving authority of Bradford does not have responsibility for Police or Fire and Rescue so there is no RNF calculated for these services) (steps derived from DCLG 2007 with specific data for Bradford extracted from the model)

$$RNA_{SUM} = RNA_{upper\ tier} + RNA_{lower\ tier} + RNA_{mixed\ tier} + RNA_{capital\ financing}$$

For Bradford $RNA_{SUM} = 0.002730959932780 + 0.000670049199500 + 0.000015966765290 + 0.001714670126970$

$$= 0.005131646024540$$

$$RNA_{Bradford} = £162,479,219 = £15,337,163,492 \times \left[\left(\frac{0.005131646024540 \times \frac{494,177}{1,000,000}}{0.239379218261960}\right)\right]$$

Where 0.239379218261960 is the sum for all authorities of $\left(RNA_{area} \text{ for the individual authority} \times \frac{\text{projected population for that individual authority in 2007}}{1,000,000}\right)$

Figure 7.22b Calculation of the second, and final, part of the Relative Needs Amount for Bradford (figures are extracted from ODPM 2007/08 Settlement Table R365 (3) and the model).

7.5: Block Two: Relative Resource Amount

As mentioned earlier the Formula Grant is calculated using a four block model, summarised earlier in section 7.1.3. The Relative Resource Amount is the second block, and is a resource equalisation process i.e. a negative figure. Effectively, it is the amount of grant (based on need) which the authority qualifies for minus the revenue that the government feels the authority can generate through council tax. This describes the extent to which the Government allocates different amounts of grant to individual authorities in order to attempt to compensate for variations in their ability to raise taxable income locally, as expressed in terms of the number of Band D equivalent properties in an area. As a result of resource equalisation the total Formula Grant is reduced by 24.57% (for England as a whole this is a reduction of £5,308,270,277) in 2007/08 (DCLG, 2006). The calculation of this figure is expressed below:

The calculation of the Relative Resource Amount (RRA) in figure 7.23 is carried out four times for each receiving authority, once for every relevant RNFy 1-4,

For RNFy 1-4

RNF 1 = Upper Tier

RNF 2 = Police

RNF 3 = Fire and Rescue

RNF 4 = Lower Tier

$$\mathrm{RRA}_{y,\mathrm{auth}} = \frac{\mathrm{taxbase} \times \mathrm{RNF}_y}{\text{projected pop in 2007}} - \min\left(\frac{\mathrm{taxbase} \times \mathrm{RNF}_y}{\text{projected pop in 2007}}\right)$$

$$\mathrm{RRA}_{\mathrm{auth}} = \text{-£5,308,270,277} \times \left[\frac{\sum_{y=1}^{4}\left(\mathrm{RRA}_{y,\mathrm{auth}}\right) \times \text{projected pop in 2007}}{\sum_{\mathrm{auth}}\left(\sum_{y=1}^{4}\left(\mathrm{RRA}_{y,\mathrm{auth}}\right) \times \text{projected pop in 2007}\right)}\right]$$

Figure 7.23: The calculation of the Relative Resource Amount in the Local Government Finance Settlement (steps derived from ODPM, 2006)

Figure 7.23 expresses the fraction of money that will be deducted from the allocation for the receiving authority based on their ability to raise tax revenue in proportion to the ability of all authorities to raise tax revenue. In the first part of figure 7.24 the authority's own ability to raise tax income is multiplied by their relative needs in relation to their population. This weighting score is subtracted from that of the poorest scoring authority. The min value represents the score of the lowest ranking authority for that specific RNF, e.g. the authority with the lowest allocation for Capital Financing in 2007/08 was Cambridgeshire Fire Authority (with a weighting score of 0.00001048969723). The second part of the equation calculates the authority's share of the overall reduction levied on all authorities in total (-£5,308,207,277 in 2007/08) by working out the tax base they can draw upon in relation to the tax raising abilities of all the receiving authorities. This is all done in relation to both their relative needs allocation and their projected populations in 2007.

$$RRA_{upper\ tier\ Bradford} = 0.009814753713 7 = \frac{144,164 \times 0.72012055000000}{494,177} - \frac{78,505 \times 0.72012055000000}{282,530}$$

The minimum upper-tier share of taxbase per head was $\frac{78,505 \times 0.72012055000000}{282,530} = 0.20009587195328$ and was for Leicester

$$RRA_{lower\ tier\ Bradford} = 0.005732793701 41 = \frac{144,164 \times 0.15847951}{494,177} - \frac{15,937 \times 0.158479510000000}{62,365}$$

The minimum lower tier share of taxbase per head was $\frac{15,937 \times 0.158479510000000}{62,365} = 0.040499680939 27$ and was for Forest Heath

$$RRA_{SUM} = RRA_{upper\ tier} + RRA_{lower\ tier}$$

$$\text{For Bradford } RRA_{SUM} = 0.009981 47\ 537137 + 0.00573279\ 370141 = 0.015714 26\ 907279$$

$$RRA_{Bradford} = -£10,176,395 = -£5,308,27\ 0,277 \times \left[\frac{0.015714 2690\ 7279 \times 494,177}{4,050,753.\ 316325} \right]$$

Where 4,050,753316325is the sum forall authorities of $\left(RRA_{SUM}\right.$ for theindividual authority×projected populationfor thatindividual authority 2007)

Figure 7.24: Calculation of the Relative Resource Amount for Bradford (figures are derived from ODPM 2007/08 Settlement Table R365 (3) and DCLG, 2006). The receiving authority of Bradford does not have responsibility for Police or Fire and Rescue so there is no RNF calculated for these services.

The main complaint about this system has been that it fails to take into account the differential rates of house price rises across the country (ODPM Select Committee HC 402). Council Tax banding is based on property value. Dwellings are assigned to one of eight valuation bands (Bands A to H). The Council Tax for each band is calculated as a fixed proportion of the Band D tax. The band in which a property falls is subject to periodic review by the local Valuation Office (http://www.voa.gov.uk/), and the last review was in 1991. A recent select committee review of local government funding concluded that "(t)he longer the council tax revaluation is left, the longer the grant distribution will be based on out-of-date information and the more dramatic the effects will be leading to more requirements for floors and ceilings rather than a system operating in accordance with the principles that ministers intended". The select committee believed this was such a serious problem that they went on to recommend that Local Authorities should receive some compensation for the delay in revaluation (Select Committee conclusion, paragraph 37 ODPM Select Committee, Local Government Revenue, HC 402 2003-04, vol. I). Devon County Council estimate that the impact for them is a loss of grant in the region of £6.4m (in 2006/07 compared to 2003/04) as house prices in Devon have not risen as sharply as other parts of the country. This would be equivalent to a Council Tax increase in the region of 2.5% (Devon CC, 2006, Committee Report FI/06/03).

7.6: Block Three: Central Allocation

The third stage in the four block process to calculate the Formula Grant is the calculation of the Central Allocation. In 2007/08 this is £11,595,117,419 (DCLG, 2006). This funding is shared out on a per capita basis; the per capita amounts are based on the minimum RNF score for each RNF block minus the minimum amount of council tax that an authority can raise. All authorities of the same type will have the same score at this point; the score is then multiplied by the population of that authority to give their individual score. To distribute the central allocation fairly the score of each authority must be compared to the total score for England. This is done by taking the per capita amount (each authority's percentage of all need) and dividing by the total need minus total tax for all of England (representing 100% of all need). The resulting ratio is then multiplied by the amount of money available in the Central Allocation pot

(£11,595,117,419). For 2007/08 the Central Allocation amount per head for each type of authority is: Unitary, London Boroughs and Metropolitan Districts £162.06; Shire Districts £65.04; Police Authorities £36.54; Fire Authorities £16.90; Shire County with Fire Responsibility) £114.15; Shire Counties without Fire Responsibility £97.92. In addition to these groups the Isle of Scilly and the Isle of Wight receive £178.30 and City of London receives £197.94 (derived from DCLG, 2007, Local Government Grant Calculation Model).

$$a = \frac{£15{,}337{,}163{,}492}{1{,}000{,}000} \times \left(\frac{\sum_{X=1}^{6} \min\left(\frac{\mathrm{RNF_x} \times 1{,}000{,}000}{\text{projected pop in 2007}} \right)}{\sum_{\text{auth}} \left(\sum_{x=1}^{6} \mathrm{RNA_{x,auth}} \times \frac{\text{projected pop in 2007}}{1{,}000{,}000} \right)} \right)$$

$$b = -£5{,}308{,}270{,}277 \times \left(\frac{\sum_{y=1}^{4} \min\left(\frac{\text{taxbase} \times \mathrm{RNF_y}}{\text{projected pop in 2007}} \right)}{\sum_{\text{auth}} \left(\sum_{y=1}^{4} \mathrm{RRA_{y,auth}} \times \text{projected pop in 2007} \right)} \right)$$

$$\text{Central Allocation} = £11{,}595{,}117{,}419 \times \frac{\text{projected pop in 2007} \times (a+b)}{\sum_{\text{auth}} \text{projected pop in 2007} \times (a+b)}$$

Figure 7.25: The calculation of the Central Allocation in the local government Finance Settlement. a = the relative needs and b = the relative resources the final part of the central allocation formula shows the distribution of the remaining funds to a receiving authority based on $a + b$ in relation that, and to all, authority(s) (derived from information in ODPM, 2006 and DCLG, 2007)

$$RNA_{\text{share for Bradford}} = £483.26321\,0523905 = \frac{£15,337,163,492}{1,000,000} \times \left(\frac{0.00754267\,042992}{0.23937921\,826196}\right)$$

Where 0.00754267042992 is the sum of the RNA_{MIN} values = $RNA_{\text{upper tier, Wokingham}} + RNA_{\text{lower tier, Gosport}} + RNA_{\text{mixed tier, Kent}} + RNA_{\text{capital financing, Cambridgeshire Fire Authority}}$

Where 0.23937921826196 is the sum for all authorities of $\left(RNA_{SUM} \text{ for the individual authority} \times \frac{\text{projected population for that individual authority in 2007}}{1,000,000}\right)$

$$RRA_{\text{share for Bradford}} = £-315.28610173590 = -£5,308,270,277 \times \left(\frac{0.24059555289255}{4,050,753316325}\right)$$

Where 0.24059555289255 is the sum of the RRA_{MIN} values = $RRA_{\text{upper tier Leicester}} + RRA_{\text{lower tier Forest Heath}}$

Where $4,050,753.316325$ is the sum for all authorities of $(RRA_{SUM} \text{ for the individual authority} \times \text{projected population for that individual authority in 2007})$

$$\text{Central Allocation} = £85,139,672 = £11,595,117,419 \times \frac{494,177 \times (£483.263210523905 + £-315.28610173590)}{£11,305,136,484}$$

Where £11,305,136,484 is the sum for all authorities of (projected population for that individual authority in 2007 × (RNA_{share} for that authority + RRA_{share} for that authority))

Adjusting for the critical ordinary watercourse adjustment;

Central Allocation = Central Allocation − £26,173 = £85,139,672 - £26,173 = £85,113,499

Figure 7.26: Calculation of the Central Allocation for Bradford (figures are derived from ODPM 2007/08 Settlement Table R365 (3) and data generated by the model).

7.7: Block Four: Floor Damping Block

The final block in the four block system calculation of the Formula Grant is the flooring damping. This sets national minimum and maximum limits are applied to restrict how much the Formula Grant amount for each council is allowed to change (in percentage terms) from one year to the next. These limits are also referred to as 'floors and ceilings'. The purpose of floors and ceilings is so that changes in the formula can be gradually introduced to ensure that no authority suffers a disruptive change to their grant amount from financial year to year. In order to pay for the minimum guaranteed increases (the 'floor') the grant amount per head is decreased evenly across all authorities that have funding outcomes higher than the maximum percentage increase for that year (the 'ceiling'). For instance, the lower limit might be set as a 3% increase. So if the formulae give a council less, their actual Formula Grant gets increased to that level. To work out the ceiling the amount of money needed to give all authorities at least their minimum increases is calculated. This amount is then removed, as a percentage of the above floor increases, from authorities in the same group. This is done at different stages in the process so the groups (such as adult's personal social services) are retained under this system and each works independently with respect to damping.

Type of Authority	2007-08 Floor
Education/social services authorities	2.70%
Police authorities	3.60%
Fire authorities	2.70%
Shire districts	2.70%

Table 7.4: The guaranteed floor increases for Local Authorities (by type) in 2006-07 and 2007-08 (information from DCLG, 2006)

The 2007/08 Formula Grant before damping is:

$$\text{Formula Grant} = RNA_{auth} + RRA_{auth} + CA_{auth} + \text{PrincipalFormulaPoliceGrant}$$

The floor damping is now applied to this figure:

Where $x = 1.027$ for authorities with education and social services responsibilities, for shire districts without those responsibilities, and for fire and rescue authorities, while for police authorities $x = 1.036$

Where: for authorities with education and social services responsibilities $y = 0.31163458$, for shire districts without those responsibilities $y = 0.61588206$, for police authorities $y = 0.002078029$ and for fire and rescue authorities $y = 0.08891056$.

This year's Formula Grant after damping is,

$$\text{Formula Grant} = (\text{last years grant} \times x) + y \times [\text{this years grant} - (\text{last years grant} \times x)]$$

OR

$$\text{Formula Grant} = (\text{last years grant} \times x)$$

Whichever is the greater amount

Figure 7.27: The calculation of the Formula Grant after the application of floor damping in the Local Government Finance Settlement (steps derived from DCLG, 2007)

For each authority the last stage of the Formula Grant process takes the previous years grant and multiplies it by the floor amount (the minimum increase guaranteed to all authorities) i.e. in the case of Shire Authorities this would be last years grant plus 2.7%. If the result of the 2007/08 grant would have been less than the 2006/07 total then the authority receives the previous years grant plus the floor amount (figure 7.28). If the amount is more than the guaranteed floor increase then this increase is scaled back to pay for the floor increases for other authorities (this is the ceiling).

As a result of the ceiling reductions, authorities with education and social services responsibilities get to keep 31% of their grant increase about the floor, shire districts without those responsibilities get to keep a substantial amount (61%) of their grant increase about the floor, whereas police authorities only get to keep 2% of their grant increase about the floor. Fire and Rescue authorities retain only 8% of their grant increase about the floor. So for receiving authorities other that fire and rescue and police the impact of changes to the Relative Needs Formulae can have a large impact on the amount of grant they eventually receive. In the case of the police though the difference

is minimal, as they can only receive a maximum grant increase reflecting 2% of their additional needs entitlement over and above the floor amount.

Last year's grant = £224,300,482

This year's grant = RNA + RRA + Central Allocation + Principal Police Grant
= £162,479,219 + (-£10,176,395) + £85,113,499 + £0
= £237,416,323

The Formula Grant for Bradford this year after floor damping is therefore;

$$(\text{last year's grant} \times 1.027) + 0.31163458 \times [\text{this year's grant} - (\text{last year's grant} \times 1.027)]$$

$$(£224,300,482 \times 1.027) + 0.31163458 \times [£237,416,323 - (£224,300,482 \times 1.027)]$$

= £232,556,651

OR

£224,300,482 × 1.027

= £230,356,595,

Whichever is the greater amount: Hence the **Formula Grant for Bradford 2007/08 = £232,556,651**

Figure 7.28: Calculation of the Floor Damping for Bradford (figures are extracted from ODPM 2007/08 Settlement Table R365 with non constant figures generated by the model)

The percentage increases in grant need to be set in the context of comparative levels of total grant per head of population for shire counties. For 2006/07 Devon's overall grant per head of population is £599. The range (for those without Fire Service Funding responsibilities) is from £792 in Durham to £527 in Dorset. The average is £649. Devon's grant per head is 7.6% less than average. (Devon CC, 2006, Committee Report FI/06/03)

The original intention of this process seems to have been that the operation of floors and ceilings should be a temporary fix to ease authorities through formula transition, and therefore prevent large year on year funding changes. The government has now

indicated that they are likely to be a permanent element of the grant distribution system. The government believes that the system gives greater certainty to local authorities and provides a safeguard against arbitrary changes. This acts as a safeguard against change as a result of methodology change, and also because of data changes (for example the move to using 2001 census data this year). On the other hand this protection has the effect of perpetuating unfair funding distributions such as continuing to provide a higher grant than the new / corrected population totals would generate. Historical spending patterns and floor damping have often been cited (for example by the pressure group SPARSE) as cause for the 'unfair' higher funding allocated to the Greater London authority (in relation to per capita funding for shire counties).

7.8: Distribution of the Grant

The Distributable Amount (Non Domestic Rates collected in that year) £18,500,000,000 for 2007/08 (DCLG, 2007) and the Revenue Support Grant, 3,162,930,634 (£58 million of the RSG is given to 'specified bodies' rather than local government so must be discounted at this stage). Now that the total grant available to receiving authorities is known and the need of each authority has been identified the weighting factors (which represent an authorities need to proportion to the needs of other authorities) are converted in to monetary funds. This is done using the formula shown in figure 7.29 below.

$$\frac{RSG_{Auth}}{(RSG_{Auth} + DistributableAmount)} \times (FormulaGrant_{Auth} - PoliceGrant_{Auth})$$

Figure 7.29: The Share of the Distributable Amount for each receiving authority other than Greater London (DCLG, 2007).

7.9: Discussion and Conclusions

After the detailed discussion of the model components mentioned above it is worth discussing the functioning and limitations of the model in some detail before Chapter Eight moves forward to suggest changes. The sensitivity for the model to changes was examined in detail, both from the perspective of errors in the input data and as a result of non-error changes such as a change to the total population of a local authority area. The final part of this chapter provides a summary of the funding between the different 'blocks' of funding and sets the scene for the scenarios in Chapter Eight.

7.9.1: Sensitivity of the Model: Input Errors

The errors in the reproduction were very small, in the 15th decimal place, resulting in an error of less than 0.1 pence. This has no significant impact on the funding of individual local authorities as the resultant change was less than 1 penny per authority.

The supporting data for the model proved to be incorrect to some extent. The errors in the published version of the datasets are outlined below. It should be stressed that the actual amounts granted to authorities proved to be correct – based on my interpretation of the funding formula – it was simply the supporting data published that was incorrect. For example, within the published data for the Sparsity Adjustment for Older People's PSS the sparsity adjustment for Cornwall is listed as 1.0100, in fact this figure should actually be 1.0101. Whilst this seems like a minor change, using the incorrect figure resulted in a gain in funding for Cornwall of £2,515.35 and losses/ gains of between £1 and £100 to all other authorities.

7.9.2: Sensitivity of the Model: Changes to Total Population

In order to test the sensitivity of the model to non-error variations in the starting conditions the base population of local authority areas was changed, Bradford LA is used here to illustrate the trends. To test whether the model was linear in character the total population was changed by a prescribed amount and the impact on the per capita funding recorded. The Bradford LA was adjusted by the addition of 5, 50 and 500 persons and the resulting change in funding for the case study areas is totally linear

prior to the application of damping (as shown in table 7.5). Funding for Bradford before was damping £237,416,323.44. The change in population established that a 1% increase in population leads to a 0.01% increase in funding. This increase in funding represents the proportion of the funding allocation that is allocated on a purely per capita basis, as opposed to the 'needs' based allocation section of the model.

The main parameter that can be varied in the model is the number of residents within an authority; all other variables are secondary to this parameter. Interestingly the model is insensitive to large non-error based changes in the population proving that most funding is distributed on the basis of additional perceived 'need' rather than per capita funding. A weakness in the model is that additional people added at this stage are not defined by their needs based category. As such the model by elimination presumes that they are a group with no additional healthcare needs, beyond the most basic per capita funding provided for all residents. The group they essentially fall into would be males or females between the age of 18-64 who are not unemployed, long term sick or from an ethnic minority.

Local Authority	Population increased by 5 persons	Population increased by 50 persons	Population increased by 500 persons
Bradford	£34.86	£348.56	£3,485.57
West Yorkshire Fire	£4.10	£41.04	£410.39
West Yorkshire Police	£14.23	£142.34	£1,423.42
Devon(shire county)	-£18.30	-£183.03	-£1,830.35
Devon Fire Authority	£0.77	£7.69	£76.94
Devon and Cornwall Police	£1.62	£16.17	£161.72
East Devon	-£0.50	-£4.99	-£49.85
Exeter	£0.74	£7.35	£73.55
North Devon	£0.22	£2.20	£22.01
South Hams	-£0.23	-£2.30	-£23.02
Teignbridge	£0.04	£0.36	£3.63
Mid Devon	£0.08	£0.84	£8.38
Torridge	£0.25	£2.50	£25.04
West Devon	£0.06	£0.62	£6.22

Table 7.5: Change to an authorities total funding allocation prior to the application of damping as a result of base population change to Bradford local authority (data from the model)

What is interesting to note is the change in funding to authorities other than Bradford. When this experiment is repeated for other authorities the patterns are replicated. Authorities of the same type as the one which has undergone population growth (in the case of Bradford and Devon they are both Upper Tier Authorities with Education functions which puts them in the same floor group) are the ones which will lose the most funding in order to finance the increased funding to, in this case, Bradford. To reiterate the funding amount available for local government finance in any given year has a fixed upper limit amount. Therefore, any gains by one authority will be at the expense of another.

After the application of the fourth funding block (floor damping) the impact on the total funding allocation to an authority after a change in total population is markedly different. Table 7.6 illustrates the same population alteration to Bradford LA with the resultant funding change after block four (where as table 7.5 illustrates the changes after only blocks One through Three have been calculated – see section 7.4 to 7.7 for a full explanation of the four block process). The model still behaves in a linear manner but the extent to which funding has been altered has been dramatically reduced as a result of the damping mechanism.

Local Authority	Population increased by 5 persons	Population increased by 50 persons	Population increased by 500 persons
Bradford	£6.16	£61.57	£615.48
West Yorkshire Fire	£0.75	£7.53	£75.42
West Yorkshire Police	£24.22	£242.23	£2,422.46
Devon(shire county)	-£9.05	-£90.51	-£905.03
Devon Fire Authority	£1.30	£13.03	£130.33
Devon and Cornwall Police	£0.00	£0.00	£0.00
East Devon	£0.00	£0.00	£0.00
Exeter	£0.49	£4.94	£49.38
North Devon	£0.16	£1.60	£15.97
South Hams	-£0.13	-£1.32	-£13.17
Teignbridge	£0.04	£0.42	£4.19
Mid Devon	£0.06	£0.63	£6.29
Torridge	£0.18	£1.77	£17.66
West Devon	£0.05	£0.51	£5.09

Table 7.6: Change to an authorities total funding allocation after the application of damping as a result of base population change to Bradford local authority (data from the model)

Both East Devon and Devon and Cornwall Police do not receive a high enough funding allocation as a result of the needs based funding formula to meet their year on year guaranteed inflationary increase. This means that the funding for these areas is automatically increased to the minimum guaranteed funding through the application of floor damping. The small amount of positive funding change caused by this experiment is simply used by the model to reduce the amount of the artificial increase granted thereby leaving the end funding figure for these authorities unchanged. In the case of all other authorities, which had exceeded their minimum floor amount, their total funding is reduced proportionally (depending on which floor group they are in) to funding the necessary inflationary increases of any of the group which have failed to be allocated sufficient funding by the model to meet the floor amount.

7.9.3: Summary

In summary table 7.5 below shows the financial distribution of the Formula Grant in 2007/08 for the case study areas (and England overall).

Local Authority	Relative Needs Amount (£ million)	Relative Resource Amount (£ million)	Central Allocation (£ million)	Police Grant (£ million)	Floor Damping (£ million)	Formula Grant (£ million)
England	15,337.163	-5,308.270	11,575.788	4,028.327	0.000	25,633.008
Bradford	162.479	-10.176	85.113		-4.860	232.557
West Yorkshire Fire	17.890	-1.207	37.036		-0.172	53.548
West Yorkshire Police	82.866	-2.721	81.554	170.949	-15.096	317.552
Devon	121.793	-72.915	77.560		-3.457	122.980
East Devon	3.299	-4.687	8.946		0.101	7.659
Exeter	5.611	-1.613	7.932		-0.266	11.664
Mid Devon	2.672	-1.845	5.026		-0.074	5.779
North Devon	3.742	-2.121	6.239		-0.158	7.702
South Hams	2.880	-3.095	5.635		-0.066	5.355
Teignbridge	4.222	-3.329	8.579		-0.127	9.345
Torridge	2.991	-1.357	4.375		-0.146	5.863
West Devon	2.159	-1.423	3.456		-0.082	4.110
Devon & Cornwall Police	21.537	-11.170	63.276	101.940	1.945	177.528
Devon and Somerset Fire	0.000	0.000	0.000		0.000	29.095

Table 7.7: Summary of Formula Grant in the Case Study Areas for 2007/08 (extracted from DCLG, 2007, Key Statistics Tables).

This chapter has discussed the funding of health and social care related services from local government. The next chapter will explore changes that could be made to the formula to achieve a more equitable funding outcome for rural areas. The Government has finally introduced socio-economic data from the 2001 Census in the 2006/07 allocations, this resulting in funding gains for both Devon and Bradford (as both have growing populations). The census data used within the weighting factors, such as the area cost adjustments is often older and as such may not accurately portray the needs of areas. Devon County Council gained from the introduction of the new needs formulae for Children's Social Services and Social Services for Older People. However, Devon

CC lost money from the new social services for Younger Adults formula. However, these gains are limited because the new formulae for Children's Social Services (as have Social Services for Young Adults) have been significantly dampened by the Government in order to restrict the movements in grant between Councils that would otherwise have resulted. On the other hand, Bradford and many urban areas have gained funding from the Social Services for Young Adults formula which seems to favour urban areas in its outcome.

There are many remaining inconsistencies in the pursuit of both transparency and intelligibility within the current system (Steve Smith, Senior Economic Development Officer Devon County Council, personal interview 03/07/2007). Chapter Eight will now move on to examine the measures of rurality and sparsity used in the formula, maintaining the focus on healthcare, in further detail and suggest how changes to the way that rurality is measured could significantly alter the outcome of local government funding for rural areas.

Chapter 8: New models of rural service funding

8.1: The need to challenge rural funding

Providing services such as healthcare to rural rather than urban areas can be more expensive. This is generally due to the greater distances involved and lack of economies of scale. The current funding formula for both the NHS and local government fails to account for this sufficiently, resulting in lower levels of services being provided and, according to Badrinath *et al.* (2006), leaving rural healthcare trusts in debt. If we accept that service provision is more costly per capita for a dispersed population than in urban areas, then the expectation is that allowances should be incorporated into the service funding model. As discussed in Chapter Seven some allowances are made for the additional cost of providing services to rural areas within the local government finance agreement. These allowances are only made for certain services and are not applied consistently.

8.1.1: Chapter Overview

In line with the objectives of this thesis, this chapter will examine the impact of changing the funding model in an attempt to produce favourable outcomes for rural areas. As discussed in Chapter Three, the definition of rural areas, in terms of method and geographical scale, has a dramatic impact on the location and volume of areas which are considered to be rural. The "what if" scenarios have been developed based on the methods for classifying rural areas currently in use within other government organisations, informed by the findings of Chapter Three, and from lessons learnt from the treatment of rural areas externally to England, drawn from the lessons in Chapter Five. These 'reactive' experiments will be combined with more 'proactive' "what if" experiments to ensure that new approaches are explored as well as innovative applications of existing ideas.

As discussed in the previous chapter, within the Local Government Funding formula population sparsity is used as the identifier for rural areas, thus identifying areas which need additional funding to cover the increased costs of providing services for rural populations. As the intention of this thesis is to examine the importance of definitions and classifications of rural areas in relation to health and social care provision, it is the intention of this chapter to provide detailed analysis of the Local Government Funding formula in relation to this aim. As the funding for Adults Personal Social Services provides an example both of funding for health and social care and of a service sector within which there is a demonstrated need for a rural weighting factor, the analysis will predominantly focus on this area of the formulae.

8.1.2: Project design

The model was designed in response to a set of meetings with two local authorities, how while contrasting in nature, felt that they had a significant rural population which was not having its needs recognised by the current funding formula. The primary contacts were Dave Melling and Phil Williams at Bradford Metropolitan District Council and Steve Smith and John Mills at Devon County Council along with David Inman from SPARSE. Whilst many of the original directional ideas were from these authorities, in terms of which outcomes they would be most interested in, the project design and implementation was driven solely from Leeds. In response to the preference that using the existing model would be of interest whereas the creation of a totally new funding model much less so, from the authorities it was decided to use the existing model of government funding distribution and to make changes that could be reasonably lobbied for and made within the confines of the model. This decision was driven by a desire to produce a model which would have a practical application outside academia.

Information about the construction of the current local government funding formula is available in ODPM and DCLG publications. Unfortunately they would not allow access to their own software (as purpose created Access Database) so a model was created in Excel using the same input data. As discussed in Chapter Seven the input data came from a wide range of sources (listed fully in Annex 2), where data was available in original format then this was used in the model (such as mid year population estimates), where data was only available in a processed format, such as unemployment statistics,

the model relied on the completed sub-block weighting factors published by DCLG. Recreating the model created many problems and challenges, mostly related to data availability, and would be more flexible in its predications if all of the data input was from raw format rather than some relying on aggregate data. This reliance on aggregate data makes it difficult to add additional population to an area as the aggregate nature of some additional need data precludes updating it with 'test cases'. The major concern of the authorities was the perceived rural/urban bias to funding, as such this was the first aspect of the funding formulae to be examined.

8.1.3: The Urban bias of Local Government Funding

A funding model has been created for each English Local Authority in order to allow direct comparisons of funding on a per head basis[1]. As Police Authorities cover multiple local authority areas the total funding for the relevant police authority was calculated and then distributed among the applicable lower tier authorities. This was done as a proxy measure as it was not feasible to calculate the police RNF at the lower tier authority scale. This will have the effect of improving the per head funding for rural areas, where a police authority encompasses both an urban area and a rural hinterland, as the outcome of the police RNF is higher funding for urban areas (see Chapter Seven section 7.3.5 for an explanation of this funding bias). It was also not possible to calculate the Fire RNF at the lower tier local authority scale so, in the same way as the police funding, the per head allocation for each fire authority was distributed proportionately among the relevant lower tier authorities. The Fire and Rescue RNF also maintains the urban funding bias (see Chapter Seven, section 7.3.3) which will again result in a slightly higher value per lower tier authority than would be strictly accurate.

Given that Fire and Police funding is not explored in detail within the analysis, the practicality of excluding these RNFs from the analysis was explored. Firstly, as some

[1] For purposes of continuity the Devon and Somerset Fire Merger is deemed not to have happened and, therefore, the analysis for the per capita funding of these authorities is based in their pre-merger allocations. This is because the need proportion, and the need equalisation take place prior to this transfer, it was felt that comparisons between funding should be based on the original allocations rather than this transfer.

Shire and Unitary Local Authorities have responsibilities for fire services and some have separate Fire Authorities it was not practical to separate the funding. Secondly, although the proportion of the Relative Needs Grant that is allocated to each authority is unchanged by the changes to the funding formulae of another RNF, the absolute funding amount will be. It was therefore felt that excluding the Police and Fire Services funding from the investigation would result in misleading predicted funding outcomes for local authorities.

Where the two tier authority structure remains (i.e. there are shire counties and then shire districts) the funding per head will be calculated at both the shire level and the district level. When the funding is calculated at the district level the share of the Upper Tier RNF for that county will be distributed on a proportional basis.

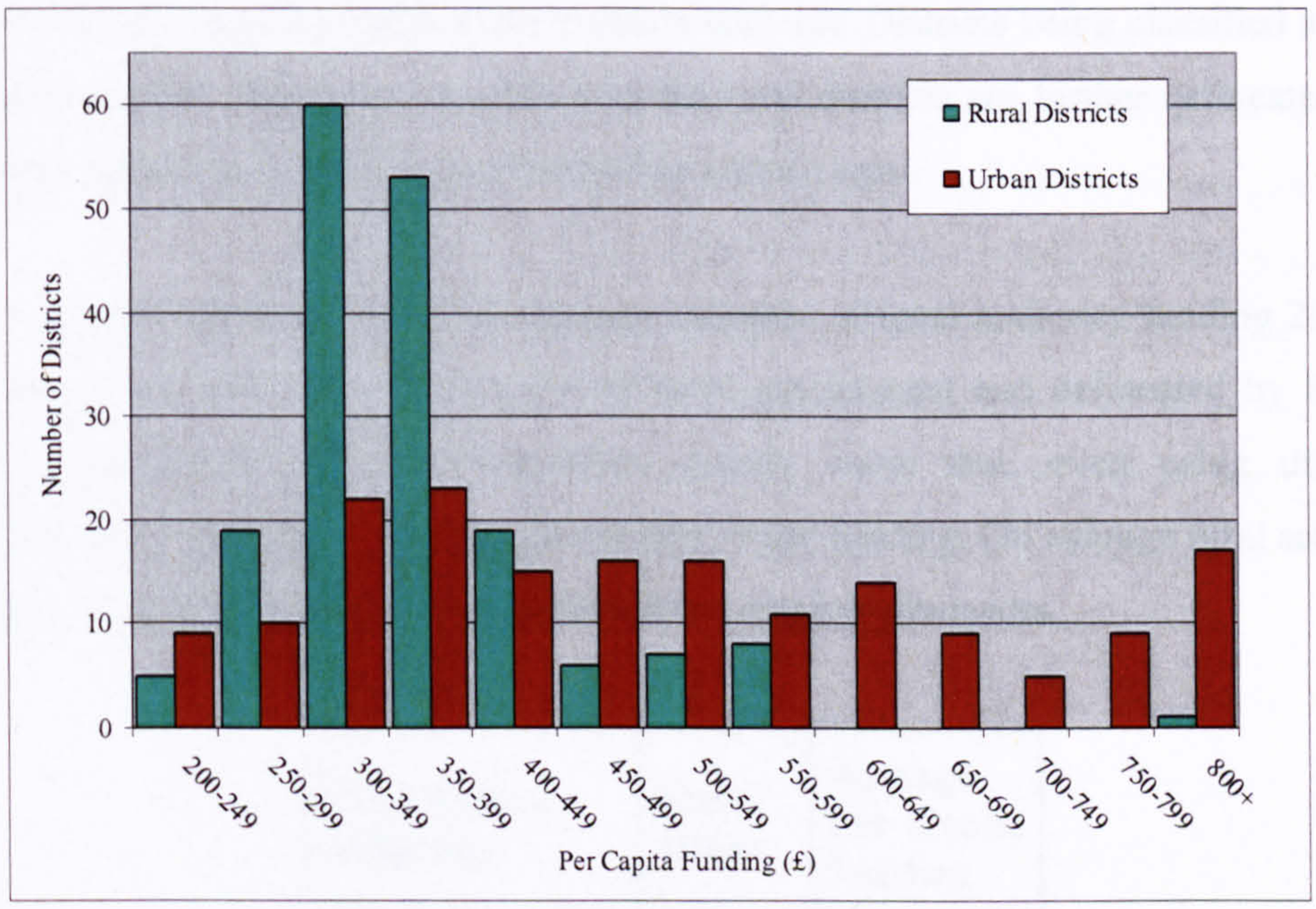

Figure 8.1: Estimates of Per Capita Funding of Local Authorities 2007/08 Formula Grant (includes Shire Level; Fire Authorities and Police Authorities) - delineated by rural and urban authorities using the Defra 2004 local authority classification (Data generated by the model)

Figure 8.1 illustrates the per-capita funding for all Local Government services by district which are funded through the Formula Grant. The graph demonstrates the contrast in funding per capita at the District level. Funding that is allocated at a higher spatial scale, such as Shire County or Police Authorities, has been allocated on an equal per capita basis among the Local Authority Districts within the higher geographically scaled group. Approximation of Fire and Rescue and of Police funding over a smaller geographical area will give misleading results. It will in fact give rural areas more funding than they would otherwise receive as the higher funding attracted by urban areas will be distributed across them.

According to the Defra (2004) classification 178 Districts are rural and 176 Districts are urban, Table 8.1b shows the sub groups that these belong to and the relevant per capita funding. The Countryside Agency District Level Classification (1999) has a less even distribution between rural and urban districts with 145 Districts being classified as rural and 209 as urban. As shown in table 8.1a the rural districts are further delineated with 80 being classed as accessible rural and 65 as remote rural.

Figure 8.1 and Tables 8.1a,b thus show an estimate of local authority funding 2007/08 per capita averaged to the lowest tier of local government and delineated by Rural / Urban classification. These illustrations clearly show that, even using different classifications, rural areas receive consistently lower funding. On average rural areas are awarded 35% less funding per capita than their urban counterparts.

Classification Subgroup	Rural/ Urban	Average Per Capita Funding
Urban	Urban	£549.85
Accessible Rural	Rural	£334.82
Remote Rural	Rural	£399.68

Table 8.1a: Per capita average funding at local authority district scale by Countryside Agency (1999) District Classification (Data generated by the model)

Classification Subgroup	Rural/ Urban	Average Per Capita Funding
Major Urban	Urban	£779.00
Large Urban	Urban	£445.18
Other Urban	Urban	£411.24
Significant Rural	Rural	£357.23
Rural-50	Rural	£363.49
Rural-80	Rural	£383.49

Table 8.1b: Per district average per capita funding by Defra (2004) local authority Classification (Data generated by the model)

Under this delineation it is estimated that Bradford Metropolitan Authority receives £645.23 per capita. This comes from £470.59 per capita district level funding; £25.20 per capita as an estimated share of West Yorkshire Fire and Rescue funding; and £149.43 per capita as an estimated share of West Yorkshire Police funding, resulting in a total grant of £318,856,214.27. For the case study area of Devon, a per capita estimate has been calculated for each shire district. It is estimated, for example, that Mid Devon receives £371.02 per capita. This comes from £77.85 per capita shire district level funding; £166.51 per capita as an estimated share of Devon shire county level funding; £18.99 per capita as an estimated share of Devon Fire and Rescue funding; and £107.67 per capita as an estimated share of Devon and Cornwall Police funding, resulting in a total grant of £27,541,944.29.

8.2: Potential Changes to Local Government Funding Formula

The focus of this chapter is to analysis local government funding to explore how the formulae impact rural areas, and specifically rural social care. The presentation of the analysis within this chapter means that the deliverable from this thesis is a dynamic analysis tool. This allows interested parties to examine the funding formula in detail and to introduce their own modifications in order to explore the impact of potential changes for their locations of interest and/or the country as a whole. The methods used in the "what if" scenarios have been informed by the findings in earlier chapters of this thesis. The demand for alternative solutions has been driven by both a reading of the literature and meetings with representatives from rural local authorities and from the local government pressure group SPARSE. Both SPARSE, Devon CC and Bradford MDC expressed an interest in knowing the impact of changing the sparsity weighting; this was to facilitate targeted lobbying for increased funding. The initial scenarios explore the limits and potential within the existing formula. The second section moves on to provide potential changes within this formula. The scenarios do not go as far as to suggest changing the entire funding mechanism for local government or other radical restructuring. The feedback from contacts strongly suggested that they wanted practical information, which could be used to lobby central government and instigate practical changes which would benefit rural authorities rather than impractical 'grand theory' outcomes. Such wholesale or radical changes, while producing great gains on paper, stand little or no chance of being taken seriously as policy options for the future.

8.2.1: "What if" scenario 1: A rurality weighting added to Lower Tier RNF

The first part of this scenario consists of several radical tests of the local government formula to establish the limits for change within the current funding structure. The first step towards creating a dramatic shift in funding for rural areas was to introduce a new weighting factor into the equations. Here a new weighting factor was applied to the lower tier RNFs to represent additional funding targeted at rural areas. This was named the "Rurality Allowance". The lower tier RNF was increased by up to 50% for those authorities with a Defra score of "Rural 50" or "Rural 80" and therefore regarded as predominantly rural (as described in Chapter Three section 3.8.4: an authority is

classified as Rural 50 if more than 50% of the population live in a rural area, similarly Rural 80 represents an authority with more than 80% of the population living in a rural area). This was repeated for varying percentage increases from 5% to 50%, in all cases the addition of the rurality allowance to the lower tier RNF did have the effect of producing a funding increase for those areas regarded as rural by the above criteria. However, this adjustment has unintended consequences for those authorities responsible for education services, there being insufficient funds for authorities in this group to gain the guaranteed inflationary increase amount (since there is insufficient additional funding in the funding 'pot' for this group of authorities). Under the most extreme scenario, that of a 50% increase, authorities with education responsibilities (the funding group most dramatically affected by this scenario) had a discrepancy of just over £1 billion to reach the guaranteed floor increase amount. With approximately £158 million available in the 'ceiling' there was a huge shortfall of almost £912 million.

Under the current government grant allocation model this outcome would be unacceptable, as authorities are formally guaranteed these inflationary increases. However this exercise usefully highlights which authorities would be disadvantaged by the introduction of a rurality allowance and serves to highlight the restrictive influence of the floor mechanism (which will be examined further in section 8.2.2). This scenario focused on funding at the district level because both Defra (2004) and the Countryside Agency (1999) produced classifications at this geographic scale, making a rural / urban distinction simple. However this is too high a level of resolution to highlight the variation in population density and distribution within the authorities themselves. As such, other scales will be examined within later scenarios.

The initial scenario was extended to examine the funding distribution if the rurality weighting was varied in accordance to how rural an area was. This was done to refine ideas for further scenarios by understanding the limits of the formula flexibility and responsiveness to change. In a repetition of the earlier test to create a basic rural weighting, the Lower Tier RNF score was given an additional weighting factor based on the area's rural classification. Based on the Defra (2004) local authority classification, areas with a score of "Significant Rural" had their weighting multiplied by an additional 10%. Areas with a score of "Rural 50" were multiplied by 1.2 and areas with a score of "Rural 80" were multiplied by 1.3.

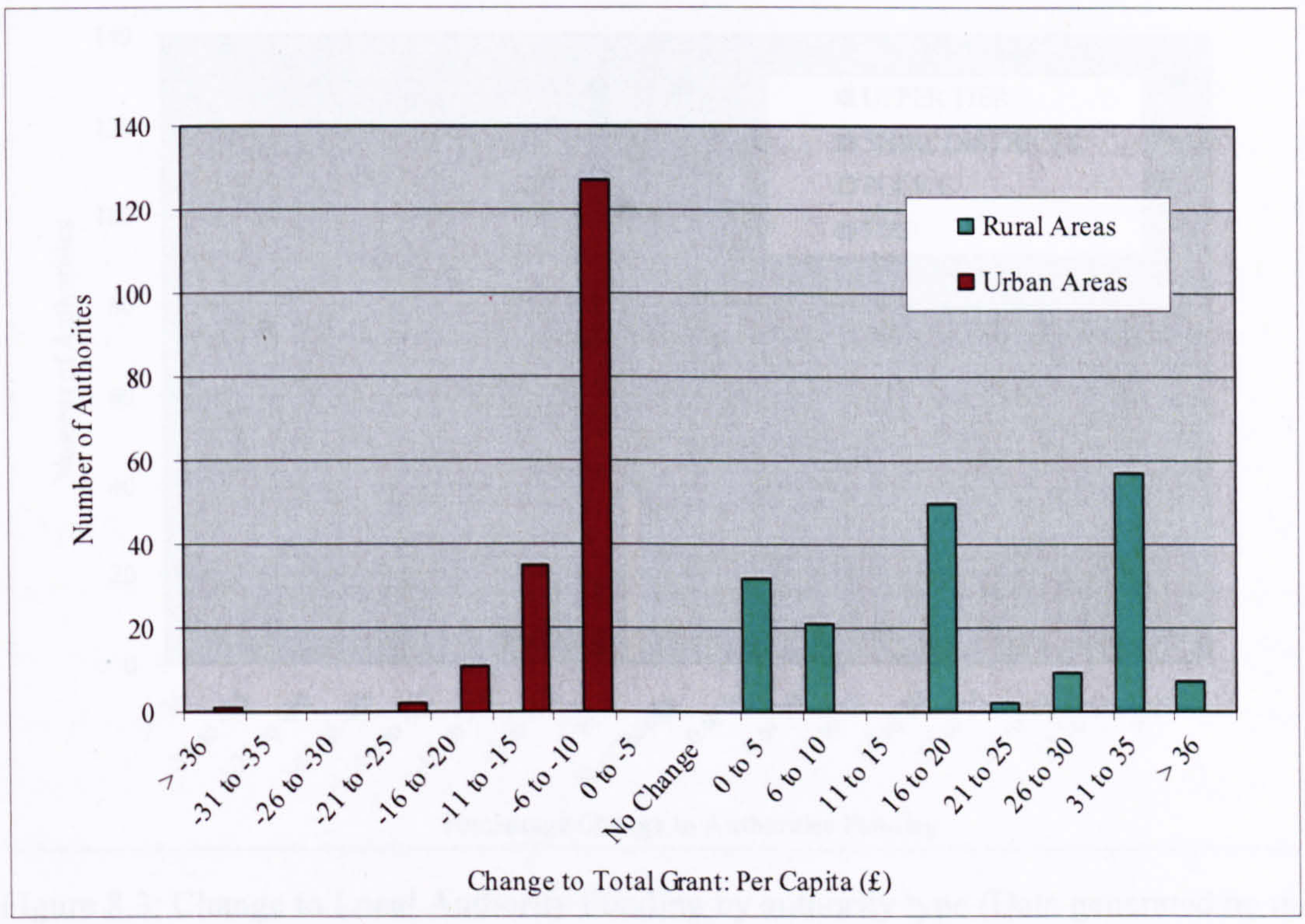

Figure 8.2: Estimated change to per capita funding by lower tier Local Authority (2007/08 financial year) using Defra, 2004 classification (with the damping block included) (Data generated by the model)

The resulting changes in authority funding from this experiment have been averaged over lower tier local authority areas illustrating (in figure 8.2) how funding changes for rural and urban areas. However, this estimate does not show the distribution of funding between services. The addition of a rural weighting predictably, in general, benefits rural areas (as illustrated in figure 8.2). As the example here shows, Bradford Metropolitan Authority is estimated to lose £5,520,112.09 of their grant, which equates to a loss of £11.17 per capita. On the other hand, rural areas such as Mid Devon District Authority receive substantial gains; in this case Mid Devon gains £2,522,381.45 which equates to £33.98 per capita.

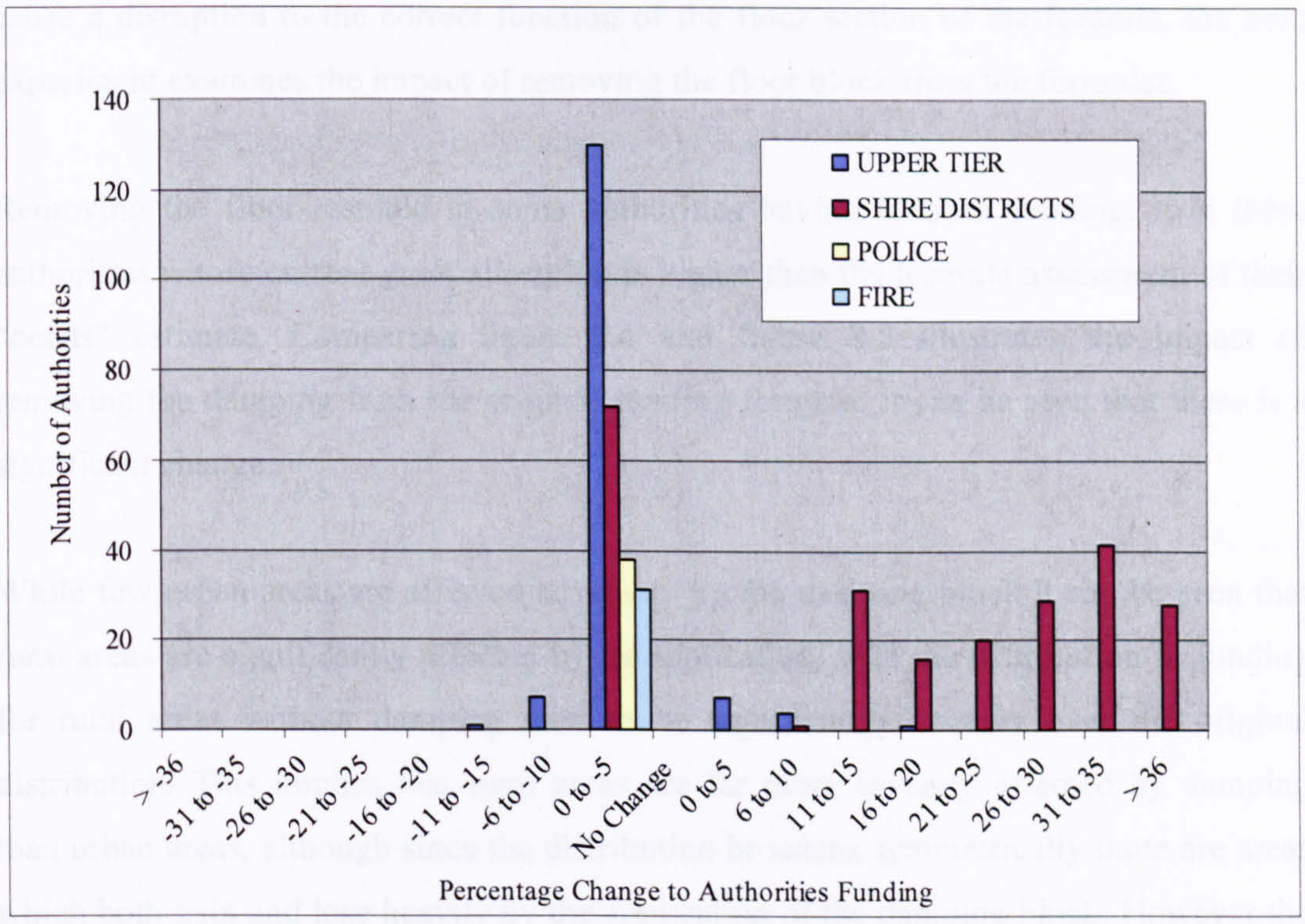

Figure 8.3: Change to Local Authority Funding by authority type (Data generated by the model)

Figure 8.3 illustrates the impact of this experiment, in percentage change, for each of the floor groups (authorities that provide upper and mixed tier services (Shire Authorities, Metropolitan Authorities and Authorities in London and authorities that only provide lower tier services (Shire Districts); fire authorities; and police authorities). There is clearly a large increase in funding for shire districts, and also some metropolitan districts that are classified as rural - and as such have seen an increase in funding. As the total funding available is a fixed value there has been an even decrease in funding for other authority types to fund these changes.

8.2.2 "What if" scenario 2: Removing the Floor

The existence of the Floors and Ceilings block of the Local Government Funding formula is not without critics. Some of those are from within local government including the pressure group SPARSE (Taylor, 2006). Given these criticisms, and the results from the above test proving that even slight changes within the formula will

cause a disruption to the correct function of the floor section of the formula, the next experiment examines the impact of removing the floor block from the formulae.

Removing the floor resulted in some authorities having reduced funding. It is these authorities whose current grant allocation is higher than the formula assessment of their "needs" estimate. Comparing figure 8.4 and figure 8.5 illustrates the impact of removing the damping from the original funding formula. It can be seen that there is a significant change.

While few urban areas are affected adversely by the damping block it can be seen that rural areas are significantly affected by its application, with the distribution in funding for rural areas without damping seen to be significantly broader over the original distribution. This implies that rural areas are far more severely affected by damping than urban areas, although since the distribution broadens symmetrically there are areas which both gain and lose heavily by the application of the damping block. However the most obvious effect of removing the damping appears at the regional scale with the Home Counties and Greater London losing the most funding, whilst remote rural areas such as Norfolk gain substantial funds.

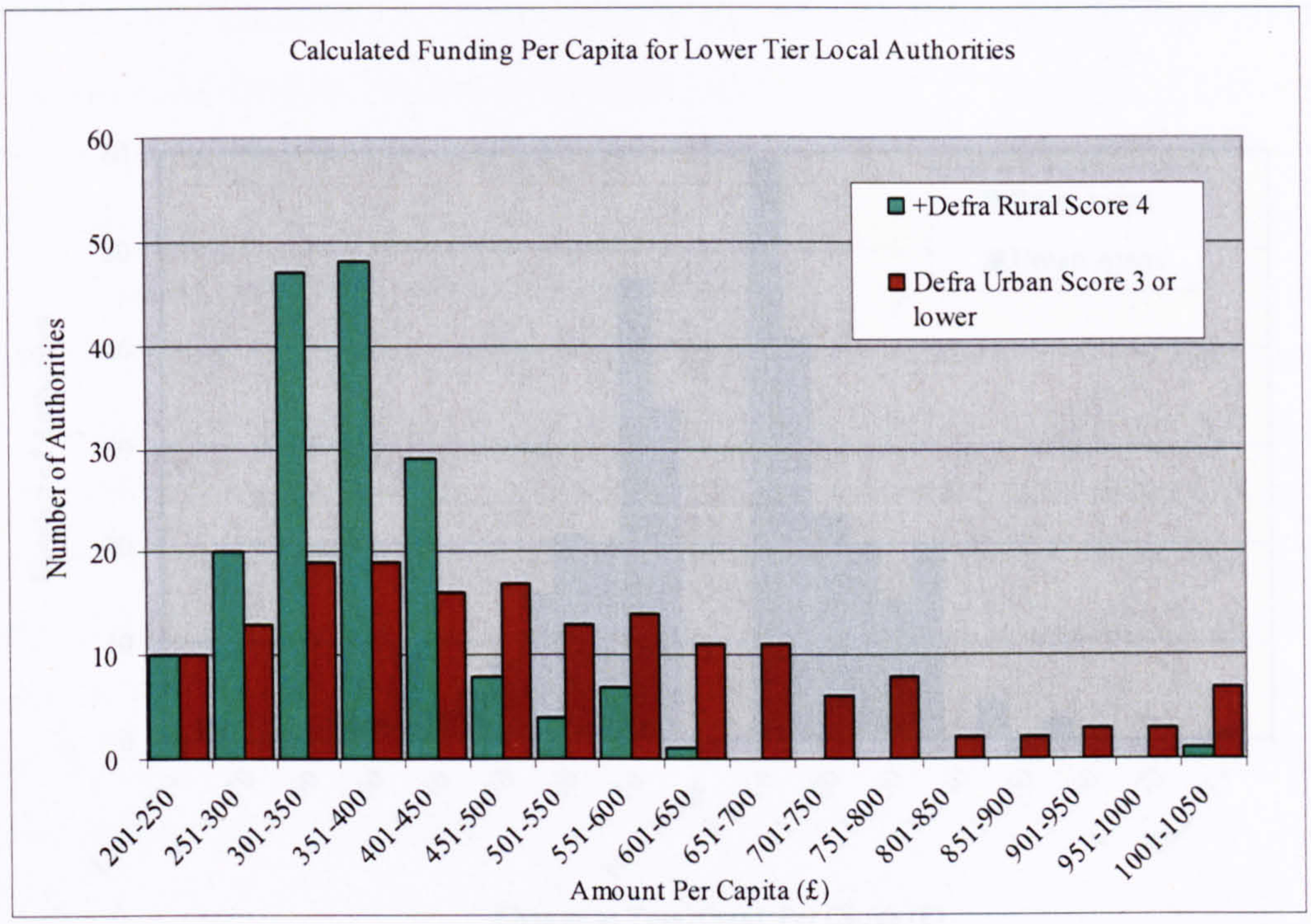

Figure 8.4: Estimated funding per lower tier Local Authority if the Damping block is excluded from the Local Government Funding Formula by Defra (2004) rural and urban district level classification (Data generated by the model)

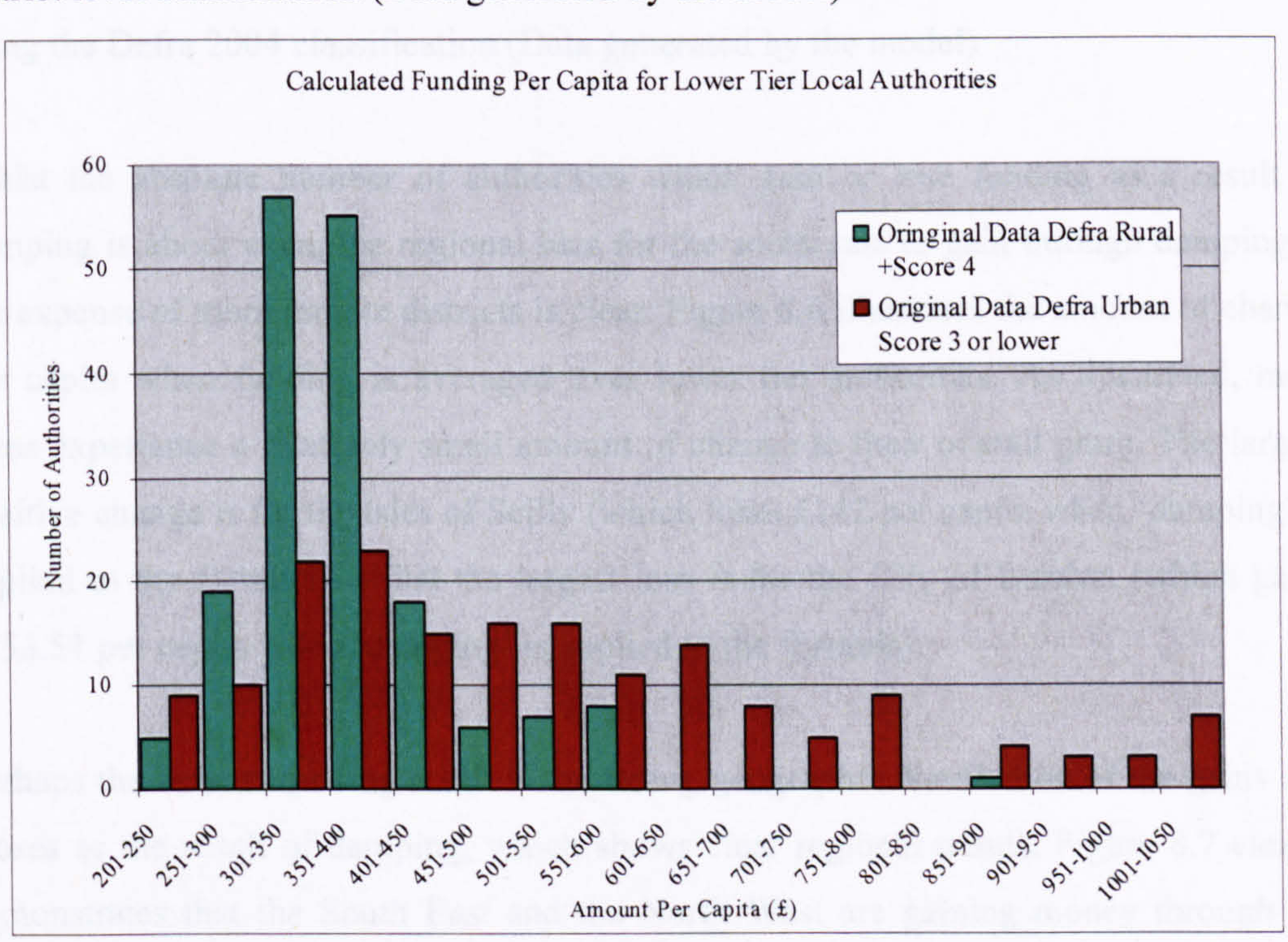

Figure 8.5: Original distribution of local authority funding per capita by Defra (2004) rural and urban area district level classification (Data generated by the model)

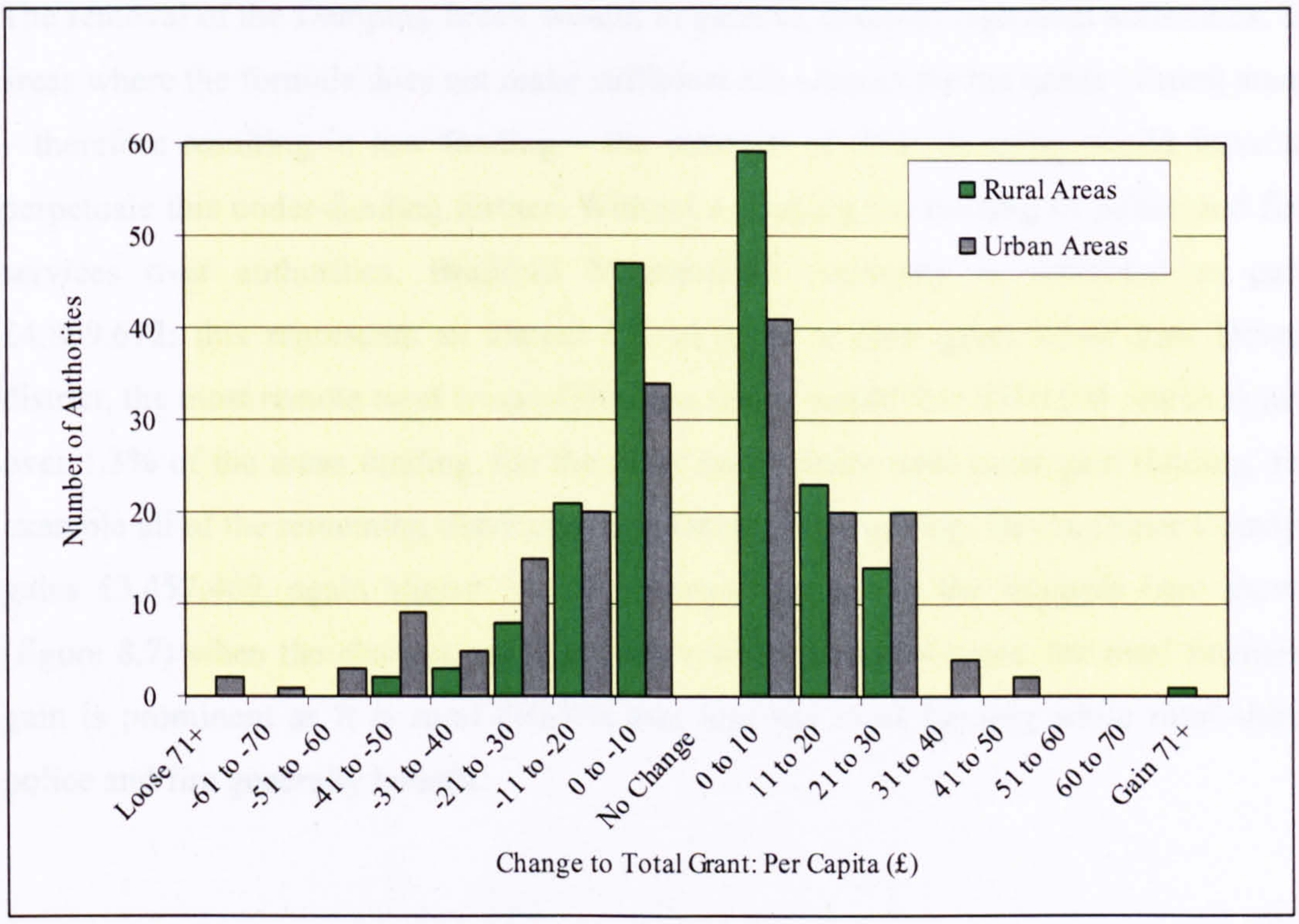

Figure 8.6: Estimates of change to per capita funding of local authorities 2007/08 Formula Grant after the removal of Damping - delineated by rural and urban authorities using the Defra 2004 classification (Data generated by the model)

Whist the absolute number of authorities which gain or lose funding as a result of damping is about even, the regional bias for the south east to gain through damping at the expense of more remote districts is clear. Figure 8.6 illustrates the amount of change per capita when funding is averaged over lower tier authorities. As illustrated, most areas experience a relatively small amount of change to their overall grant. The largest positive change is for the Isles of Scilly (which loses £142 per capita when 'damping' is applied to the formula) whilst the largest loss is for the City of London (which gains £653.51 per capita when 'damping' is applied to the formula).

Perhaps the most surprising result is the strong geographic distribution of the gains and looses as the result of damping, which shows clear regional trends. Figure 8.7 clearly demonstrates that the South East and the North West are gaining money through the application of Damping, with south London and the Hampshire / Surrey Shire areas gaining the largest amounts. The South West and the Midlands, especially the remote rural Shire areas around Norfolk, lose the largest sums of money as a result of damping.

The removal of the Damping Block would, in general, disadvantage rural authorities. In areas where the formula does not make sufficient allowances for the needs of rural areas – therefore resulting in low funding – the removal of floor damping would serve to perpetuate this under-funding further. Without averaging the funding of police and fire services over authorities, Bradford Metropolitan Authority is estimated to gain £4,859,672: this represents an almost 3% increase in their grant while East Devon district, the most remote rural areas of the case study, would lose £100,949 which is just over 1.3% of the areas funding. On the other hand, many rural areas gain funding, for example all of the remaining districts within Devon gain funding. Devon (Shire County) gains £3,457,409, again almost 3% of the area's grant. As the example here shows (figure 8.7) when the changes are averaged over all authority types, the rural financial gain is prominent as it is rural districts that lose the most funding while rural shire, police and fire generally benefit.

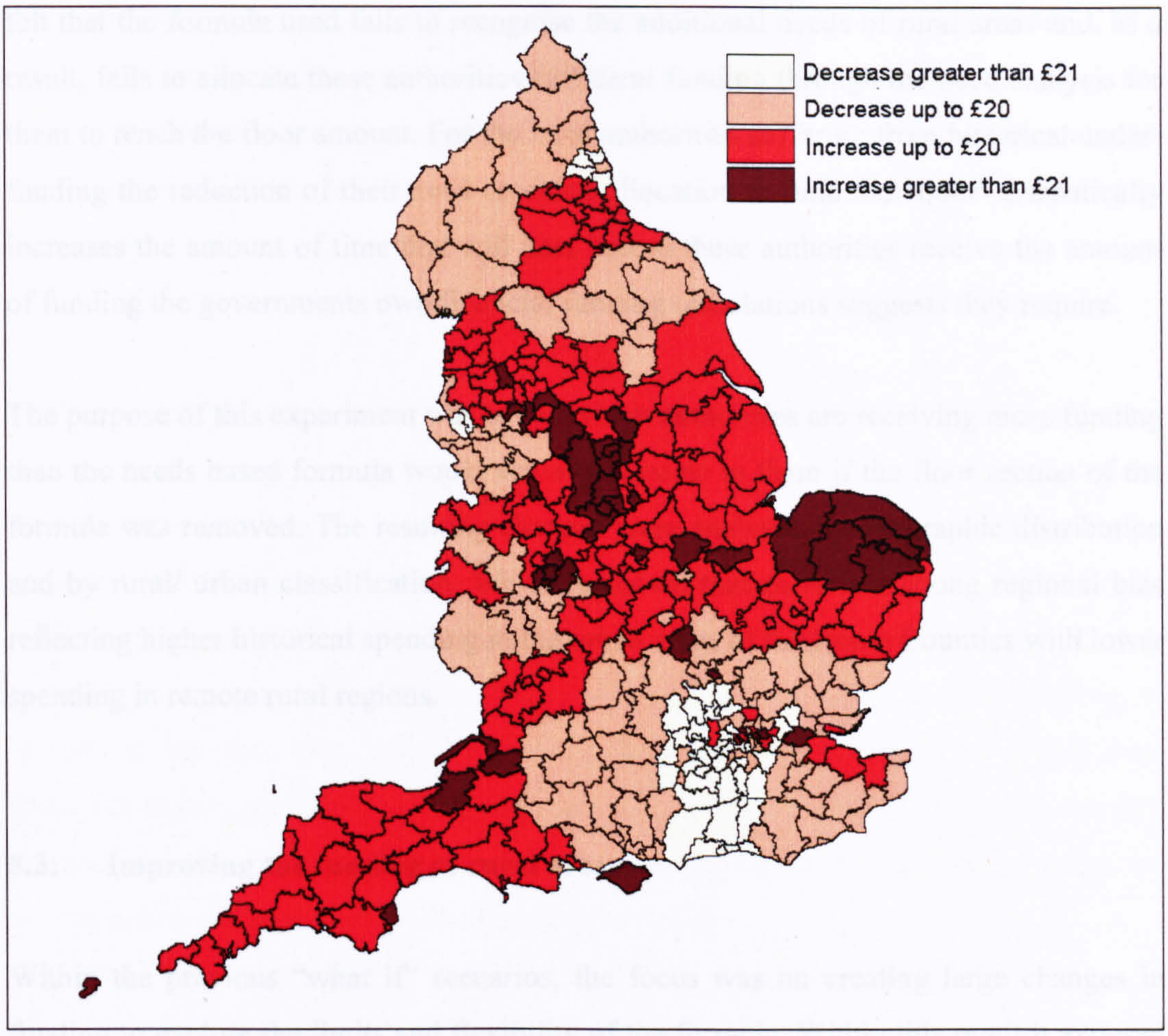

Figure 8.7 Estimated Change in Per Capita Funding after the removal of the Damping element of the Local Authority Formula Funding (2007/08 Data) (Data generated by the model)

There are two parallel explanations to the patterns shown in figure 8.7: historic misjudgement of need and inappropriate formula to estimate need. In the case of historic misjudgement of need, areas which are now not reaching their guaranteed increase in funding on the basis of need assessment were potentially over-funded initially (or possibly have a changing population which no longer has such high needs). In London and the North East, where funding has been particularly high per capita, it is possible that need has been over-estimated in these areas and according to DCLG (2007) as a result there is now a legacy of over-funding which the damping is used to gradually redress. For rural and for peripheral areas in general, such as the rural North where funding is substantially less per capita, the argument for historical over-spend seems less plausible (David Inman, 17/10/2007, personal interview). In these areas it is

felt that the formula used fails to recognise the additional needs of rural areas and, as a result, fails to allocate these authorities sufficient funding through the need analysis for them to reach the floor amount. For the rural authorities suffering from historical under-funding the reduction of their need assessed allocation to fund the 'floor' dramatically increases the amount of time that will pass before these authorities receive the amount of funding the governments own financial funding calculations suggests they require.

The purpose of this experiment was to see which authorities are receiving more funding than the needs based formula would actually allocate to them if the floor section of the formula was removed. The resulting changes were analysed by geographic distribution and by rural/ urban classification. We have shown that there is a strong regional bias reflecting higher historical spending in the urban areas of the Home Counties with lower spending in remote rural regions.

8.3: Improving the funding of rural areas

Within the previous "what if" scenarios, the focus was on creating large changes in funding to explore the limits and flexibility of the formula. Within this remit it exposed the role of floor damping in reducing the funding for rural areas. This second set of "what if" scenarios builds on the knowledge gained from the first section, along with lessons learnt from previous chapters, to provide detailed options for improving the funding (and the identification) of rural areas through the use of improved variables and alternative classification methods.

As discussed in Chapter Three the actual classification of rural chosen is important as is the populations measured as the variation in the populations classified as rural varies dramatically (see Chapter Three table 3.1). With this in mind the next "what if" scenarios responded to suggestions from interviewees to examine the impacts of changing the adults PSS formula to better reflect the rural population. This is done initially through changing the geographic scale that sparsity (sparsity being the inverse of density, but in this case taken to be any area classified as sparse under the local government funding allocation – as described fully in Chapter Seven) is measured on (section 8.3.3), then by examining the impact of using the total resident population

rather than simply the older adult population density and finally changing the weighting of sparsity top-up within the adults PSS formula. After these options for altering the existing classification of sparsity have been examined, the section then moves on to a more radical suggestion – replacing the measurement of sparsity with a measurement of remoteness.

8.3.1 "What if" scenario 3: Different geographical scale

An important factor in the funding formulae is the question of scale; it is vital for the interpretation and comprehension of spatial data. The Social Services for Older People sub block measures population sparsity of lower super output areas using older adult resident population data, whereas the Children's formula uses a measurement of sparsity at the ward level and EPCS measures population sparsity at the output area. Both Children's services and EPCS measure sparsity against the total resident population even though Children's services are targeted at a specific age range (in common with the targeting of Older Adults' services).

The use of different geographical scales for measurement of sparsity can have as dramatic an impact on funding provision as changes to the actual population density classes chosen for the calculation of the sparsity weighting. For example, if the whole of England is measured as one area the resulting population density is a mere 3.76 persons per hectare, low enough to classify the entire population as sparse (for the purposes of calculating the Children's Services Sparsity Top-up, the Environment, Protective and Cultural Services Sparsity Top-Up, or the Police Sparsity Top-Up). For the older population this outcome would be equally pronounced. Measuring the population sparsity for those aged 65 and over (age at last birthday, 2001 Census) results in a population density of only 0.59 residents per hectare which results in England, as a whole, being classified as sparse for the purposes of the Older Adults PSS Top-up.

This scenario explored the impact of classifying areas into sparse and super sparse at the output area scale rather than the lower super output area scale used currently. As when funding is averaged to the district level, this adjustment works strongly in the favour of

rural areas with 98 rural areas receiving extra funding compared with only 39 urban areas (all authorities experienced some change).

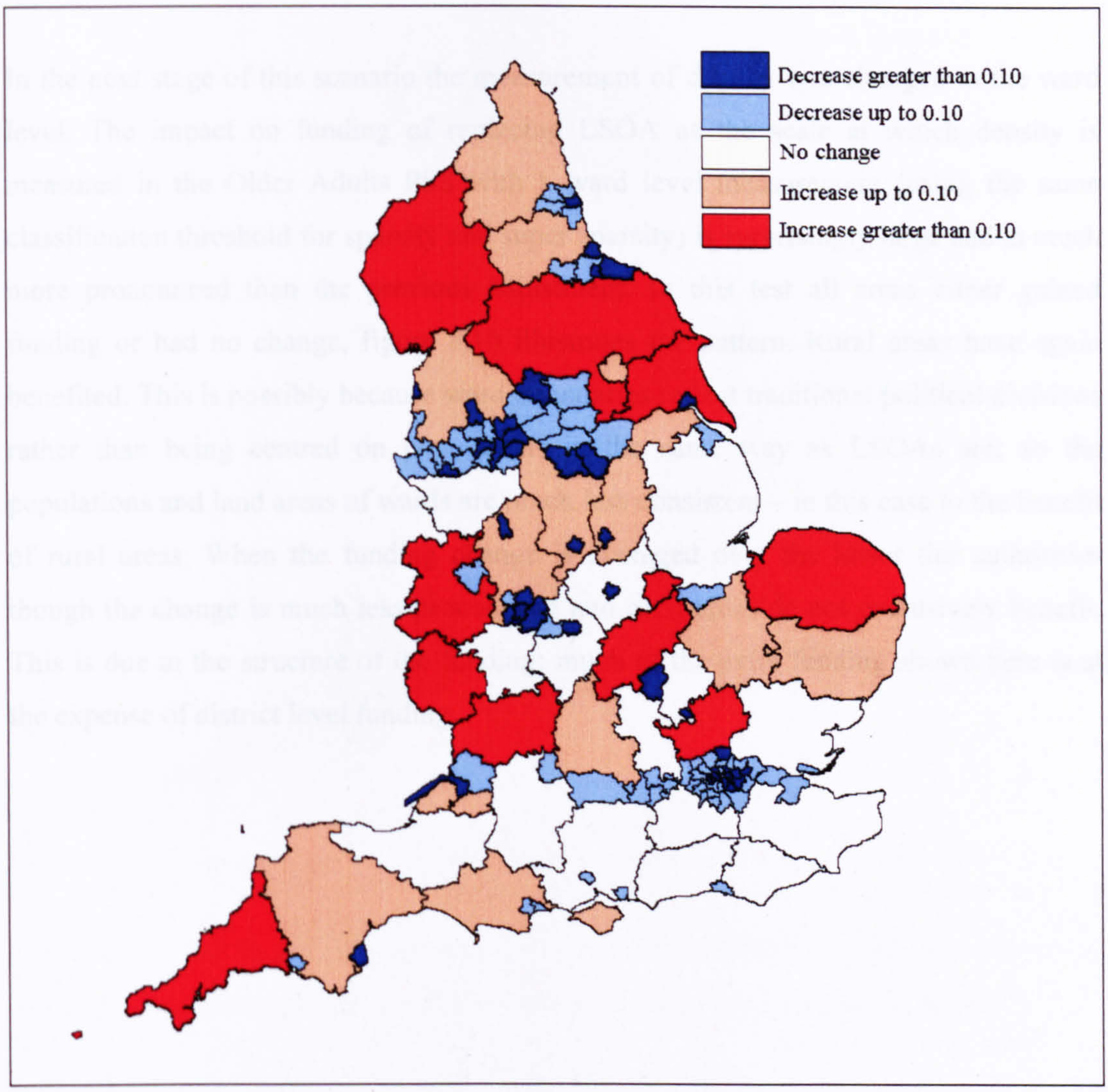

Figure 8.8: The impact on funding of measuring sparsity at the output area scale (with the damping block included) (Data generated by the model)

Figure 8.8 illustrates the impact of measuring sparsity at the output area level for authorities that provide social services (therefore not showing the funding change to lower tier authority shire districts). The change in funding here shows a stark contrast with all urban areas losing funding and the vast majority of rural areas - particularly peripheral areas seeing an increase in funding. In per capita terms these changes are obviously very small; this is because the Adults PSS sparsity top-up represents only 1%

of the Adults social services funding, and therefore only about 0.25% over the overall funding. Given that the top-up affects such a small amount of the formula these changes are surprisingly large.

In the next stage of this scenario the measurement of density was changed to the ward level. The impact on funding of replacing LSOA as the scale at which density is measured in the Older Adults PSS with a ward level measurement (using the same classification threshold for sparsity and super sparsity) is surprisingly large and is much more pronounced than the previous adjustment. In this test all areas either gained funding or had no change, figure 8.10 illustrates the pattern. Rural areas have again benefited. This is possibly because ward boundaries reflect traditional political divisions rather than being centred on populations in the same way as LSOAs are, so the populations and land areas of wards are much less consistent – in this case to the benefit of rural areas. When the funding change is averaged over the lower tier authorities though the change is much less pronounced and rural areas do not exclusively benefit. This is due to the structure of the funding; much of the extra funding shown here is at the expense of district level funding.

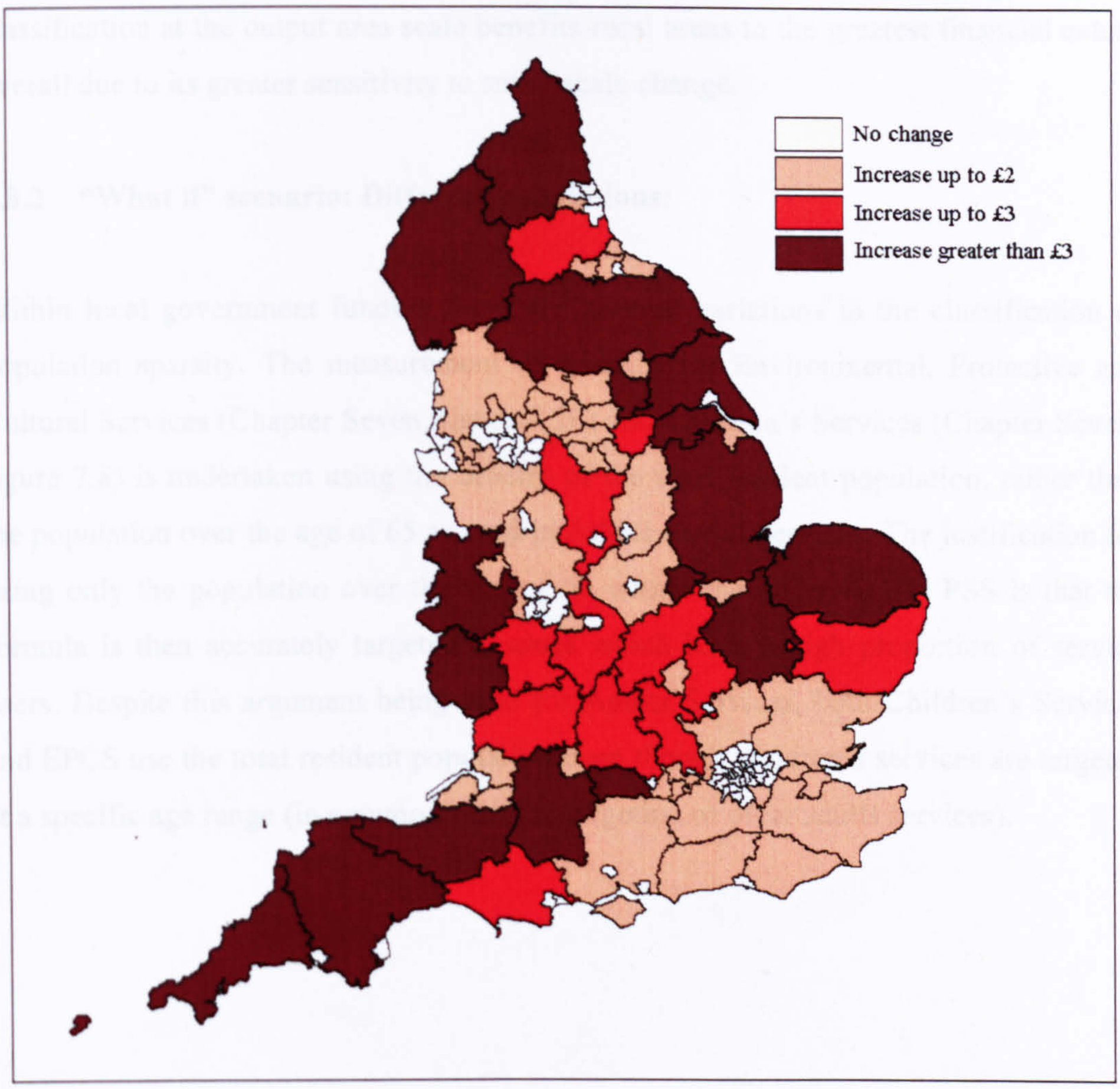

Figure 8.10: The impact on per capita funding for authorities which provide social services from measuring sparsity at the ward scale (Data generated by the model)

This suggests that measuring sparsity at a higher level of resolution might benefit regions characterised by large expanses of open land combined with high density urban settlements. Areas with a more even distribution of population settlement benefit from a classification at the smaller geographical scale as it is able to identify more subtle variations in density. None of the classification options here provide an ideal solution as they are based on geographical scales developed to delineate political boundaries or clusters of similar populations. Only a non-politicised area measurement such as the 1km grid square coverage adopted in Northern Ireland could provide a non-biased assessment of population density from which to derive a classification of sparsity. However, in the absence of such a classification then at least we can see that a

classification at the output area scale benefits rural areas to the greatest financial extent overall due to its greater sensitivity to small scale change.

8.3.2 "What if" scenario: Different populations:

Within local government funding there are internal variations in the classification of population sparsity. The measurement of sparsity for Environmental, Protective and Cultural Services (Chapter Seven, figure 7.20) and Children's Services (Chapter Seven, figure 7.8) is undertaken using the density of the total resident population, rather than the population over the age of 65 as used in Adults Social Services. The justification for using only the population over the age of 65 within the Older Adults PSS is that the formula is then accurately targeted at areas which have a high proportion of service users. Despite this argument being used for Adults Services, both Children's Services and EPCS use the total resident population even though children's services are targeted at a specific age range (in common with the targeting of older adults services).

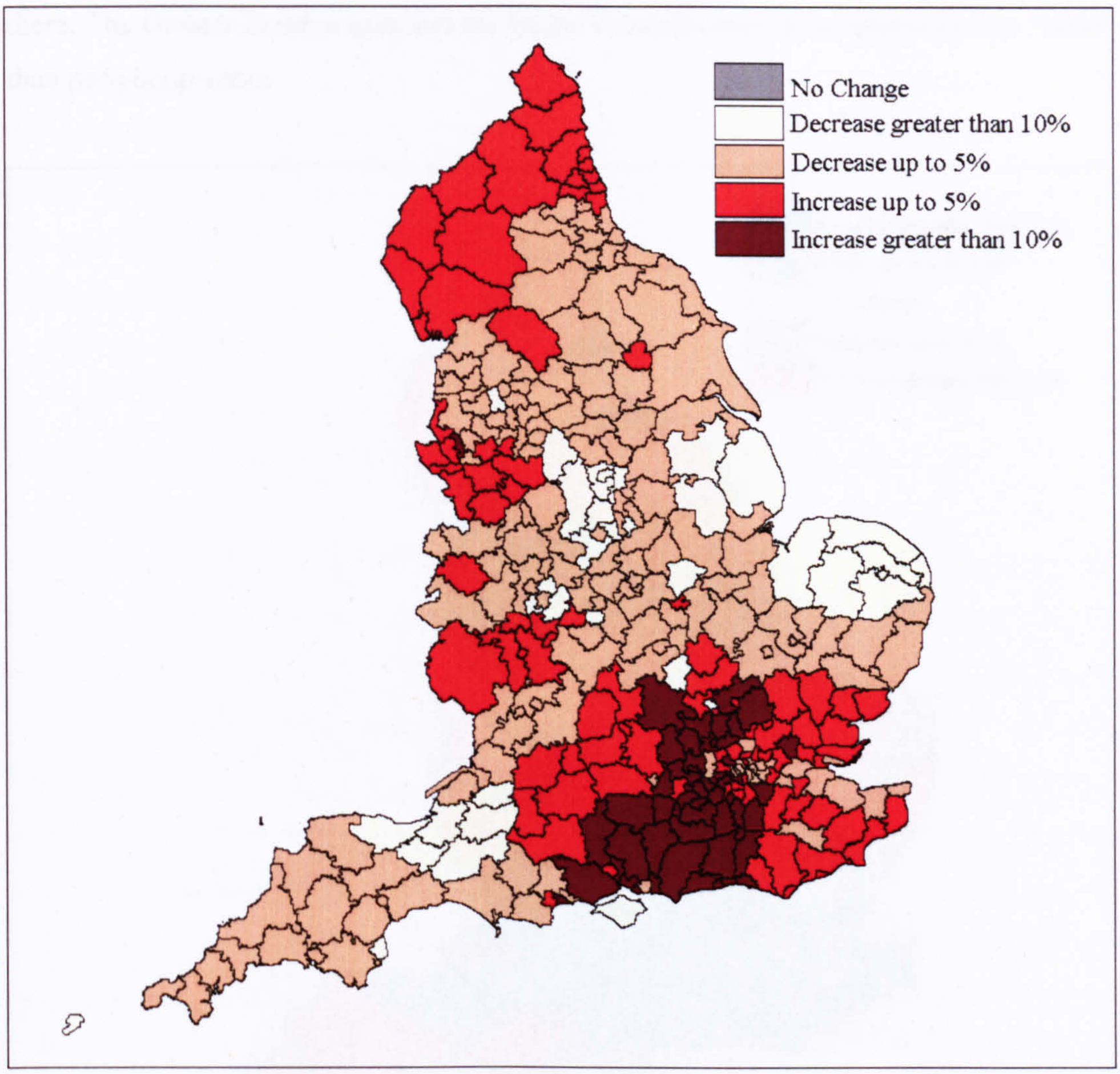

Figure 8.11: Change in the amount of an authorities population which is regarded as rural (sparse or super sparse) as a result of measuring sparsity through the entire population rather that using older adult residents (with the damping block included) (Data generated by the model)

This map (figure 8.11) could almost be a representation of popular retirement destinations, highlighting areas such as coastal regions around the South West and to the East of England. The areas which lose funding are those which have a higher than average percentage of older residents in these areas; this is due partially to higher life expectancy in these areas and their popularity as retirement destinations, coupled with poor employment prospects reducing the younger population. East Devon and the south of Dorset have some of the highest proportion of elderly persons of the country (over 30% in contrast to a national average of just 16%). The low proportion of older residents within the Greater London area is responsible for the increase in rurality seen

there. The Greater London area and the Home Counties remain substantially less "rural" than peripheral areas.

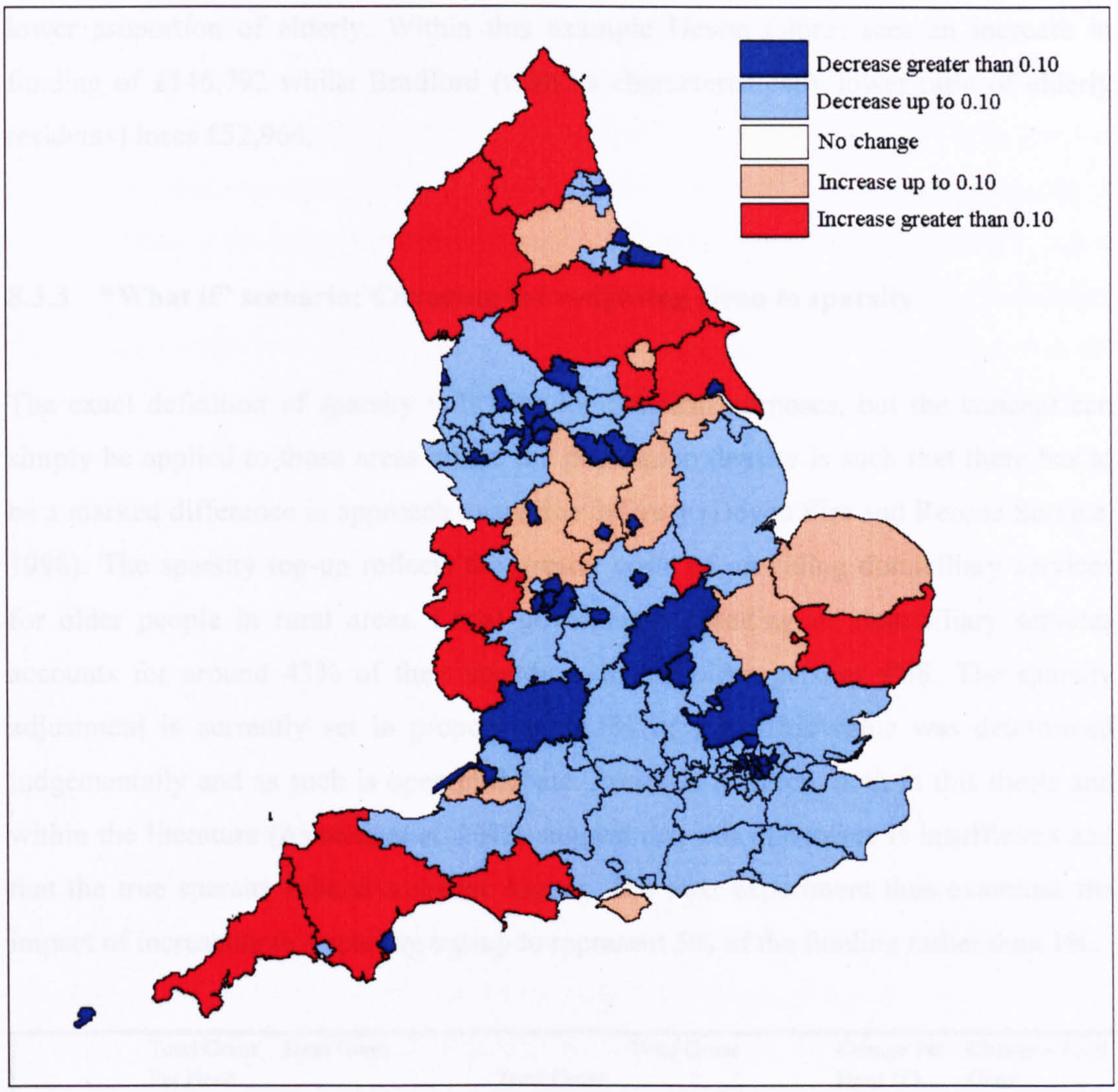

Figure 8.12: The change in funding for authorities which provide social services if the sparsity measurement in the adults PSS was measured using the whole population (with the damping block included) (Data generated by the model)

Despite the expectation drawn from figure 8.11, funding for rural areas is actually increased by measuring sparsity at a whole resident population level rather than measuring simply the older population. As illustrated in figure 8.12, areas with the highest proportion of older residents benefit the greatest amount, as the proxy population of elderly persons rather than total resident population relied on the

population to maintain a consistent age curve across the county. Without this consistent distribution, areas which have a higher than average percentage of elderly residents would appear to be higher density residence areas in comparison with areas with a much lower proportion of elderly. Within this example Devon (shire) sees an increase in funding of £146,792 whilst Bradford (with its characteristically lower ratio of elderly residents) loses £52,964.

8.3.3 "What if" scenario: Changing the weighting given to sparsity

The exact definition of sparsity will vary for practical purposes, but the concept can simply be applied to those areas where the population density is such that there has to be a marked difference in approach to service delivery (Devon Fire and Rescue Service, 1998). The sparsity top-up reflects the greater costs of providing domiciliary services for older people in rural areas. Local government spending on domiciliary services accounts for around 43% of their spending on the older persons PSS. The sparsity adjustment is currently set in proportion to 1% of this. This value was determined judgementally and as such is open to debate. Previous research, both in this thesis and within the literature (Asthana *et al*, 2002) suggest that this allowance is insufficient and that the true sparsity related costs are higher. The next experiment thus examines the impact of increasing this sparsity top-up to represent 5% of the funding rather than 1%.

	Total Grant Per Head	Total Grant	Total Grant Per Head	Total Grant	Change Per Head (£)	Change - Total Grant
East Devon	£57.12	£7,515,850.35	£57.44	£7,558,074.00	-£0.32	-£42,223.65
Exeter	£102.12	£11,885,944.46	£102.50	£11,930,097.59	-£0.38	-£44,153.13
North Devon	£85.30	£7,826,661.33	£85.66	£7,859,746.57	-£0.36	-£33,085.24
South Hams	£65.11	£5,391,749.93	£65.46	£5,420,352.69	-£0.35	-£28,602.77
Teignbridge	£74.41	£9,428,707.33	£74.75	£9,472,008.09	-£0.34	-£43,300.76
Mid Devon	£78.49	£5,826,885.09	£78.84	£5,852,753.98	-£0.35	-£25,868.89
Torridge	£93.30	£5,984,934.64	£93.68	£6,009,010.82	-£0.38	-£24,076.19
West Devon	£81.88	£4,173,271.55	£82.25	£4,191,853.19	-£0.36	-£18,581.64
Devon	£176.75	£130,549,527.52	£171.19	£126,437,523.14	£5.57	£4,112,004.37

Table 8.2: Increasing the Sparsity weighting within the Older Adults PSS from 1% of domiciliary services spending (43% of total spending in this sector) to 5% (with the damping block included) (Data generated by the model)

Changing the sparsity adjustment to a proportion of all Older Adults PSS rather than just a proportion of spending on domiciliary services results in small but important changes for funding, table 8.2 shows the changes to funding in Devon. All areas which provide social services in rural areas (such as Devon County) gain funding as a result of this scenario. What is slightly unexpected is the proportion of funding lost from districts (in order to fund the increase to shire areas). Whilst the brunt of the increase results in reduced funding for those authorities providing social services in urban areas, a higher than expected proportion of the funding is appropriated from the funding of districts. Given this balance in funding, when the effects of the change are proportioned over the district level, rural areas are occasionally losing, rather than gaining, substantially. With this pattern in mind, rural policy makers with a vested interest in county level funding would be advised to follow this approach. For district councils, further refinements would be needed to safeguard their funding.

8.3.4 "What if" scenario: Replacing sparsity with remoteness

There is a saying that "old age never comes alone" representing the realism that illness, poverty, disability and loneliness also invariably come with age. A similar concept can be applied to sparsity. As discussed in Chapter Two, not only are such areas sparse, they are usually remote from major centres with substantial geographical challenges, such as moors or mountains, estuaries or large expanses of coastline. Access is frequently poor. In fact, understating distances to be travelled, and the effects of extremes of weather in such areas, pose even greater problems. All of these factors have direct effects on the provision of services. Shepherd and Bibby felt that for this reason a simple measure of sparsity is unlikely to capture the needs of a population (Shepherd, 2006; Bibby and Shepherd, 2004). They incorporated a measure of remoteness into the Defra 2004 Rural and Urban Area Classification (2004) in an attempt to rectify the weakness of the sparsity method without making the classification overly complex.

Within Local Government Finance the argument is made that sparsity is only one of a wide range of variables to capture 'need' and that therefore it is largely irrelevant that this measure of rurality lacks the ability to reflect 'need' sufficiently. However, when,

as in this case, only one measure of rural need is made, there is a strong case for using a more resilient and representative variable. It was an appreciation of this argument which was responsible for the creation of the next what-if test: replacing the sparsity measure within Older Peoples Social Services with a representation of Defra's 2003 Rural and Urban areas classification.

Rather than being given a weighting for sparsity based on population distribution over the LSOA. A weighting was given based on the number of older persons living in an LSOA where the population was regarded as 'rural' under the 2004 Rural/Urban Classification (the methodology for this classification is explained in Chapter Three). The more rural an area was considered to be by the classification the higher the weighting that was given to that population. For example, if an area was classified as the most remote classification (Hamlet and Isolated Dwelling, Sparse) then the population (total of the population over the age of 65) total in this area was weighted by 1.3, in the next rural class the total population was weighted by 1.2 etc. Then the totals in this column were summed in the model to produce the sparsity score for the Older Adults PSS.

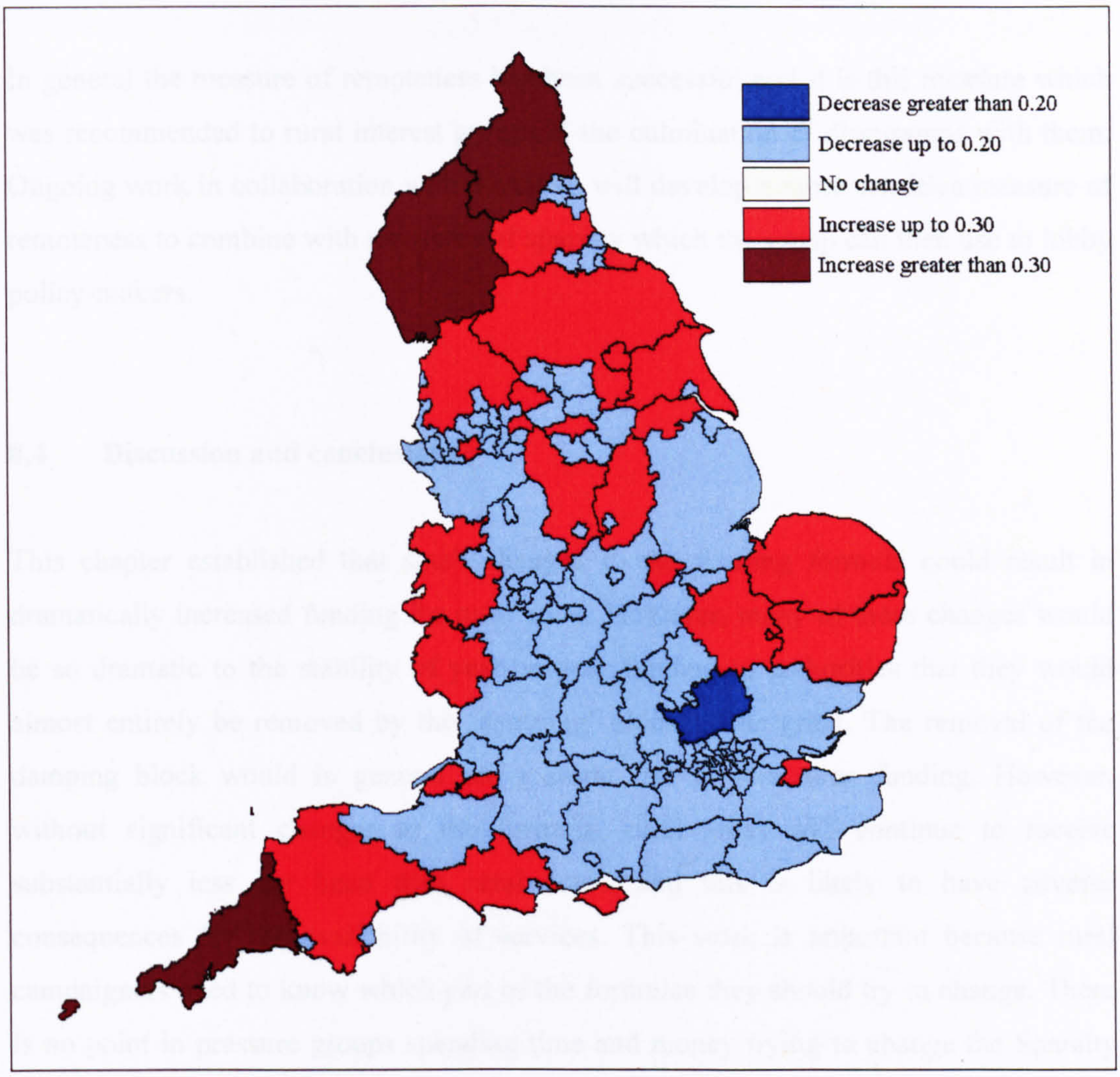

Figure 8.13: Per capita funding change for authorities that provide social services when rurality is measured using Defra 2004 LSOA level classification of rural and urban areas (with the damping block included) (Data generated by the model)

The formula is successful in many ways in identifying remoteness, with the most remote parts of England such as Cornwall and Northumberland gaining funding whilst areas such as around London, and especially surrounding Oxford and Cambridge, see a dramatic decrease in funding. As mentioned earlier, the funding change is small per capita due the very small proportion of funding that the Older Adults PSS sparsity top-up impacts. Under this revised scheme Devon would gain £183,014 whilst Bradford

loses the least funding under this scenario than any of the earlier ones, with a fall of only £12,612.

In general the measure of remoteness has been successful and it is this measure which was recommended to rural interest groups at the culmination of discussions with them. Ongoing work in collaboration with SPARSE will develop a more sensitive measure of remoteness to combine with measures of sparsity which the group can then use to lobby policy-makers.

8.4 Discussion and conclusions

This chapter established that small changes to the funding formula could result in dramatically increased funding for rural areas. However, many of these changes would be so dramatic to the stability of year-on-year funding to authorities that they would almost entirely be removed by the 'damping' block of the grant. The removal of the damping block would in general see a slight rise in rural area funding. However, without significant changes to the formula, rural areas will continue to receive substantially less per head than rural areas, and this is likely to have adverse consequences for the availability of services. This work is important because rural campaigners need to know which part of the formulae they should try to change. There is no point in pressure groups spending time and money trying to change the Sparsity Top-up as the 'damping' is going to wipe out all of these gains. They should instead focus their energy on changing the damping mechanism or changing both. The outcomes from this chapter better enable them to make informed choices and to assess their priorities.

Rural authorities should argue for a shift from sparsity-based classifications to those which incorporate accessibility measures such as distance from nearest service centre (on the grounds that this could serve as a proxy for distance to healthcare services). In the absence of this the measurement of sparsity should be normalised across the formula so that the classification remains constant across services, although the weighting that the subsequent classification is given will understandably vary depending on the typical geographic distribution of the service provided. For example, services which provide

social care home visits to elderly persons (a service which attracts a cost sensitive additional time and distance burden) would require a much greater rural premium than police services (given that rural areas generally experience a much lower crime rate than their urban counterparts).

Chapter 9: Conclusions and Recommendations for the Future

9.1 Introduction

Classification is an important first step in all research areas from retail planning to organism evolution. The simplification of a complex dataset can make the previously unfathomable easy to understand. This thesis has attempted to simplify the complexity of health and social care funding within the National Health Service and Local Government. The aim has been to provide a clear and easy to interpret picture of the spatial distribution of funding, highlighting the importance of rural and urban classifications in the identification of 'need'.

This final chapter concludes the thesis; it shows how the overall research aim has been achieved by summarising the findings of the research and highlighting the main discoveries made. It does this with reference to the objectives outlined in Chapter One. Section 9.2 discusses how the main aim was achieved though the implementation of the research objectives. Section 9.3 discuses some of the limitations of the research with a view to offering a future research agenda. The chapter ends with Section 9.4 which looks to the future, outlining a number of possible research project ideas and providing concluding comments to the research (Section 9.5).

9.2 Summary of Research Findings

Objective 1: Review and discuss the research methods and the definition of rural areas in use within the academic community.

Chapter Two provided academic contextual background for this thesis. The definition of rural areas has been shown to be as much an art as a science, as illustrated by the three

very different academic discourses discussed (sociology, socio-economic and area morphology).

Social representations see rurality not as a fixed geographical entity but as a way of conceptualising space. "Rural" (and its synonyms) are words and concepts understood by lay people in everyday conversation, used as symbolic shorthand to deal with the complexities of the modern world (Halfacree, 1993). Social representations are therefore, crucially, social – a conceptual way of making the unfamiliar familiar. However, only those who share a representation will use it in the same way, allowing multiple and converging understandings of the same concept (Halfacree, 1995). In contrast, classifications based on socio-economic characteristics relate to the extent to which individuals' socio-economic characteristics vary with the type of environment in which they reside. The most widely known of these classifications is Paul Cloke's Index of Rurality (Cloke, 1977, Cloke and Edwards, 1986). The third discourse, area morphology, is empirical in conception, accepting that the rural exists and concerned with the identification of the correct selection of parameters to measure it. Denham's built up areas (1984) and Coombes's density measures (1991) are also typical of this approach, which concentrates on what is observable and measurable.

In the context of the current debate about defining rural areas and rurality there is really only one aspect which all the groups concerned agree on; that it is generally accepted that current rural definitions, both the official government definitions and those used by other bodies, are problematic because they are not good enough for the needs of users. The definitions arrived at are very much a product of the methodology as much as the characteristics of the area and/or population. If the analysis were conducted in alternative ways, different, but equally valid, definitions could be produced.

Objective 2: Compare existing classifications and definitions of rural areas in England

The analysis provided by Chapters Two and Three does not conclude that academics or government departments should (as expressed by Hoggart, 1990) 'do away with rural' as a definitional term. The term rural continues to have practical and emotive value in identifying different types of locality and associated 'need'. However, due largely to its

emotive connotations as a phrase, it is a misleading and potentially insufficient phrase to use within a policy context. Thus the classification of rural areas used has been carefully articulated in the remaining chapters within the thesis and the use of the word "sparsity" rather than "rurality" has been given preferential usage (where this phrase is appropriate within the classification chosen) in an effort to reduce confusion. While Chapter Two debated the treatment and definition of rural areas, Chapter Three examined the definition and classification of rural and urban areas in England used by government organisations. The classification of rural areas in general, and the choice of variables such as sparsity, have often been arbitrary - informed by previous research but still based on the pursuit of the 'optimal' research outcome rather than scientific modelling.

Chapter Three provided details on the variety of classification methods available and informed the choice of variables tested within Chapter Eight. The focus within the rest of the thesis has been predominately on the use of sparsity as a proxy indicator and of the 2004 Classification of Rural and Urban Areas produced for Defra which could potentially replace the simple sparsity measure. This possible replacement was worth examining as this classification is being directed by Defra as the official classification to be used within future government research. The classification is gaining wide acceptance within Governmental organisations as the new 'official' classification of rural areas in order to allow simple comparison of statistics. Given the plethora of classifications used in recent years this would be a valuable goal, and if the classification could be applied successfully to health research it would facilitate funding comparisons. Rural areas are likely to benefit from the adoption of such a system not only because the results of Chapter Eight show that the identification of rural areas would be more realistic, but also because a classification which did not treat rural areas as a residual category has the potential to raise their profile within policy.

Objective 3: To understand the challenges presented to healthcare providers in rural areas and examine why health and social care funding currently fails to recognise these special circumstances.

In general the thesis has found strong arguments for greater consideration of the definition of rurality within health research. Chapter Four discussed the needs of rural

populations in relation to health and social care provision whilst also providing some insight as to the challenges which rural service provision presents. The challenges are highlighted in Chapter Four. They include accessibility (both for clients and for service providers) and high service costs due to diseconomies of scale. The thesis findings indicate that there is a strong need for better ways of measuring rural deprivation and for understanding its contribution. There are (as illustrated in Chapter Four) significant intra-rural variations in mobility and access to healthcare services though average levels of ill health are often less than in urban areas. More research is needed into the measurement of health and social care services in relation to access, and its association with health care provision in rural areas. Access is a complex issue and includes the supply of local public services, and primary, secondary and tertiary health care as well as transport availability and travel distance. In addition causal directions are hard to establish in such diverse areas; while health care provision can influence health, selective migration and inequity of provision to deprived areas might account for any association. Nevertheless, it is still important to ensure equitable health care delivery in relation to health care need in rural areas.

Objective 4: Provide an accessible and understandable description of health and social care funding in England

Chapter Six and Chapter Seven provided accessible explanations of the funding of health and social care in England through the two main sources: the National Health Service and the local government finance agreement. Both of these sources of funding have long been criticised for being hard to understand even by a skilled statistician and by engendering confusion. Indeed, they prevent accountability outside their respective organisations. In addition Chapter Eight has offered an increased understanding of this funding by exposing the ways in which the local government formula is biased towards urban areas and how it can be manipulated in order to produce higher funding in certain areas. The local government pressure group SPARSE is now using this research to formulate future policy and inform its members of the rural/ urban conflicts in relation to funding.

Objective 5: Compare the funding of health and social care services in England to those in use in the rest of the UK and to International examples, and then examine the lessons learnt in the context of possible funding formula improvements.

Chapter Five compared healthcare funding formulae in operation in other countries, focusing initially on other parts of the UK, then moving on to examine Australia, New Zealand and the USA. Many of the features mentioned within these countries are country specific and therefore not applicable to England or the UK; such as the need to reach minority ethnic populations in Australia, Canada and New Zealand, whereas in England minority populations are concentrated in urban areas. However, there are still many lessons to be learnt. The persistent use of sparsity across classification methods reinforces its strength as a variable in proxying accessibility problems. The use of proximity to a large service centre within the Australian Small Hospital Adjustment shows that a service based variable (such as the Defra 2004 rural urban classification) could have a viable role within the prediction of rural area service planning. The specific access variables used in this classification may not be deemed appropriate for health planning, as they are targeted towards retail services, but they form a model for additional work on this subject. Scotland's use of distance to GP might be the most practical measure to replicate within the NHS formula. Also distance to a council's outreach social services base could provide a similar proxy for service provider distance within local government funding.

Objective 6: Propose changes to the classification of rural areas used within health and social care delivery formulae in order to improve the funding of rural areas.

The final objective of this thesis is covered in Chapter Eight (with possible follow-up work described below in Section 9.4). On the basis of lessons drawn from Chapters Five and Seven, a representation of the local government funding formula was constructed in Excel so that the impacts of modifications to the formula could be explored. Methods for classifying rural areas were incorporated, based on the methods for classifying rural areas currently in use within other government organisations (informed by the findings of Chapter Three) and from lessons learnt from the treatment of rural areas externally to England (drawn from the lessons in Chapter Five). Chapter Eight details the construction of a variety of 'what if' scenarios to establish which elements of the Local

Government Funding formula were most sensitive to changes in the sparsity thresholds and establish the impact of different geographic scales.

The scenarios then went on to establish the impact of using different rural definitions, which were discussed in Chapter Three. Chapter Eight established that some very minor changes to the funding formula could result in dramatically increased funding for rural areas. However, these changes would be so dramatic to the stability of year on year funding to authorities that they would almost exclusively be removed by the 'damping' block of the grant. The removal of the damping block would in general see a slight rise in rural area funding (although almost as many areas would lose funding as would gain). However, without significant changes to the formula, rural areas will continue to receive substantially less per head than urban areas, and as such, have to put up with lower quality service provision.

The results of the analysis in Chapter Eight concluded that rural advocates should argue for a shift from a sparsity based classification to one which incorporates accessibility such as distance from nearest service centre (on the grounds that this could serve as a proxy for distance to healthcare services). In the absence of this, the measurement of sparsity should be normalised across the formula so that the classification remains constant across services (although the weighting the subsequent classification is given will understandably vary depending on the typical geographic distribution of the service provided). For example, services which provide social care home visits to elderly persons (a service which attracts a cost sensitive additional time and distance burden) would require a much greater rural premium than police services (given that rural areas generally experience a much lower crime rate than their urban counterparts).

9.3 Limitations

Whatever the outcome of a research project has been, it is important to recognise the limitations of the research. This thesis is no different and there are several areas in which it could be criticised. The majority of the limitations of this research relate to fundamental problems with the identification of the "best" formula to serve the needs of rural areas due to difficulties in identifying which geographic areas should actually be

rural, based on different classifications. Added to this is the fact that the healthcare funding formulae used to distribute funds to the NHS and local government are so complex that even understanding them, before any alterations could be suggested, was almost worthy of a PhD in itself!

One of the objectives of this thesis has been to propose changes to the classification of rural areas used within health and social care delivery formulae in order to improve the funding of rural areas. Apart from the aforementioned challenges of data reliability and the variation in services provided across areas making comparison difficult, there has been the problematic issue of deciding what the "best" solution would be.

The "best" formula, statistically speaking, is seldom head and shoulders above the other formulae that might be adopted. The practical experience, right from the start, has been that there were often several alternative formulae which would score quite similarly on the statistical tests, but which would produce quite different patterns of "winners" and "losers" among local authorities. In such circumstances, adopting the statistically-"best" formula, without wider consideration of the "close seconds", is not necessarily the soundest answer. To further complicate comparisons with past spending, the "best" formula is not always chosen (e.g. increased spending on concessionary bus travel or household recycling is largely a response to central government targets).

Second, assessing the merits of any formula has to rely to a large extent on informed judgement. Each formula will have been founded (implicitly at least) on an initial presumption that a particular relationship between expenditure and the characteristics of each area is to be expected. This is necessary to guard against spurious correlations. For example, variations in school spending could probably be explained quite well by reference to the numbers of elderly people; the higher proportion of elderly people in the area, the lower the spending on schools. The correlation of such a variable is likely to be high; however, the causal link is the low number of school age children not the number of people aged over 65.

The evidence is that there is an almost limitless scope for plausible debate about the best basis for the formula; that, far from resolving differing views, the findings from this chapter offer as many questions as they do solutions, and the value of the results is

limited by the need to choose among almost equally good formulae on the basis of relatively limited evidence. Due to the heterogeneity of rural populations there will always be difficulties regarding definitions of rurality within rural areas as well as the difficulties inherent in attempting to compare rural and urban areas. Using consistent approaches to defining rurality will assist in ameliorating these historic difficulties and make it easier for users to understand, and therefore enable levels of service provision which are more appropriate for local needs.

The most important lesson from this evaluation has been an appreciation of the importance of recording the methods used in the creation of definitions. Many of the difficulties in replicating and exploring the local government funding formula were due to omissions or incomprehensible steps within the explanations provided by Government. Producers of classifications should record the methods used in the creation of the definition, as well as the rationale behind the selection of variables. Not only would this allow more critical evaluations of methodologies, it would also create the possibility of adding to or extending the results of the analysis (Vickers, 2007). There are many examples of researchers who have failed to provide significant information about the decisions that were taken. Tarling *et al* (1993) classification for the Economy and Rural England Report failed to name the variables or even the method that was used in the study. For classifications in current use by a large number of users which fail to provide information about the creation of classifications and the steps that are used in cluster analysis, we need look no further than providers of geodemographic classifications such as ACORN and Mosaic (in this case more because of the need for commercial confidentiality rather than poor scientific method).

Classifying areas can be seen as more of an art than a science. The classification is thus as much a result of the process that the data are put through as the data itself. If the analysis were conducted in a different way, a different classification would be produced. However, in all research the results of any analysis depend on how the research was conducted and performing the research in another way could alter the results. The crisp nature of classifications (an area is in one class and not in other classes) has long been a criticism of classification and has led to the increasing popularity of fuzzy classifications (such as the commercial ACORN and Mosaic) which by their nature avoid the problem. The splitting of continuous datasets groups (Sparse, Super Sparse

etc.) creates possible sources of error, on or close to, where the divisions are made. This may cause individual areas to be classified differently to very similar areas.

The use of sparsity as a variable to measure rurality was chosen because the lack of commonality in rural areas (in contrast to the socio-economic similarity clustering common in urban areas) made a rural definition based on socio-economic commonalities impractical. Chapter Three showed that socio-economic methods focus on urban areas and the variables chosen to represent areas may not be stable in the longer term. The Oxford Countryside Agency (1998) ward level classification, for example, uses the percentage of ethnic minorities in an area as an indicator of urban tendencies. Whilst this is currently a statistically valid indicator, as there are few ethnic minorities in rural areas, the numbers are growing quickly (with the influx of migrant labour from Europe and the changing priorities/ increased prosperity among British Asians which seems to be encouraging a move to rural areas) meaning this indicator will soon become outdated. It is the overall population served and the distances required to deliver services that has the greatest impact on the difference between the cost units for rural and urban health and social care provision.

There are problems inherent in using total resident population to measure demand in an area. When comparing rural definitions, permeable borders should be acknowledged, as patients can use facilities in other areas or even other countries; such as residents in Cheshire using hospital services in Wales, or Scottish residents using services in England. If they are doing so, then demand and cost measurements may be more challenging (Senior, 2006, Unavoidable Costs of Rurality and Remoteness in NHS resource allocation, p2). This could now be a much larger issue for NHS services within England as patient choice gives patients the right to choose (through their GPs) to receive treatment in a selection of hospitals, some of which may be outside their resident PCT. This is a less obvious issue for local government finance, as users of services such as social services and education will predominantly do so within their home local authority. For services such as transport, police and fire (though significant proportions of their expenditure could be due to the activities of non residents) this is an especially pertinent concern in population tourist locations.

Under the current funding models for health and social care provision, both within the NHS and local government, much of the funding is based on previous funding patterns. This practise is problematic for a number of reasons. First is the risk that a formula will be unable to distinguish reliably between variations in spending because of differences in local preferences and efficiency, and variations that are accounted for by matters outside the authority's control, such as the characteristics of the area and its people. For example, expenditure on some services tends to be lower in rural areas than elsewhere. This could either be because rural areas "need" fewer services or because they have historically had fewer services and the population are willing to accept this: although in all likelihood it is a combination of both. Second, the analyses, and the resulting grant formulae, are dependent on data. There is a relatively limited amount of data available on a consistent basis for each local authority, other than from the census. The need to rely on much census data means that the figures become increasingly outdated. Other data are either estimated (in the case of population) or taken from administrative systems which do not have the statistically reliability of the Census. The expenditure data which are analysed may also have weaknesses. The data used at present can be out-of-date; but newer figures would have been restricted by damping. Data analysis is unable to differentiate between lower spending due to lower need and lower spending from budget reductions potential meaning that some needs are left unmet.

9.4 Further Work

- In the first instance the 'what if' scenarios would be extended to cover a wider range of options. Such as funding health and social care at the district level to allow more individualised response to differentiated service need in different areas.

- Better measures of rural need, relevant to health policy, are required, using alternative data sources, which can then be validated against health outcomes (possibly incorporating individual level variables or additional contextual factors). The lower levels of service provided in less accessible rural areas suggest that the contribution of accessibility to public and health care services is one approach which needs further exploration. A continuation of this research

would be to establish a better measure of additional rural/remote service delivery cost. Initial ideas for this include a large case study of the time spent by healthcare professionals travelling to see patients in a variety of areas, this real data would then be used to measure the increased cost to the provider - as increased travel time results in either shorter time with patient (resulting in poorer service); less patients seen; additional staffing costs to see the same number of patients as more accessible areas.

- The limits of time and of data prevented an analysis of possible rurality and sparsity funding measures that could be incorporated into the NHS funding formula to allow for the additional cost of providing outreach services to rural areas. Further work would deepen the comparisons and lessons between the funding of Local Government and NHS health and social care services. While measures of sparsity have proved a useful tool in identifying rural areas, they are extremely limited in the identification of need and accessibility. With these two key issues unaddressed, further work should naturally be focused on the identification of measures that could identify these service provision challenges within government funding formulae for service provision.

- A task intended for a future paper is the expansion of the analysis beyond England to create a comparison of the treatment of rural areas within health and social care government in an international context. The detailed analysis of funding methodology covers only England. It would be interesting to compare the distribution of funding if a simplified model of English health and social care funding could be proxied against the population distribution of other counties.

- Interesting too would be further analysis of other countries' funding, as introduced in Chapter Five, to see what the impact of transforming their funding model style on to the English healthcare market could do to the allocation of funds.

9.5 Concluding Remarks

The aim of this research has been to examine geographical variations within the funding of health and social care services in England by examining the treatment of rural areas in terms of resource allocation. Weighted Capitation formulae provide a valid route for distributing health and social care funding to organisations. The evidence is that there is an almost limitless scope for plausible debate about the best basis for the formula; that, far from resolving differing views, this thesis may have raised even more questions, and that whilst the formulae contain a certain degree of objectivity, the value of that is limited by the need to choose amongst almost equally good formulae on the basis of relatively limited evidence. What remains under debate is the fairest, and most equitable, method to be utilised. Better measures of rural need, relevant to health policy, are required, using alternative data sources, which can then be validated against health outcomes. A common methodological problem in rural research and funding formula allocation are the levels of aggregation used. Although the ward and lower super output areas levels are fine scale geographies even these may be internally heterogeneous, with hidden pockets of deprivation and additional health needs. The effect is to bias results so that there is no relation between deprivation and health in rural areas. However, this has to be balanced by the statistical instability that would arise from using smaller areas (because of the rarity, in absolute terms, of health events). This thesis has demonstrated that, in contrast with urban areas, the needs of rural areas are poorly characterised by generic deprivation indices and by inappropriate classification systems.

This type of research is not limited to healthcare services. The methodology used to determine the distribution of funding could be applied to other services such as police or education. It is hoped that, with further development, the explanation of funding will be extended to cover a wide range of government services, and in doing so prove a valuable tool for those wishing to understand the implications of funding change further including government agencies, academics and pressure groups.

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Annex 1: Glossary

Area Cost Adjustment (ACA)
: A scaling factor, applied to the Relative Needs Formulae in Local Government Finance, calculated to reflect differences in the cost of providing services – mostly pay – in different council areas. The factor is given as a look-up table in Annex H of the Local Government Finance Report 2007/08 (DCLG, 2007).

ACRE
: Advisory Committee on Resource Allocation, Government advisory committee for the Department of Health

Aggregate External Finance (AEF)
: The total level of revenue support the Government provides to Local Authorities for their core functions. This support is made up of Revenue Support Grant, Police grant, specific formula and ring-fenced grants and the amount distributed from business rates (NNDR) (see chapter 7 for a full explanation).

Billing authorities
: A local authority empowered to set and collect council taxes, and manage the Council Tax, on behalf of itself and local authorities in its area. There are 354 in England consisting of: shire and metropolitan districts, the Council of the Isles of Scilly, the Isle of Wight unitary authority, London Boroughs and the City of London are billing authorities.

Business rates (see NNDR)

Countryside Agency (CA)
: Formed in 1999 from the Rural Development Commission (RDC) and the Countryside Commission. Following the Haskins Review in 2006 it was split: partially merged with English Nature to become Natural England. The remaining part of the Countryside Agency became the Commission for Rural Communities

Capping
: If the government believes an authority has raised its council tax by too large an amount then they may intervene and restrict this to what they deem acceptable level. This intervention is referred to as capping.

Control Totals
: These are the totals of all authorities' Relative Needs Formulae for each major service area. They are set out in Annex E to The Local Government Finance Report.

Council tax
: A local charge on domestic property set by the local authority. It replaced

the community charge on 1 April 1993 and is based on the value of the property and the number of residents. The Valuation Office Agency assesses the properties in each district area and assigns each property to one of eight valuation bands; A to H. The tax is set on the bases of the number of Band D equivalent properties. Council tax varies between authorities but the proportion charged (in relation to band D charges) must remain constant.

Council Tax bands

There are eight Council Tax bands. How much Council Tax each household pays depends on the value of the homes. The bands are set out below.

Value of home estimated at April 1991		Proportion of the tax due for a band D property
Band A	under £40,000	66.7 %
Band B	£40,001 - £52,000	77.8 %
Band C	£52,001 - £68,000	88.9 %
Band D	£68,001 - £88,000	100.0 %
Band E	£88,001 - £120,000	122.2 %
Band F	£120,001 - £160,000	144.4 %
Band G	£160,001 - £320,000	166.7 %
Band H	over £320,001	200.0 %

Damping

'Damping' is used to describe the way limits are applied to the effect on grant funding of changes to the distribution formulae or data used. Minimum increases, floors, on Formula Grant changes from one year to the next are now the major damping mechanism. There is also damping specifically for children's social care and younger adults' social services RNF's.

Distributable Amount

The Distributable Amount is made up of the Non Domestic Rates (Business Rates) collected in that year. The Distributable Amount 2007/2008 is £18,500 million (DCLG, 2007, p5). The basis for distribution is the same as that used for the Revenue Support Grant.

Formula Grant

Comprises Revenue Support Grant, redistributed business rates, and (for relevant authorities) principal formula Police Grant.

Labour Force Survey

The Labour Force Survey is a survey of households living at private addresses in Great Britain, carried out by the Social Survey Division of the Office for National Statistics (ONS). Its purpose is to provide information about the UK labour market

Local Government Finance Settlement

The annual determination of formula grant distribution as made by the Government and debated by Parliament. It includes:

- The total formula grant;
- How that grant will be distributed between local authorities; and
- The support given to certain other local government bodies.

Lower Tier Authorities

Authorities that carry out the functions that, in shire areas with two tiers of local government, are carried out by shire districts, they are the same councils as billing authorities.

Needs Equalisation Amount

This is an alternative name for the Relative Needs Amount. It is the amount of money that an authority will be allocated in the local government finance settlement in relation to the special needs of their population (Local Government Funding)

National Non-Domestic Rates (NNDR)

(Business Rates) charges paid by Businesses, and are the equivalent of Council Tax for Businesses. However, unlike Council Tax, Business Rates are paid into a central pot and then redistributed according to need, rather than retained by the collecting local authority. (Local Government Funding)

Office of the Deputy Prime Minster (ODPM)

Formed in 2001 originally part of the cabinet office, responsibilities included Local Government Finance. As of 2006 this has become the Department for Communities and Local Government (DCLG)

Office of Population Censuses and Surveys (OPCS)

Created in 1970 in a merger from the General Register Office it became part of the Office of National Statistics (ONS) in 1996.

Rural Development Commission (RDC)

Government organisation which merged with the Countryside Commission in 1999 to become the Countryside Agency (CA).

Relative Needs Amount (RNA)

Also known as the Needs Equalisation Amount. It is the amount of money that an authority will be allocated in the local government finance settlement in relation to the special needs of their population (Local Government Funding)

Relative Needs Formulae (RNF)

These are the first stages in the calculation the Government uses to distribute formula grant. The relative needs formulae for each service block are set out in Section 4 of the Local Government Finance Report.

Resource Equalisation

Resource Equalisation is the way in which the Formula Grant distribution system takes account of councils' relative ability to raise council tax. The amount of council tax an authority can be expected to raise (based on the number of band D properties), known as the Resource Equalisation Amount, is subtracted from their total for Central Allocation, Revenue Support Grant and Police Grant (see chapter 7 for a full explanation).

Revenue Support Grant (RSG)

A Government grant which can be used to finance revenue expenditure on any Service. It does not vary with a local authority's spending and is designed to compensate for differences in costs of providing a standard level of service (see chapter 7 for a full explanation of how it works).

Ring-fenced grant

A grant paid to local authorities which has conditions attached to it, which restrict the purposes for which it may be spent.

SCFIR

Shire County Fire (Local Government Funding) – in the Local Government Finance Settlement tables this is used to mark out councils which have the functions of Shire Counties including the responsibility of funding fire services.

SCNFIR

Shire County No Fire (Local Government Funding) – in the Local Government Finance Settlement tables this is used to mark out councils which have the functions of Shire Counties apart from the responsibility of funding fire services.

Special grants

These are grants paid to local government for very specific and usually temporary purposes (Local Government Funding, see Chapter Seven).

Standard Spending Assessment (SSA)

A prior method for distributing the Formula Grant (for Local Government Funding) which attempted to measure relative levels of need, by using numerous complex statistical indicators. SSA replaced grant-related expenditure assessments (GREAs) in 1990. It was intended to reflect the relative costs of providing comparable services between different authorities. The SSA was widely criticised on the grounds that was unfair and also that it was too complex. As a result of these criticisms it was replaced by the Revenue Support Grant in 2003.

Annex 2: Data Sources used in the calculation of local government finance agreement 2007/08

Registrar General –

- Estimated number of resident children under 18 years of age at 30 June 2003
- Estimated total resident population at 30 June 2004
- Estimated resident population aged 18-64 at 30 June 2004
- Estimated resident population aged 65+ at 30 June 2004
- Estimated resident population aged 90+ at 30 June 2004
- Projected resident population aged 65+ in 2007
- Projected resident population aged 18-64 in 2007
- Projected total resident population in 2007

2001 Census –

- Area of authority in Hectares (used for population sparsity/density calculations at Output Area, Ward and LSOA scale)
- Total resident population
- Household population aged 65+
- Resident population aged 65+
- Household population aged 90 +
- Resident population aged 90+
- People 65+ living alone
- People 65+ in rented accommodation
- Children without good health
- Proportion of children who are in 'black' ethnic groups
- Proportion of people who are in 'other' ethnic groups
- Proportion of people who are in 'mixed' ethnic groups
- Proportion of residents who were born outside the UK, the Republic of Ireland, Ireland (part not specified), Channel Islands and Isle of Man, EU Countries, Canada, USA, Australia and New Zealand
- Highest Qualification level attained
- Proportion of females whose economic activity is looking after home or family
- Proportion of households which are lone parent households with dependant children
- Proportion of people aged 18 to 64 who are long term unemployed or have never worked (NS-SEC 6 and 7)
- Proportion of people aged 18 to 64 who work in routine or semi routine occupations (NS-SEC 6 and 7),
- Proportion of households with no family
- Number of persons working but not resident in the authority's area
- Number of persons resident in but working outside the authority's area
- Proportion of households that contain all students
- Proportion of households which are terraced, including end terraced
- Average number of rooms per household resident

Secretary of State –

- Taxbase for a billing authority's area as at 10 October 2005 (based information provided by the local authority)
- Assumed local authority outstanding debt at 1 April 2007
- Length of coastline (to the nearest 1000 metres) at low water, using information on 1991 administrative areas from the Ordnance Survey Boundary Line Product
- Estimated annual average number of nights stayed by domestic and foreign visitors in the authority's area. Based on information from the United Kingdom Tourism Surveys (1996 to 2004), for domestic visitors; and from the International Passenger Surveys (2002 to 2004) and the 1991 Census, for the apportionment only, of foreign visitors.
- Estimated annual number of day visitors to the authority's area based on research commissioned by the Department of National Heritage using information from the Leisure Day Visits Survey 1988/1989, the 1991 Census, the 1991 Survey of Visits to Tourist Attractions undertaken by the National Tourist Boards, the 1991 Census of Employment and other information about urban areas
- Estimated annual average number of days with snow lying at 09.00 hours during 1978 to 1990 inclusive, on the basis of information from the Meteorological Office.
- Average number of days where gritting would have been predicted, using the Meteorological Office Open Road Index (MOORI), averaged over 1991/92 to 2001/02
- The number of top tier Control of Major Accident Hazards (COMAH) sites, a using information extracted on 3 October 2005 by the Health and Safety Executive
- Estimated property and societal risk to a Fire and Rescue Authority, based on buildings information from the Valuation Office Agency and risk frequency information from FDR1 forms (1996 to 2000).
- Average of net current expenditure in 2001/2002 and 2002/03, 2003/04 on coast protection; uprated to reflect 2005/2006 market prices, derived from the authority's General Fund Revenue Accounts Returns ending 31 March 2002 (RO4), 31 March 2003 (RO4) and 31 March 2004 (RO5)
- Average of net current expenditure in 2001/02, 2002/03 and 2003/04 on flood defence, uprated to reflect 2005/2006 market prices. The estimate is generally derived from the authority's General Fund Revenue Accounts Returns ending 31 March 2002 (RO4), 31 March 2003 (RO4), and 31 March 2004 (RO5)

Secretary of State for Education and Skills –

- The number of pupils in secondary schools who are from ethnic groups which are low achieving.
- Number of dependent children of claimants receiving Income Support/Income based Jobseeker's Allowance in August 2000 and August 2002
- The number of Income Support/Income based Jobseekers Allowance/Guarantee Element of Pension Credit claimants aged between 18 to 64 inclusive, between August 2001 and August 2004
- The average number of absences (both authorised and unauthorised) of pupils of primary school age, over the period 2002/2003 to 2004/2005
- Estimated number of children aged 3, 4 or 5 in December 2004

Secretary of State for Work and Pensions -

- The average number of people aged 65+ in receipt of attendance allowance between May 2003 and May 2005
- The average number of people aged 18-64 in receipt of disability living allowance between May 2003 and May 2005
- The average number of persons who are, or whose partner is, aged 60+ and in receipt of Income Support/ Income Based Jobseeker's Allowance/ the Guarantee element of Pension Credit, between August 2001 and August 2004
- Number of Income Support/ Income based Jobseekers Allowance/Guarantee Element of Pension Credit claimants, between August 2001 and August 2004
- Average number of people receiving Incapacity Benefit and Severe Disablement Allowance, over the period 2002 to 2004

Secretary of State for Health –

- Number of Local Authority supported residents in permanent care homes aged 65 years and over as at 31 March 2004
- Number of Local Authority supported residents in permanent care homes aged 90 years and over as at 31 March 2004

Secretary of State for Transport -

- Estimated annual average flow of all motor vehicles (in millions) during 2002, 2003 and 2004 on principal roads for which the authority is the highway authority.
- Estimated annual average flow of heavy goods vehicles, buses and coaches (in millions) during 2002, 2003 and 2004 on principal roads for which the authority is the highway authority
- Principal built-up roads: the length (in kilometres) of principal roads that are subject to a speed limit not exceeding 40 miles per hour and principal motorways; Principal non built-up roads - the length of principal roads that are not subject to a speed limit of 40 miles per hour or less, but excluding principal motorways; Other built-up roads - the length of all other roads that are subject to a speed limit not exceeding 40 miles per hour; and Other non built-up roads - the length of all other roads that are not subject to a speed limit of 40 miles per hour or less, where the lengths of principal roads relate to the position at 1 April 2005, The roads are those for which the authority is the highway authority.

Local Authority -

- Base Estimate Returns 1992/93
- Subjective Analysis Return 2003/04
- Estimates of office hereditaments and floorspace as at 2004 as supplied by authorities from the National Non-Domestic Rates Provisional Contributions Return 2005/06
- Gross non-domestic rates and increases and reductions in rate yields, as supplied by authorities from the National Non-Domestic Rates Provisional Contributions Return 2005/06
- The total of any special levies which are payable in the financial year 2005/2006 to Internal Drainage Boards derived from information from DoE and Defra

- The total of any Environment Agency levies which are payable in the financial year 2005/2006 to English Regional Flood Defence Committees derived from information from DoE and Defra

Office for National Statistics -

- Annual Survey of Hours and Earnings 2002, 2003 and 2004
- 2003 Annual Business Inquiry – total number of bars in an area (defined as Standard Industrial Classification (SIC) 55.4 - BARS),
- number of claimants of unemployment-related benefits, currently Jobseeker's Allowance and National Insurance credits, unemployment 1 year + averaged between May 2002 and April 2005, using NOMIS
- Number of claimants of unemployment-related benefits, currently Jobseeker's Allowance and National Insurance credits, who were male and aged under 25 years, averaged between May 2002 and April 2005
- Proportion of people in accommodation that is rented, averaged over 2001/2002 to 2003/2004 based on ONS Labour Force Survey

CACI Limited -

- Proportion of household residents living in areas classified as ACORN category 'Hard Pressed', as defined in ACORN 2004 data
- The proportion of household residents living in areas classified as ACORN category 'Wealthy Achievers', as defined in ACORN 2004 data
- Proportion of household residents in ACORN Type 50 (Single elderly people, council flats)
- Proportion of household residents in Acorn Type 53 (Old people, high rise flats), as defined in ACORN 2004 data, based upon (information from the 2001 Census and the updated ACORN classification 2004).

Other -

- **Valuation Office:** 2005 Revaluation of Local Authority Schools
- **Inland Revenue:** Authority rateable values and hereditaments at 1 August 2005

(Information derived from: DCLG, 2006; DCLG 2007; DCLG 2007b; DETR, 2000; ODPM, 2006; ONS 2006; ODPM, 2002; CACI Limited. 2004)