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Rural health care

A rapid review of the impact
of rurality on the costs of
delivering health care

Report prepared for the
National Centre for Rural Health and Care

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About the report

In autumn 2018, the Nuffield Trust was commissioned by the National Centre for Rural Health and Care to explore the key issues around the impact of rurality and sparsity on the costs of delivering health care. The three aims of the review were to:

- outline the policy considerations around accounting for unavoidable costs in providing health care in rural areas
- review and summarise key evidence on the additional costs of delivering health care in rural areas
- describe, quantify and critique current NHS allocation formulae in the four UK nations with respect to adjustments for rurality.

The work is intended to highlight the key issues and, given the timescale for its production, is not intended to be a comprehensive or in-depth review. While the report focuses on health care, there are clearly similar considerations for social care and, in addition, we draw on some analysis of rates of 'delayed discharges' in rural areas, which may be an indication of pressures in both settings.

Acknowledgements

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Contents

Summary	2	
1	Introduction	8
2	The policy goal – equal opportunity of access for equal need	12
3	Existing evidence of additional and unavoidable costs of delivering health care in rural areas	16
4	Evidence on effect on wider quality and sustainability measures	25
5	Rurality factors and the NHS allocation process	29
6	Conclusions	48
References	50	
Appendix A: Examples of additional costs associated with rural primary care services	59	
Appendix B: 2007 review of GP funding	59	
Appendix C: Allocations in the education sector	61	

Summary

Policy background

The NHS, a universal health care system funded from general taxation and free at the point of use, was founded on the principle of providing equal opportunity of access for those at equal risk. Since the early 1970s, it has been recognised that the health care needs of populations vary across the country. Hence, different areas should receive different allocations from the total NHS budget in order to provide equal access.

But it has also been recognised that in different areas of the country, the costs of providing care vary in ways that are unavoidable or uncontrollable. This can be due to differences in local markets for land, buildings and labour, and other factors associated with remoteness, population sparsity and rurality generally. If no adjustment or compensation is made for such unavoidable costs, it is likely that some health services will not be able to afford to provide their populations with the same access to, and quality of, care that others do. On this basis, since the early 1980s, local allocations have been adjusted to account for unavoidable variations in costs in different parts of the country.

For example, there are higher costs associated with providing emergency ambulance services in more rural areas due to the longer travel times, and from the late 1990s an adjustment introduced to acknowledge this. Since 2016/17 there has also been a small additional uplift in allocations to seven local areas which commission services from hospitals judged to face higher costs. These hospitals are ‘unavoidably small due to remoteness’, and are hence unable to benefit from economies of scale. There is also a more general adjustment to mitigate for supply-induced demand in urban areas, which, for example, have more hospital facilities available. This adjustment is intended to help balance funding between urban and rural areas.

How variations in health care needs and the costs of providing care are dealt with is not an easy matter. The weighted capitation systems across the four

UK health services have developed over the last 50 years or so into some of the most sophisticated systems for allocating public money anywhere in the world. Nevertheless, they have limitations – as outlined in this report – and trade-offs between desirable policy goals, such as equity of access, and the efficient use of public money, are inevitable. Such trade-offs are not resolved by technical fixes alone, but also require judgements about what we are prepared to forgo (some degree of efficiency, for example) to obtain some other benefit (more equal access to care, for example).

Evidence of additional costs in rural areas

Our initial rapid review of the research literature on unavoidable costs of providing health care in rural and remote areas suggests possible issues related to:

- difficulties in staff recruitment and retention, and higher overall staff costs
- higher travel costs and unproductive staff time when travelling
- the scale of fixed costs associated with providing services within, for example, safe staffing level guidelines
- difficulties in realising economies of scale while adequately serving sparsely populated areas.

But quantifying these costs is somewhat more problematic. The research evidence on this is mixed: some sources suggest that these unavoidable costs are either minimal or non-existent, while others suggest varying degrees of unavoidable costs in certain contexts. That said, NHS Improvement did approve an uplift to the tariff (prices) for one trust (Morecambe Bay) it deemed to have unavoidable costs in delivering care to a dispersed population, equivalent to around £20-25 million a year.

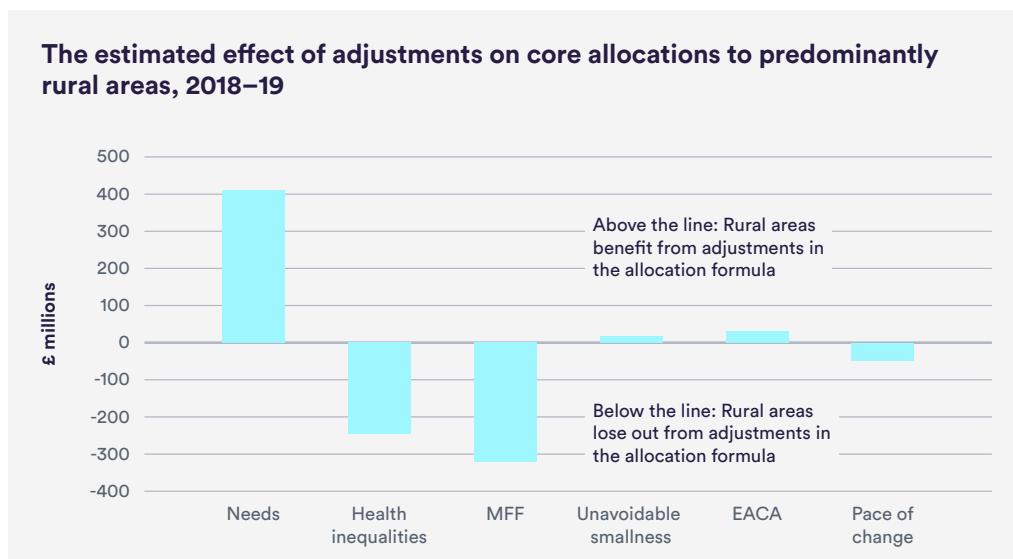
Documents published by NHS Improvement suggest the view that around 80% of emergency care costs may be fixed. This suggests that smaller hospitals (and rural hospitals tend to be smaller) with lower levels of activity may face higher unit costs for emergency care. In primary care, one study has suggested that a 10% increase in patient list size is associated with a 3% reduction in cost per patient (Deloitte, 2006; 2016).

Our analysis suggests that while the association between rurality, overstretched services and financial pressure are unclear, NHS trusts with ‘unavoidably small’ sites do appear to underperform: as well as having generally longer waiting times and lengths of stay, they are also in greater financial difficulty. Six of the seven trusts with unavoidably small sites ended 2017/18 in deficit, with the combined financial position between the seven amounting to more than a quarter-of-a-billion pound deficit. These trusts account for 3% of all trusts, but almost a quarter (23%) of the overall deficit for trusts, which is possibly indicative of unavoidable rural costs.

Making allocations to rural areas

Our review of the current mechanisms for funding services, which includes the approach to allocating budget to local commissioners and the payment system for NHS trusts, suggests the following.

- Given the higher average age of rural populations, adjusting for health needs increases the target allocations per person more in rural areas (see figure below). However, some suggest that the calculations do not adequately reflect the higher health needs in these areas.



EACA is the emergency ambulatory cost adjustment.

This figure is based on core allocations to 32 CCGs, and excludes funding for primary care and specialised services. Analysis based on NHS England's published data on allocations; actual allocations may have differed and, as such, the precise figures should be treated with caution.

- The allocations are heavily influenced by the weight given to the adjustments for health inequalities and unmet need. These adjustments are not informed by evidence, but remain a matter of judgement. This has the effect of directing the target allocations primarily towards urban areas.
- The scale of the adjustment for unavoidable smallness (£33 million in total) is very small compared to both other adjustments and NHS Improvement's own calculation on unavoidable costs used in adjusting the tariff for just one of these affected trusts (Morecambe Bay), which was equivalent to £20–25 million a year.
- The level of compensation for unavoidable smallness is somewhat sensitive to the cut-offs used to identify trusts in this category and the assumptions made as a result. For instance, changing the arbitrary cut-off on drive times to the next nearest service (which determines remoteness) from 60 minutes to 30 minutes would increase the number of sites that are candidates for receiving additional payments from 8 (across 7 trusts) to 27. NHS England accepts that 'parameters are based on some, albeit limited, advice' (ACRA, 2015a).
- The actual allocations received by specific areas are not only affected by population needs and unavoidable costs, but also historic funding levels. Policymakers seek not to destabilise local health economies by making large changes in funding. Overall, across the allocations for core, specialised and primary care services, this has the effect of moving money away from rural areas. In addition to this policy, the majority (54%) of the needs calculation for specialised services (such as child heart surgery) is dictated by previous spending patterns between areas rather than calculations of population need. The effect of this latter adjustment is to move £700 million within target allocations to predominantly urban areas.
- England appears to have been more parsimonious than the other UK nations in making adjustment for rurality. NHS England has announced revisions to the way funding is allocated to local areas from April 2019. It is hoped the changes will better reflect needs and costs in rural areas. That said, NHS England accepts that further work is required on rural costs and, in fact, the increase in allocations for predominantly rural areas next year is actually marginally lower than for their urban counterparts.

Funding providers

The adjustment to the funding levels received by hospital trusts to account for unavoidable differences in costs means urban areas receive more for providing the same service. At the extremes for acute trusts, University College London receives 29% more than Royal Cornwall Hospitals.

The amount of money actually received by providers for unavoidable smallness – and the method of compensation used – is opaque and inconsistently applied to the seven trusts in this category. In particular, York Teaching Hospital NHS Foundation Trust receives its clinical commissioning group's (CCG's) uplift (£2.8 million) in full; the uplift in tariff to University Hospitals of Morecambe Bay NHS Foundation Trust is equivalent to around four times the level the CCG receives; and other trusts receive no additional funding at all.

The seven trusts also received, in total, just 1.7% (£30 million out of £1,783 million) of the total allocation through the Sustainability and Transformation Fund in 2017/18.

Improving transparency, support and approach to funding rural services

We have identified a number of areas where national bodies could improve their approach to the funding of rural services, including:

- NHS England and the Department of Health and Social Care being more transparent about the nature and scale of the current mechanisms for compensating for rural costs
- NHS Improvement being more transparent around the calculations of, and decision-making to approve or reject, local modifications
- The Advisory Committee on Resource Allocation (ACRA) continuing to revisit evidence on costs, in consultation with rural trusts, including non-acute providers, and commissioning further research if required

- In addition to any review of funding arrangements, national bodies should also be providing non-financial support to rural commissioners and providers to help them overcome the unique challenges they face.

Areas for further research

This rapid review identified a number of areas for further work:

- Defining the envelope for adjustments for rurality by, for example:
 - calculating the consequences of different allocation decisions (including using other UK nations and international precedent) in terms of identifying hospitals with unavoidable costs and also the extent of the cost
 - calculating the consequences of applying Morecambe Bay's tariff elsewhere.
- Further work to unpack:
 - any associations between rurality and performance and financial pressures, including for non-acute providers
 - the distribution of the various key funding streams to providers, such as money to support medical training placements and salary costs.

1 Introduction

The three aims of this rapid review of the impact of rurality and sparsity on the costs of providing health services were to:

- outline the policy considerations around accounting for unavoidable costs in providing health care in rural areas
- review and summarise key evidence on the additional costs of delivering health care in rural areas
- describe, quantify and critique current NHS allocation formulae in the four UK nations with respect to adjustments for rurality.

Policy issues

The degree of compensation for additional costs of delivering services in rural areas is a policy choice. It is also a complex area, with the level of such compensation determined – to some extent – by the priority given to, for example, addressing inequalities in health outcomes and the stability of health economies by ensuring no large changes in funding. This review highlights the basis on which these policy decisions are (and could) be made and the trade-offs involved (for example, between equity and efficiency).

The issue is also affected indirectly by other policies. Over the last decade or so there has been increased priority given to the choice agenda, meaning that providing required services in rural or isolated areas is even more difficult. For example, the Department of Health and Social Care has expressed the intention to:

- increase levels of choice in health and social care and, in particular, allow patients to choose which GP surgery to register with
- offer choice in where and how women have their baby (Department of Health, 2006 and 2007).

Evidence of additional costs

Drawing on existing literature and research, this review sets out the range of possible cost impacts arising from rurality and sparsity, and summarises the evidence – such as it is known – on the scale of additional net costs of delivering health care in such areas. We also outline the evidence on how rurality affects delivery costs, including what factors relate to demand (for example, higher health care needs) and provision of care (for example, hospitals being less able to realise productivity gains from economies of size due to the decision to provide more local access). Using available data, we also seek to explore the association between a provider's rurality and their performance against measures of service and financial pressures.

Addressing rurality in NHS allocations

In this review we describe, quantify and critique how current allocation formulae and funding mechanisms are used in the UK to deal with rurality/sparsity factors in relation to the overall goal of these allocation methods. This covers the processes to: estimate population needs; adjust for unavoidable costs; set actual allocations for local areas; and fund services. We explore the variation in approaches across the four UK nations and different health care settings (for example primary versus secondary care).

This review concludes with some observations about the consistency, transparency and adequacy of current approaches to compensate health services in rural areas for the impact on their costs of providing services, so that the overall goal of allocation – equality of opportunity of access for those in equal need – is met.

Rurality

It is worth reflecting what is meant by 'rurality'. The studies identified in our literature review (Chapter 3) and allocation adjustments (Chapter 5) use a range of approaches to classify services, as summarised in Table 1. Most commonly, rurality or 'sparseness' is based on population density,

population size, travel time to other hospitals, or some index combining multiple measures.

Previously it was estimated that 30 different definitions were in use across the UK (Scott and others, 2007). Some work has focused specifically on the manifestations of rurality and sparsity – such as having unavoidably small providers – and their direct influence on costs. As such, any efforts to directly translate findings on rural costs or approaches to allocate for unavoidable costs need to be treated with caution.

Table 1: Examples of methods for categorising rural or sparse services

Category	Studies	Allocation formulae
Rural	<p>The OECD (2011) presents a range of classifications for local and regional areas. For example, local area ‘units’ (i.e. wards in the UK) are deemed rural if their population density is below 150 inhabitants per square kilometre (below 500 for Japan and Korea).</p> <p>The European Union (EU; 2010) outlined a framework based on classifying ‘grid cells’ of one kilometre squared. For example, a region is described as predominantly rural if the share of the population living in urban areas is less than 20%.</p> <p>Morris and others (2007) outlined a range of rurality measures including: population density; proportion of land used as domestic buildings or as roads; and proportion of total workers who are part-time agricultural workers.</p>	<p>Scotland – Settlement is rural if it has less than 3,000 people.</p> <p>New Zealand – Number of people living more than one hour from a settlement of at least 30,000 people.</p> <p>Canada – Rural communities are those with a population of 10,000 people or fewer (Canadian Medical Association).</p>

Sparse/ remote	Brezzi and others (2011) classify predominantly rural areas as remote if the drive time of at least 50% of the regional population to the closest locality with more than 50,000 inhabitants is greater than one hour.	England – Hospitals with more than 10% of their catchment population more than 60 minutes from the second closest provider (ACRA, 2015a). Scotland – Has used multiple definitions, including proportion of residents in settlements of more than 500, 1,000 or 10,000 people (SEHD, 1999), and road kilometres per 1,000 population (SEHD, 2000). The latter definition has also been used by Wales (Senior and Rigby, 2001). United States (US) – ‘Frontier’ states have at least 50% of their counties having an average population density of fewer than six people per square mile (Affordable Care Act definition). Medicare sole community hospital criteria include those greater than 35 road miles or more than 45 minutes’ drive time from other hospitals, with additional caveats for prolonged extreme weather conditions and very small hospitals.
Unavoidably small	‘Smaller’ hospital providers defined by Monitor (2014) as those with operating revenue below £300 million in 2012/13 (‘smallest’ under £200 million).	England – Hospitals with a catchment of fewer than 200,000 people. This size measure was used in conjunction with an additional measure of remoteness (ACRA, 2015a). US – The Medicare remote hospital criteria is hospitals more than 25 road miles from another general acute hospital with fewer than 200 discharges.

2 The policy goal – equal opportunity of access for equal need

Since its inception, the NHS has developed increasingly sophisticated ways to meet one of its key founding principles: that those in equal need should have equal opportunity of access to health care. Indeed there is a legal requirement that services should be equitable for all population groups, under the Equality Act 2010.

Ensuring care is free at the time of need has been central to meeting this principle. But as experience has shown, this is not in itself sufficient. And while for the first two decades of its existence, funding for the NHS was largely distributed to pay for the pattern of services the NHS inherited in 1948¹, a crucial policy over the last half century has been to redistribute funding in a fairer way. Specifically, the NHS has sought to ensure that the available resources to deliver care are distributed across geographical areas in a way which reflects variations in the need for care, and hence support the policy goal of equal opportunity of access.

A brief history of allocations

Since the early 1970s, supporting this goal of equal access has involved a recognition that populations and health care needs vary across the country and hence that different areas should receive different allocations from the total NHS budget. The report of the Resource Allocation Working Party (RAWP) in 1974 was the first systematic attempt to set out the basic principles of a weighted capitation funding formula; and these largely remain the basis

¹ Or, as it has been characterised, ‘Last year’s budget, plus an addition for growth, plus a bit for scandals’.

for setting target allocations today. RAWP recommended that budget targets for different areas of the country be set on the basis of:

- population size adjusted for the demographic structure
- further weightings to account for additional health care need
- adjustments to account for geographical variations in the costs of providing care.

Since RAWP and its implementation in 1976 (and similar formulae in the rest of the UK), there have been further technical refinements to the basic capitation formula as more research has been carried out; new data have become available; and new statistical techniques have been applied to, for example, establish more accurate quantifications of the relationships between need for, and utilisation of, health care (see timeline, page 15).

Policy considerations

The focus of this rapid review is on supply side issues associated with the allocation of budgets – in particular the geographical variations in the costs of providing care as they relate to rural or sparsely populated areas. However, while there have been technical developments in this area of the weighted capitation formula too, it should not be forgotten that underlying and driving such work are value-based judgements and policy decisions involving trade-offs between desirable policy goals. Equity involves inevitable trade-offs with, for example, efficiency, or between the NHS and patients (in terms of the burden of travel costs, for example), which are not amenable to technical fixes. As Gwyn Bevan has pointedly noted "... it is clear that after 30 years of work, we know for certain that there is no perfect formula for allocating resources. Formulas can only offer rough justice" (Bevan, 2008a).

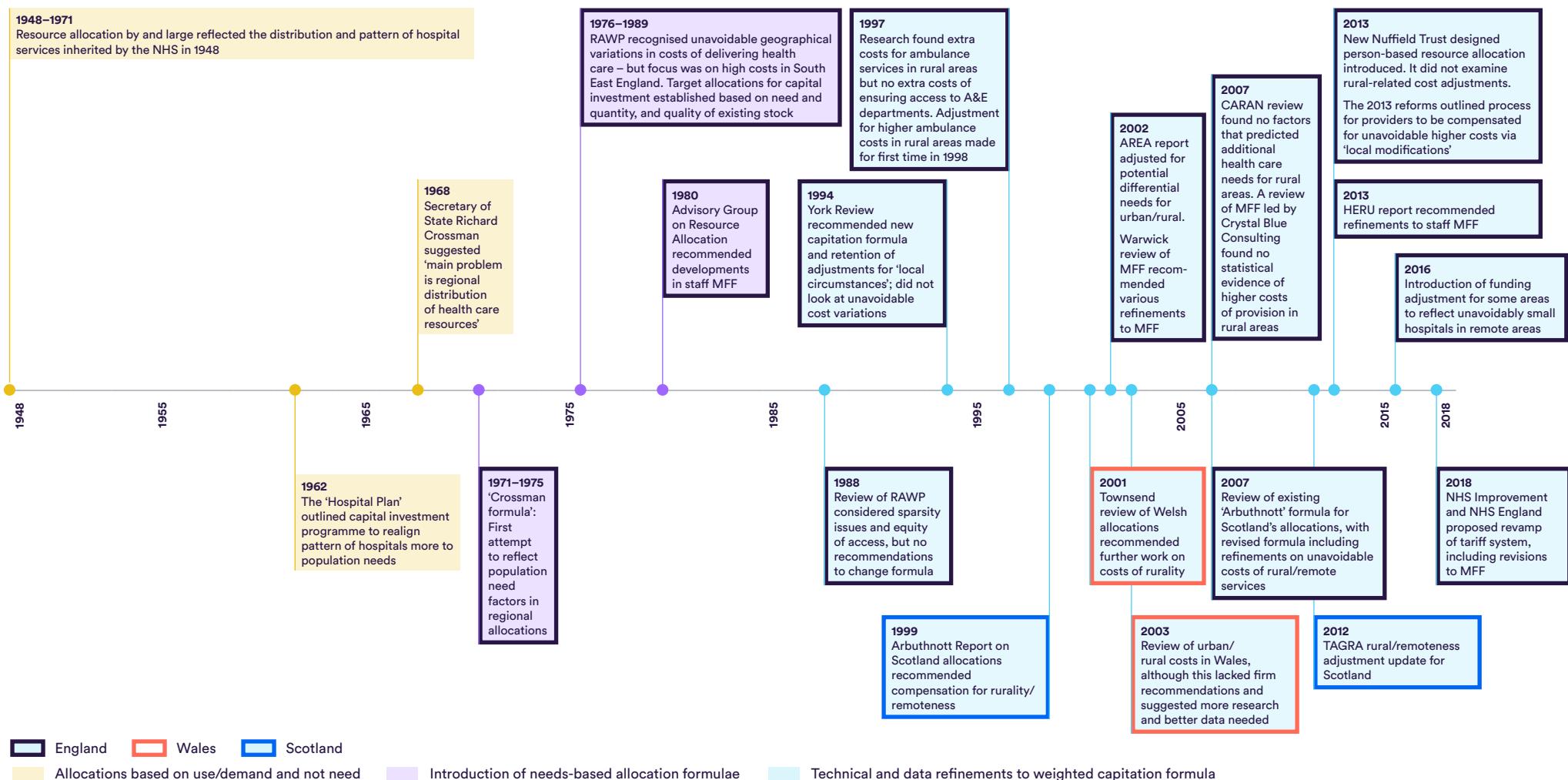
Nevertheless, while there is an inevitable balance to be struck between conflicting policy goals, and although formula-based allocation methods may never be perfect, they almost certainly can be made better and, for example, evolve as new and more accurate data become available. And, as ever, there is never just one policy lever available; for a range of reasons, formula funding may not be appropriate in dealing with the unavoidable costs of rurality. Fundamentally, if unavoidable costs are not compensated for, wholly or to

some degree and by whatever mechanism, patient care will potentially be affected, both in terms of access and quality. There are three particularly noteworthy policy considerations on how the allocations account for historic funding, health inequalities and patient costs:

- 1 RAWP recognised that moving health authorities towards their needs-based budget targets would take time, given the size of some of the gaps between current funding levels and the calculated target budgets. How quickly budgets would change was left for ministers to decide, based, in part, on minimising disruption in areas above their target budgets and the size in the growth of the overall budget to be distributed.
- 2 Since 1999, allocations have included an adjustment to move money towards areas with lower life expectancies, with the aim of reducing health inequalities (NAO, 2014). NHS England and the Department of Health and Social Care have a legal obligation to reduce health inequalities under the Health and Social Care Act 2012 (HM Government, 2012). However, the act of reducing health inequalities may require offering greater opportunity of access to some areas irrespective of their need.
- 3 A further policy point is whether or not to include patient costs in accessing health care. The NHS has followed the equality of opportunity of access for equal need principle, but this is not the only approach; following a different philosophy will have implications for the distribution of resources to rural areas. For instance, if a policy of equal access – rather than opportunity of access – was applied, the implication would be to seek to allocate funding to, for example, account for patient travel costs.

In the following chapter we review and summarise key evidence on the additional costs of delivering health care in rural areas, based on a review of existing literature. Chapter 4 outlines some initial exploration of the association between rurality and data on cost pressures and financial position. This is followed by looking at how the allocation systems and funding mechanisms affect the funding of local services (Chapter 5).

Resource allocation in the UK: Timeline of key reviews



3 Existing evidence of additional and unavoidable costs of delivering health care in rural areas

It is generally agreed that – in principle at least – rural and sparsely populated areas face some extra costs of providing a unit of health care compared to more urban and densely populated areas. A recently published report highlighted views on reasons for excess costs in rural areas (see Box 1).

Box 1: Quotes from NHS finance directors on rurality and unavoidable costs

Staffing pressures

‘Recruiting into [this area] is hard. This is what has hurt one of our isolated hospitals. It’s hard to recruit and retain. We get pushed into agency staff.’

‘We get hit by other costs – premiums on agency costs to get people to travel, less natural churn as people stay put. There are high agency costs in rural areas.’

‘Whose perspective is this supposed to be from? It’s harder to recruit in Cumbria than London. In small isolated providers if you lose one member of staff you have no choice but to recruit.’

‘national Terms and Conditions [determine] two-thirds of costs... we benefit London against Cornwall, Cumbria and Lincolnshire... because of workforce supply but these areas struggle to recruit too. Yes, we need an adjustment but not the one we have now.’

Economies of scale and other costs

'Rurality has costs: we must deliver in a more distributed way. Outpatient clinics out in GP practices, diagnostics too. Community health services and ambulances are affected and they can then affect us.'

'We have a number of smaller hospitals in rural areas, losing economies of scale and there must be others like us.'

'Outpatients is harder to deliver in dispersed areas. Outsourcing is harder as well.'

'I have worked in organisations from the £250m to the over £1bn. Big hospitals do benefit from size. Part of this is resilience in clinical and non-clinical services. In small teams you need to instantly recruit [if you lose someone].'

Source: The King's Fund and the University of York, 2018

Other interviewees raised questions as to whether current approaches to dealing with this issue – such as the market forces factor adjustment which seeks to reflect additional cost in both local allocations and the direct level of funding to providers – were fit for purpose. The sorts of circumstances which lead to higher costs and which, for geographical reasons, may be wholly or at least partly unavoidable given the need to ensure equity of access to services of comparable quality, are summarised in Box 2.

Box 2: Examples of reasons for additional costs

Cost element	Example of potential additional cost
Workforce Staff retention, recruitment and overall staffing costs	<ul style="list-style-type: none"> Recruitment is more difficult in rural areas with smaller, more remote hospitals possibly viewed as less desirable from a career point of view. The need for higher spending on more expensive agency/locum staff to deal with recruitment problems, and the need for safe/required staffing levels. There may be greater need to work independently and therefore need to be more highly graded.
Travel Unproductive staff time	<ul style="list-style-type: none"> Travel times/distances are longer, increasing unproductive time for staff travelling during work for example. Higher costs for ambulance services in rural areas in order to meet response standards.
Size Economies of scale and fixed and sunk costs	<ul style="list-style-type: none"> Smaller hospitals in rural areas may find it harder to exploit economies of scale, leading to higher unit costs. The cost of providing the correct level of multidisciplinary input is thought to be high for small client groups with complex needs and where patients are highly dispersed. The fixed costs of providing the full range of services in more sparsely populated areas, including meeting minimum staffing level guidelines.
Access to resources	<ul style="list-style-type: none"> Some resources may be more expensive to obtain in rural settings, including higher telecommunication costs. Other resources may be more difficult to access, including training, consultancy and other support areas.

Further theoretical factors affecting financial sustainability have been cited in the primary care setting. These include, for example, unrecognised demand side costs (i.e. higher needs which have a consequence on costs) such as limited access to other support services; and less ability to influence activity – and therefore income – by nature of the rural, dispersed population. More detail on these additional costs are summarised in Appendix A.

Background on our literature review on additional costs

This section presents a brief review of the evidence on the range of possible cost impacts of rurality on health care provision. Our review took a broad approach in assessing potential theories of why costs may be different in rural areas and used a range of potential sources of literature.²

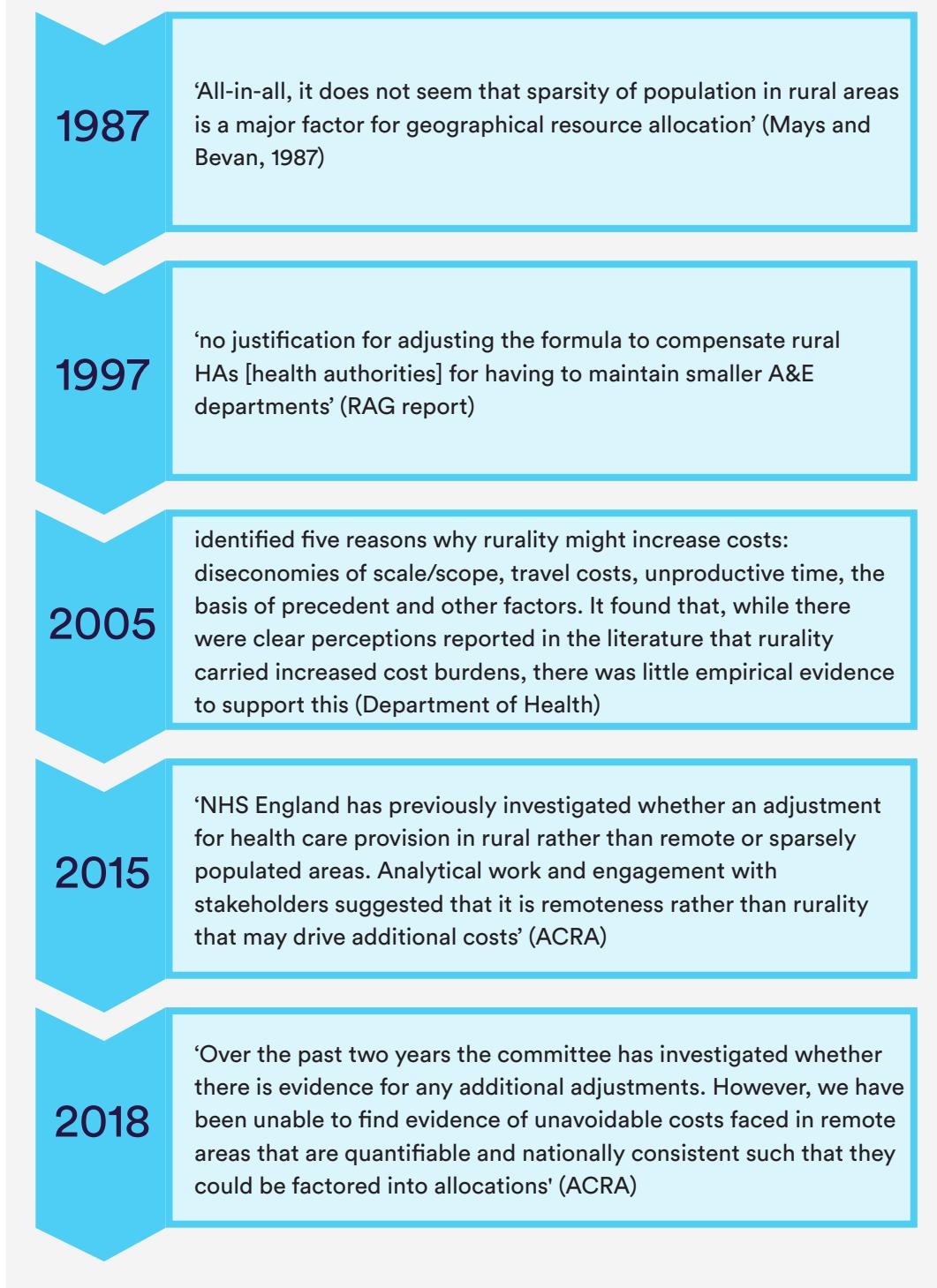
Some limitations to the review are worth noting from the outset. Firstly, this was a rapid review and was not intended to be an exhaustive, systematic review. For instance, we did not review non-English language literature. From the literature we did identify that the studies also have quite different focuses, with some looking at additional costs for just major hospitals (defined as having a major accident and emergency [A&E] department), while others looked at the additional costs of providing primary care (Deloitte, 2016).

Insights from published reviews on allocations

While we cover the allocation process elsewhere (Chapter 5), the review of allocations in England represent a key source of literature as they have sought to summarise existing evidence and conclude whether there are additional costs of providing health care in rural settings. Historically, these have suggested limited evidence for there being unavoidably higher costs in rural areas, although there appears to be a growing evidence base on additional costs for services in remote/sparse areas (Figure 1). That is not to say there is no literature arguing for further funding to rural areas.

² Google Scholar, with forward and backward citation tracking; Database of Abstracts of Reviews of Effects (DARE); Cochrane Database of Systematic Reviews (CDSR).

Figure 1: Conclusions on the effect of rurality from reviews of NHS allocations³



³ The 2005 review is not available online. The quote is from Crilly and others (2007).

Insights from general literature

In terms of the wider literature, we found mixed evidence on the nature and scale of additional costs (Table 2).

There are other factors that make delivering health care more difficult in rural areas, which may indirectly lead to increased costs. These include relative extremes of terrain and weather conditions (Bull and others, 2001), difficulties in maintaining patient confidentiality (Brems and others, 2006), and the fragile economic base in rural areas (Strasser, 2003).

Table 2: Potential factors leading to cost differences in delivering health care in rural areas

Examples in literature	
Patient needs	<ul style="list-style-type: none"> Patients in rural areas under utilise health care services (Asthana and others, 2003) and tend to be sicker when they do use health care services (for example, cancers are diagnosed later; Campbell and others, 2001). Rural populations are older, with 24% of the population being over 65, compared with 16% in urban areas (Department for Environment, Food and Rural Affairs, 2018). Some poverty and deprivation measures used to calculate funding in the allocation formula were developed based upon urban populations and do not represent rural populations as well (Asthana and others, 2003).
Economies of scale	<ul style="list-style-type: none"> Population sizes may be too small for hospitals to achieve economies of scale Giancotti and others, 2017 The Advisory Committee on Resource Allocation (ACRA) analysis suggested that, overall, depending on assumptions, the total compensation was between £12 and £54 million. The analysis suggested economies of scale and therefore potential sub-scale costs for remote providers operating at lower scale. The remoteness variable is statistically insignificant, indicating that this model does not identify further additional costs associated with remoteness. The analysis suggested hospital uplifts of £0 to £7.8 million per hospital, equivalent to up to 10.6%. (ACRA, 2016)

- Documents published by NHS Improvement detailing proposals for revamping the tariff system indicate a view that fixed costs for emergency care services could be around 80% – evidence that smaller hospitals (and rural hospitals tend to be smaller) with lower levels of activity may face higher emergency unit costs (NHS England and NHS Improvement, 2018).
- Evidence on economies of scale in hospitals suggests that they may exist when a hospital is smaller than 200 beds (Posnett, 2002). However, among the ‘smallest’ (Monitor, 2014) acute providers in England, the average bed base is over 400.

Workforce pressures

- Recruitment and retention of health workers is common challenge (Rechel and others, 2016).
- ‘Professional isolation for rural providers is profound’ (Brems and others, 2006).
- Monitor (2014) report that smaller hospitals are trying to implement seven-day working or increase the number of consultants to meet clinical standards, but are concerned about their ability to do so and maintain financial sustainability.

**Access/
patient
costs**

- Utilisation of health care is negatively correlated with travel time.
- Where patient costs are included in research (e.g. Canada examples), there is a bias towards further distribution of resources to rural areas.

There is some evidence of a perception that there are additional costs in rural areas which are not currently funded. Some had argued that there is a precedent for providing additional funding to rural areas, with the other UK nations making a substantive adjustment for rurality (Asthana and others, 2003). This ‘perceived wisdom’ is not a phenomenon unique to the UK. In New Zealand, a recent article has shown that there is a public perception (particularly on the South Island of the country) that the formula allocations are inequitable and that they have failed to keep pace with a number of factors, including the diseconomies of scale relating to rurality (Chester and others, 2018).

Quantification of costs

Quantifying these costs is somewhat more problematic. The research evidence on this is mixed: some sources suggest that these unavoidable costs are either minimal or non-existent, while others suggest varying degrees of unavoidable costs in certain contexts. That said, NHS Improvement did approve an uplift in the tariff (prices) for one trust (Morecambe Bay) it deemed to have unavoidable costs in delivering care to a dispersed population, equivalent to an additional £20-25 million a year uplift. Meanwhile, the analysis of overall costs associated with hospitals that are unavoidably small due to remoteness ranged from £12 million to £54 million (ACRA, 2016).

Primary care

While our review of the literature was not focused on primary care, we did identify existing work commenting on the effect of rurality on both costs of providing care and workload. Carr-Hill – whose formula still underpins the main component of practice funding – found that there was a large diseconomy of scale effect for low list sizes. Subsequently, in 2006, Deloitte undertook research on unavoidable smallness to take account of lost economies of scale where isolated rural practices have unavoidably small list sizes (Deloitte, 2006 and 2016). They concluded that there is clear evidence of diseconomies of scale for practices with list sizes of below approximately 1,900. They found that a 10% increase in list size was associated with a 3% reduction in cost per patient. The research suggested that those practices at least 2.5km from the next nearest practice should be considered. In a 2007 review of the primary care allocations, the British Medical Association and NHS Employers were unable to recommend whether or not a rurality adjustment should be included in the revised formula, due to a lack of evidence and rationale to support its inclusion.

There is also evidence of additional workload in rural practices. Analysis to inform the primary care formula found that rurality has a positive and significant impact on workload, equal to around four minutes per patient per year (Gardiner and Everard, 2016). This research posed two possible explanations of the link between longer aggregate file openings and rurality (once demography and deprivation have been taken into account):

- 1 In rural areas patients consult with their GPs over conditions they would take to a different provider of health care services if one were available locally.
- 2 In rural areas practices are less rushed and are able to devote more time to consultations, or recommend additional appointments.

The measure for longer consultation duration was not consistent for all age groups. However, for 15–44-year-old women, it was 10% longer in rural areas than in urban areas. They also found that their measure of the number of consultations per person was higher in rural areas. However, they could not say whether these additional openings related to supply or demand side factors.

Summary

Direct evidence to support additional net costs of delivering health care in rural areas was mixed. There was more indirect evidence of factors more common in rural areas leading to additional costs. Much research acknowledges other workforce issues for rural hospitals. Evidence in favour of increased costs for rural hospitals tends to be set in areas where there are greater extremes of rurality compared to England (for example Canada and the US). The extent to which evidence supports the assertion that rural areas incur additional costs often depends on the perspective taken for the analysis. Where the analysis includes costs to patients as well as costs to providers, or includes unproductive travel time, stronger evidence was found.

4 Evidence on effect on wider quality and sustainability measures

As well as reviewing the existing literature, we also briefly explored the relationship between the rurality of hospital trusts and some key measures of quality and sustainability. We used two trust-level measures of rurality based on existing analysis which feeds into the funding allocations, and compared these to a small number of measures of waiting times, lengths of stay, unit costs and financial position (Table 3). This exploratory analysis focused on acute trusts only. Previous work has suggested that rural areas should get a premium in the allocations, as rural areas could not meet quality standards without more funding (Asthana and others, 2003).

Table 3: Variables used in exploratory analysis

Variable	Source
Rurality	<ul style="list-style-type: none"> • Sparsity: based on ‘emergency ambulance cost adjustment’, which is a measure of the costs of providing emergency services in sparsely populated areas • Unavoidable smallness: a dichotomous measure of unavoidable smallness due to remoteness, capturing seven trusts
Waiting times	<ul style="list-style-type: none"> • A&E waiting time performance: percentage of A&E waits of four hours or less from arrival to admission, transfer or discharge, for June to August 2018. • Elective waiting times: patients starting treatment within 18 weeks at end of August 2018

Lengths of stay	<ul style="list-style-type: none"> Mean length of stay, 2017/18 Delayed transfers of care: measured as average number of delayed days per admission, October 2017 to March 2018 	Hospital Episode Statistics; NHS England
Efficiency and financial position	<ul style="list-style-type: none"> Unit costs: reference cost index in 2016/17, adjusted for market forces factor and including excess bed days. Numbers over 100 reflect higher than average costs Financial position: surplus/deficit as at 31 March 2018 	NHS Improvement

Notes: See page 9 for more details on the rurality measures. A&E waiting times include mapping of additional activity. Denominator for 'delayed transfer' measure is 50% of the total number of admissions for 2017-18.

The findings from this exploratory analysis are mixed, with no clear associations with measure of sparsity, but some evidence of pressures for unavoidably small providers in remote areas:

- Broadly speaking, using the continuous **measure of sparsity**, we did not find clear evidence of a strong relationship with waiting times, lengths of stay, efficiency or financial position. This can be seen on the dispersed scatter plots of rurality versus measures of performance and pressure (Figure 2, page 25). This may well be due to the complexity of the relationship with, for instance, many unmeasured and unadjusted factors other than rurality that are likely to affect performance against the other measures. In addition, the measure of rurality itself should be considered to be a rough estimate as it has been mapped from an area-level rather than provider-level indicator.
- The trusts that have sites deemed to be **unavoidably small** due to their remoteness (highlighted in blue in the graphs in Figure 2) appear to have, in general, high cost pressures. While the performance across the seven trusts is variable, on average, they have longer waiting times and lengths of stay, more delayed transfers of care, higher average unit costs (reference costs), and worse financial positions (Table 4). Six of the seven trusts with unavoidably small sites ended 2017/18 in deficit, with the combined financial position between the seven amounting to more than

a quarter-of-a-billion pound deficit. These trusts account for 3% of all trusts, but almost a quarter (23%) of the overall deficit for trusts, which is possibly indicative of unavoidable rural costs.

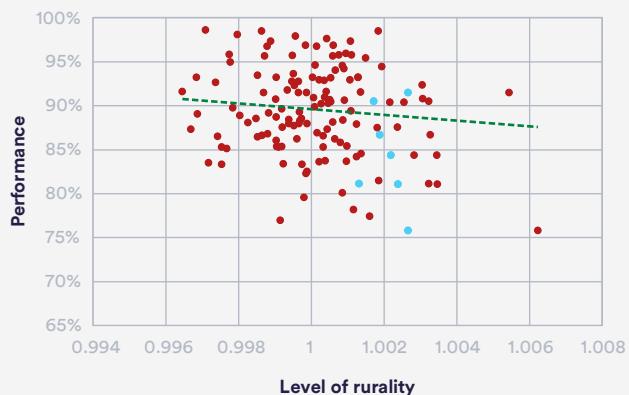
Table 4: Mean (median) performance across key performance measures for trusts with unavoidably small hospitals due to remoteness and other trusts

	A&E: Percentage waiting four hours or less	Elective: Patients starting treatment within 18 weeks	Mean length of stay	Delayed days per 1,000 admissions	Unit costs: reference cost index	Financial position 2016/17
Trusts with unavoidably small hospital	84.4% (84.3%)	78.9% (82.0%)	4.3 (4.3)	118 (114)	107.9 (109.1)	£36.2m deficit (£26.2m)
Other trusts	89.9% (90.0%)	85.4% (87.3%)	4.2 (4.1)	81 (74)	100 (99.4)	£8.4m deficit (£5.9m)

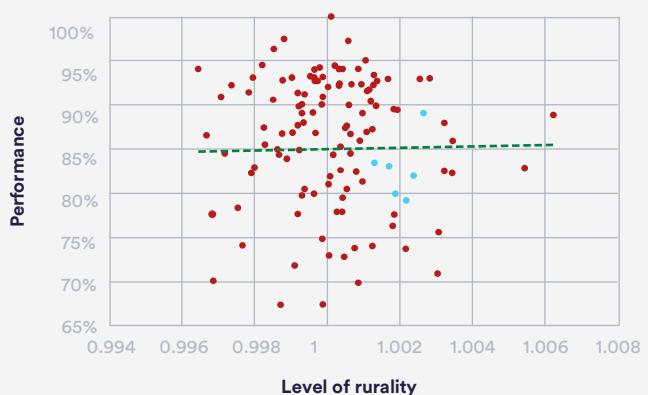
Note: Mean performance is calculated as the crude average between trusts and not weighted by size.

Figure 2: Association between rurality/remoteness and measures of performance

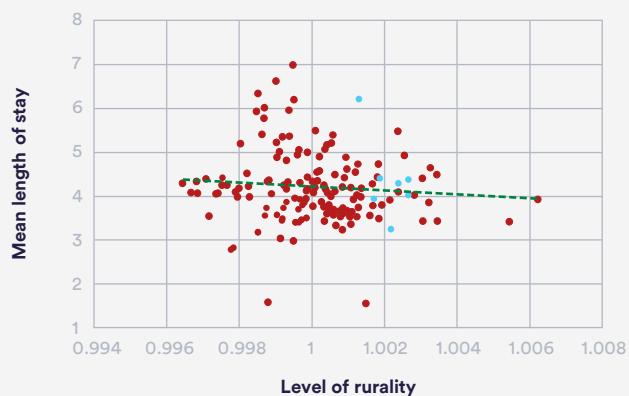
A&E 4 hours performance (all activity)



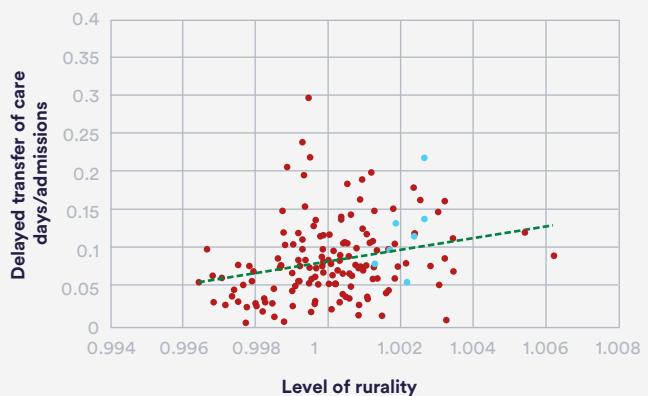
Patients waiting within 18 weeks at the end of August 2018



Mean length of stay



Delayed transfer of care



Reference cost index (MFF adjusted)



Financial position as at 31 March 2018



Notes:

1. Level of rurality based on ECEA adjustment.
2. Blue dots are the trusts with 'unavoidably small' hospital sites.

5 Rurality factors and the NHS allocation process

The funding of health and care services across the UK is complex, involving a range of national bodies, local commissioners and individual providers. In this chapter we focus on if – and how – additional costs of providing care in rural areas are reflected in both:

- allocations to local areas for commissioning services
- the funding arrangements for individual providers to receive any additional money for rurality.

Background

As noted earlier, it has long been recognised that in different areas of the country, the costs of providing care vary in ways that are unavoidable or uncontrollable. This is due to differences in, for example, local markets for land, buildings and labour; and other factors associated with remoteness, population sparsity and rurality generally.

The funding arrangements differ across the four nations of the UK and, while much of the material focuses on the English funding framework, we separately draw out comparisons with the systems in Scotland, Wales and Northern Ireland (see page 37). Indeed, Asthana and others (2003) argued that England should include a rural premium in allocations on the basis of precedent, given other UK nations do.

Allocations to local commissioners in England

There are three main allocations of health services in England.⁴ The starting point to calculate the relative level of allocations between areas is their population, with adjustments made to account for the needs of their demographics. Further adjustments are made to give higher levels of funding to areas with higher unmet need or additional unavoidable costs. These factors determine the ‘target allocation’ for each area, while the actual amount it receives is based on a ‘pace of change’ policy. This policy moderates changes in funding towards the target allocation to ensure that the maximum increase is at a level which can be used efficiently, and the minimum growth (or reduction) is sufficient to ensure health economies remain stable (see Figure 3).

While the core clinical commissioning group (CCG) funding allocation contains the most explicit adjustments directly aimed at addressing costs of providing care in rural areas (the emergency ambulance cost adjustment and unavoidable smallness in remote areas), the other adjustments, which include matters of judgements on how they are calculated and applied, will influence the relative funding available to local areas. We note that the calculation of allocations also accounts for ‘supply factors’ to ensure that the availability of additional facilities does not influence estimations of need. The impact of this is to send more funds to rural areas than would otherwise be the case but we have not been able to quantify the effect based on the data available.

⁴ A further set of allocations to local authorities are provided for public health services via Public Health England. These are not covered in the scope of this rapid review.

Figure 3: Key factors for calculating allocations to local areas

Adjustments	CCG core (£70.5bn)	Primary care (£7.3bn)	Specialised (£14.5bn)
Population need	100% formula	100% formula	46% formula and 54% historic spend
Unmet need/ inequalities	10% adjustment based on SMR<75	15% adjustment based on SMR<75	5% adjustment based on SMR<75
Costs	MFF; EACA; Unavoidable remoteness	MFF	MFF
Financial stability	Pace of change	Pace of change	Pace of change

Notes: MFF = market forces factor; EACA = emergency ambulance cost adjustment; SMR<75 = standardised mortality ratio for those aged under 75 (a measure of levels of deaths in a local area compared to the national average, having adjusted for differences in age profiles).

Clinical commissioning groups' core allocations

The core allocations to CCGs are arrived at by adjusting CCGs' crude populations for a number of demand and supply factors affecting their population's need for, and the costs of delivering, care (Table 5).

Table 5: Key weighted capitation adjustment factors

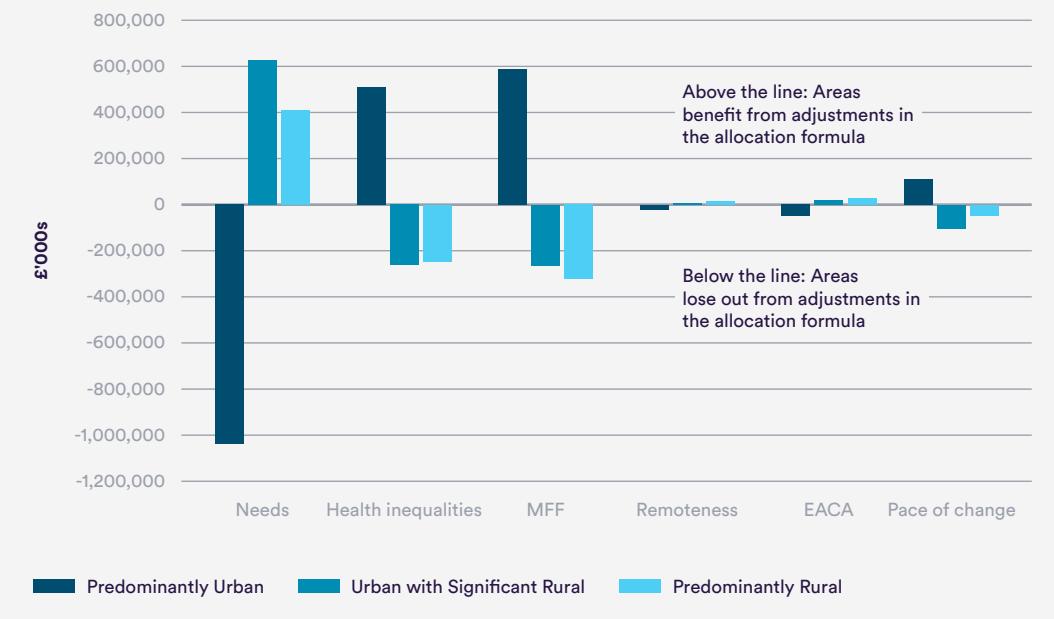
Adjustment	Detail	Estimated effect in 2018/19, % of allocation
Target allocations		
Needs	In calculating the target allocation, only the health needs of the population are taken into account. However, ‘supply factors’ such as the number of hospital facilities available are measured but then ‘neutralised’ in an area’s allocation calculation, with the intention of helping balance funding between urban and rural areas.	-32.2% (Wandsworth) to 19.8% (Knowsley)
Market forces factor (MFF)	Adjusts for the unavoidable differences in unit input costs between areas due to their geographical location alone. For example, it typically costs more to run a hospital in a city centre than in other areas due to higher staff, buildings and land costs.	-6.4% (Kernow) to 12.2% (Camden)
Emergency ambulance cost adjustment (EACA)	Adjusts for unavoidable variations in the costs of providing emergency ambulance services in different geographical areas, and in particular sparsely populated areas. The EACA was refreshed by NHS England Analytical Services for 2016/17 allocations.	-0.4% (Tower Hamlets) to 0.6% (West Suffolk)
Inequalities/unmet need	An adjustment for unmet/inappropriately met need and health inequalities is made based on a measure of population health: the standardised mortality ratio for those aged under 75 (SMR<75).	-4.2% (North Norfolk) to 10.6% (Bradford City)
Unavoidable smallness	A further adjustment is made for the higher costs of running hospitals with 24-hour A&E departments in remote areas. These hospitals are typically unable to achieve the same economies of scale as other hospitals. The EACA and this adjustment capture higher costs over and above those covered by the MFF. The conditions used to identify remote hospitals were that they are: <ul style="list-style-type: none"> • Small – with a catchment of fewer than 200,000 people • Remote – with more than 10% of its catchment population more than 60 minutes from the second closest provider • Major – with provision of 24/7 major (tier 1) A&E facilities 	In 2016/17, seven CCGs – covering eight remote hospitals that they commission from – received an uplift of £31.2 million. This increased to £33.1 million (+6.0%) by 2018/19, ranging from £2.8 million (Scarborough and Ryedale CCG) to £8.9 million (North Cumbria CCG). The largest relative adjustment is the 2.8% increase for Isle of Wight.
Actual allocations		
Pace of change	Changes in funding towards the target allocation are moderated to ensure the health economy is not destabilised.	-4.8% (Oxfordshire) to 26.1% (West London)

Notes: ‘Target allocations’ calculations are based on NHS England’s published data on allocations; actual allocations may have differed and, as such, the precise figures should be treated with caution. ‘Pace of change’ figures taken from revised allocation figures, published January 2019.

The needs adjustment has the effect of moving funding towards rural areas. This is expected as populations in rural areas are typically older. As described earlier, the calculation of need is one of the most sophisticated internationally and has developed over many years. That said, some have argued that it does not sufficiently reflect need in rural areas (Asthana and others, 2003). Specific issues could relate to longer transfer times in ambulances and the health consequences of these, uncaptured demographic factors (for example itinerant workers), and fewer support services (NHS England, 2016).

We analysed the effects of removing these adjustments from the allocations to reveal the separate impacts of these changes on CCGs in rural and urban areas (Figure 4). It showed that the health inequalities, market forces factor (MFF) and pace of change adjustments have the effect of, broadly speaking, moving funding from rural to urban areas; while the unavoidable smallness and emergency ambulance cost adjustment (EACA) adjustments have the opposite effect. However, it is noticeable that the magnitude of the effect of the health inequalities and MFF adjustments is many times larger than the other adjustments, with these two moving in the region of £600 million of funding from ‘predominantly rural’ areas to urban areas within the target allocations.

Figure 4: The impact of weighted capitation needs and other adjustments on rural and urban CCGs allocations



Analysis based on NHS England's published data on allocations; actual allocations may have differed and, as such, the precise figures should be treated with caution.

The adjustments are also sensitive to the assumptions made. For the criteria used to identify remote hospitals, NHS England has accepted that 'parameters are based on some, albeit limited, advice. Changing these parameters will give different results' (ACRA, 2015a). For instance, NHS England has noted that using an alternative remoteness cut-off would result in 27, as opposed to 8, sites being candidates for qualifying for additional funding.⁵

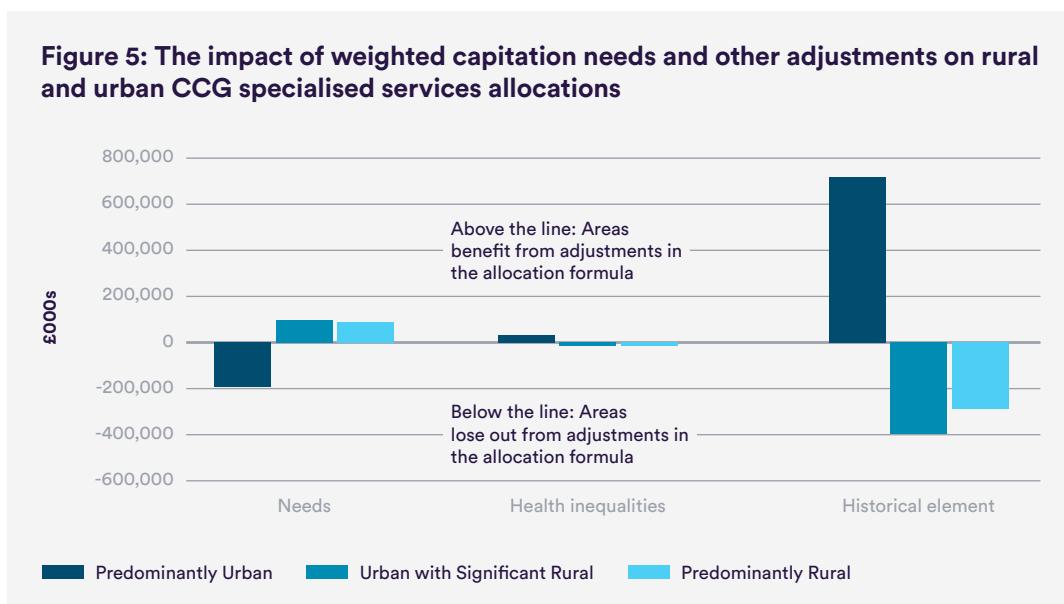
NHS England have revised some aspects of the way allocations are made to local areas from April 2019. They expect that the needs in some rural areas will be better captured by the new method for estimating the need for community services and by using population data which better reflects seasonal workers. In addition, there is a phased update to the adjustment for unavoidable costs (Market Forces Factor) which would tend to benefit rural areas. However, this

5 Using 300,000 rather than 200,000 maximum population adds two hospitals; using 150,000 population reduces it from eight to three. Using 45 minutes rather than 60 minute minimum drive time to next nearest hospital gives 13 trusts; 30 minutes gives 27.

does not appear to be a short-term fix; the allocations for predominantly urban areas will actually increase by marginally more (5.7%) than their rural counterparts (5.6%) next year.

Specialised services

A separate funding allocation is used to cover specialised services such as child heart surgery. For these allocations, there is a small (5%) adjustment for health inequalities, while the majority (54%) of the allocation is dictated by previous spending patterns between areas, rather than calculations of population need. The effect of this latter adjustment is to move around £700 million within target allocations to predominantly urban areas (Figure 5).



Analysis based on NHS England's published data on allocations; actual allocations may have differed and, as such, the precise figures should be treated with caution.

Hospital funding

The funding of trusts is complex, with income streams derived from different sources and in different ways. Here we focus on three sources: Payment by Results (PbR); local modifications to the PbR tariff; and the Sustainability and Transformation Fund. However, future work should look at the effect of, for example, 'block contracts'.

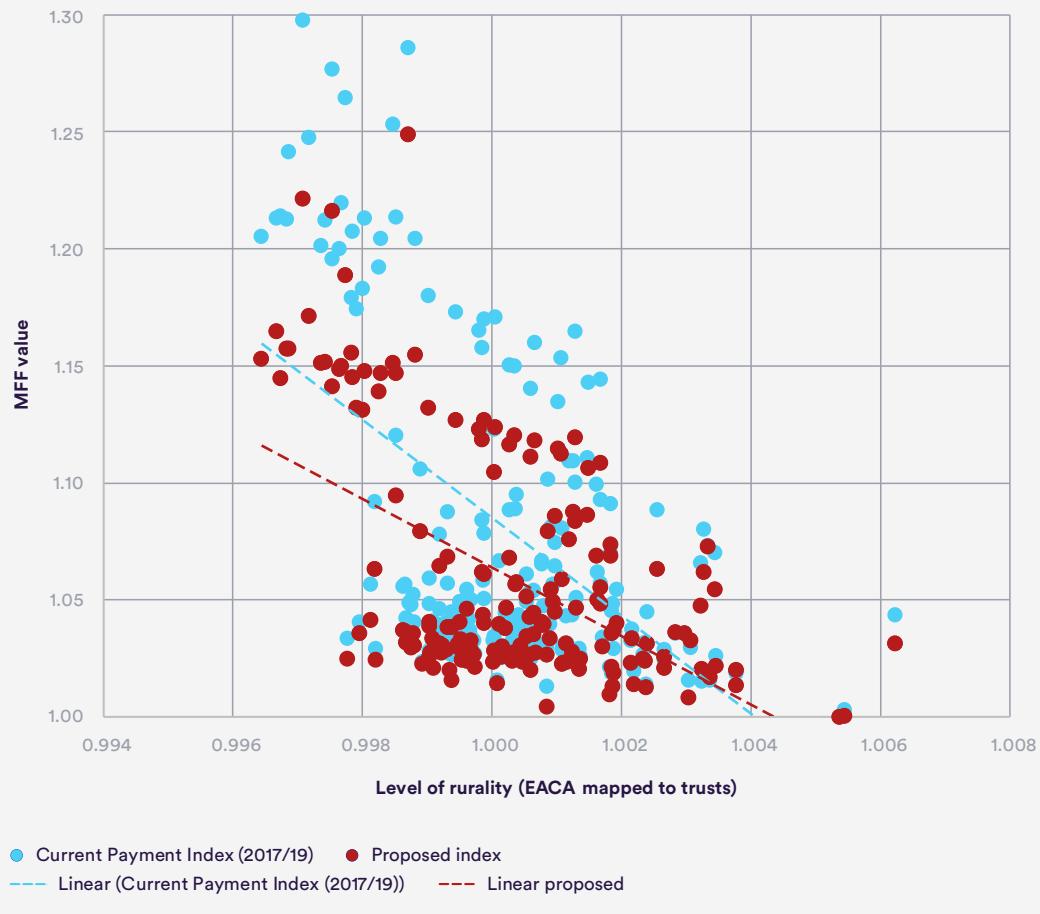
Payment by Results

For services commissioned through the PbR framework, the level of funding received by a trust for each admission is dictated by the MFF. The adjustment to the funding levels (tariffs) received by hospital trusts to account for unavoidable differences in costs generally means urban areas receive more for providing the same service. At the extremes for acute trusts, University College London receives 29% more than Royal Cornwall Hospitals for delivering the same unit of care (Figure 6).

A 2017 review of the MFF noted that there were unavoidable higher costs related to unavoidable smallness in remote areas and due to some providers having high travel times but, in both cases, did not deem the MFF to be the appropriate mechanism to reimburse trusts; instead suggesting amendments to the CCG allocations and to potentially applying the travel time adjustment for ambulance trusts to community and mental health trusts (Frontier Economics, 2017).

In October 2018, NHS England and NHS Improvement published their latest proposals for revamping the tariff system of payments to NHS trusts, together with an overhaul of the MFF to better align the payment system with the goals of the new 10-year plan (NHS England and NHS Improvement, 2018). The proposed MFF values reduce the extent of the variation between the most urban and the most rural providers.

Figure 6: Current and proposed market forces factor by level of rurality



Local tariff modifications

"If an adjustment is were [sic] to be made to allocations, the funding may reach the provider in a number of ways, though the position is complex."

(Smyth and Chaplin, 2015)

While there are specific adjustments for rurality of specific providers within the formula, the funding is provided to commissioners but there is no certainty that those particular rural providers will receive it. The Health and Social Care Act 2012 made provision for providers to be compensated for unavoidable higher costs via 'local modifications' to ensure that health care services can be delivered where they are required by commissioners for patients, even if the cost of providing services is higher than the national prices

(Smyth and Chaplin, 2015). Specifically, NHS England and NHS Improvement (then, Monitor) were given responsibility for agreeing the method of determining local modification to national prices. Once NHS Improvement has approved such a modification for a given provider, then CCGs must pay the higher prices set by NHS Improvement. In 2015/16, Monitor granted the first local modification to Morecambe Bay, focusing on 'six essential services' (Monitor, 2015a).⁶ However, the method for calculating the prices has not been published.

The amount and method of compensation actually received by providers for unavoidable smallness is opaque and inconsistently applied to the seven trusts identified in this category. In particular, York Teaching Hospital NHS Foundation Trust receives its CCG's uplift (£2.8 million); University Hospitals of Morecambe Bay NHS Foundation Trust's tariff (prices) has been increased by the equivalent of around four times the level the CCG receives via a local modification (£20–£25 million); and other trusts receive no additional funding at all (Table 6).

Data provided by NHS Improvement for this study suggest that, to November 2018, 17 trusts have applied for local modifications.⁷ Of the applications, the majority (11 applications) are for rurality (or sparsity/economies of scale), with the remainder consisting of rationale relating to case-mix complications (2), Private Finance Initiatives or estates (2), A&E services (2), and clinical negligence scheme costs (1). To date, only one trust (Morecambe Bay) has been successful with their application.

Sustainability and Transformation Fund

Following the announcement of increased funding to the NHS, a special 'Sustainability and Transformation Fund' was established. The Fund is provided directly to trusts, with decisions on the funding largely taken by NHS Improvement, who oversee them. The combined deficits for the seven trusts with 'unavoidably small' sites amounted to over a quarter of a billion pounds in 2017/18, which accounted for almost a quarter (23%) of the overall

⁶ The services affected are: Accident and emergency; General surgery; Trauma and orthopaedics; Paediatrics; Women's health; and Non-elective medical specialties.

⁷ One trusts has applied twice, so the total number of applications is 18.

deficit for all trusts, and each was higher than the average, which is possibly indicative of unavoidable rural costs. Some of these deficits are particularly large given the size of the trusts involved; for example, Wye Valley's deficit was 18% of turnover in 2017/18 (Wye Valley NHS Trust, 2018).

The seven trusts received, in total, just 1.7% (£30 million out of £1,783 million) of the total allocation through the Sustainability and Transformation Fund in 2017/18.

Table 6: Funding position of trusts with unavoidably small hospitals due to remoteness

Site	Trust	CCG	Remoteness adjustment, 2018/19, £000s	Trust financial position, Q4 2017/18	Total Sustainability and Transformation Fund	Local modification (where known)
St Mary's Hospital	Isle of Wight NHS Trust	NHS Isle Of Wight CCG	£5.2m	(£22.9m)	£0.5m	
North Devon District Hospital	Northern Devon Healthcare NHS Trust	NHS North, East, West Devon CCG	£3.9m	£6.5m	£6.1m	Working with the CCG to understand and recognise the financial impact of unavoidable cost within the current financial position.
Cumberland Infirmary and West Cumberland Hospital	North Cumbria University Hospitals NHS Trust	NHS North Cumbria CCG	£8.9m	(£40.3m)	£11.7m	
Furness General Hospital	University Hospitals of Morecambe Bay NHS Foundation Trust	NHS Morecambe Bay CCG	£6.1m	(£64.7m)	£0m	Yes – a local modification was agreed for 2015–16 which meant that the Trust would receive between £20m and £25m more (Monitor, 2015b).
Pilgrim Hospital (Boston)	United Lincolnshire Hospitals NHS Trust	NHS Lincolnshire East CCG	£2.9m	(£81.3m)	£3.5m	
Hereford County Hospital	Wye Valley NHS Trust	NHS Herefordshire CCG	£3.3m	(£26.2m)	£5.1m	Currently negotiating local modification and also having arbitration with CCG on current funding.
Scarborough General Hospital	York Teaching Hospital NHS Foundation Trust	NHS Scarborough and Ryedale CCG	£2.8m	(£24.1m)	£3.1m	Application rejected by NHS Improvement two years ago. Since 2017/18, Scarborough and Ryedale CCG has passed their unavoidable smallness adjustment straight through to the trust, as a top-up to the tariff ('sparsity payment').
All trusts			(£1,086.4m)		£1,782.9m	

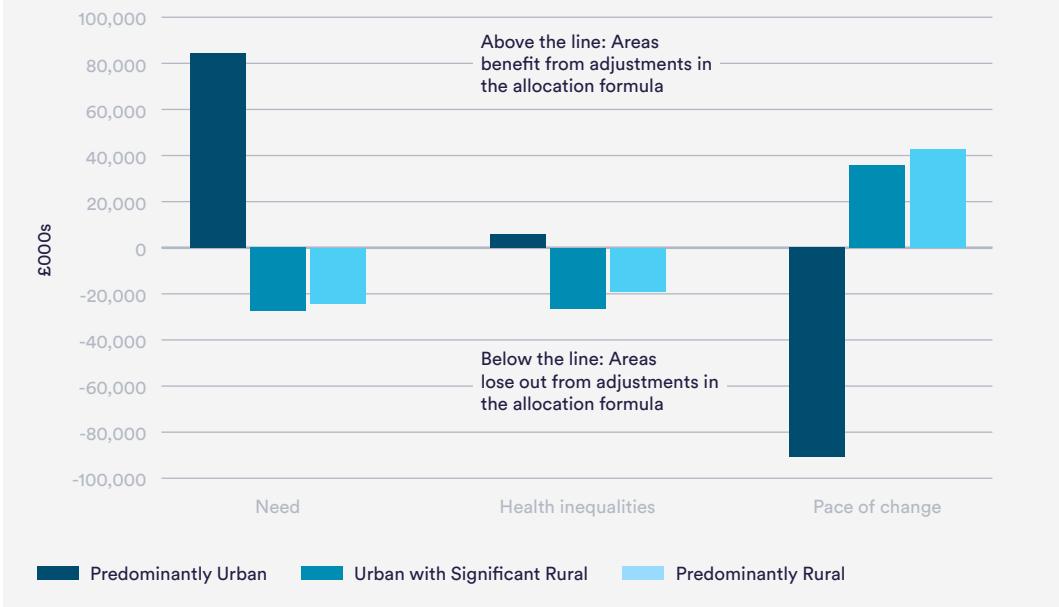
Primary care

The funding for primary care is also complex. The largest single mechanism for practices is the global sum payments for the General Medical Services (GMS) contract, which are informed by the Carr-Hill formula. This formula includes an adjustment for population densities and dispersions. However, a further adjustment to account for apparent large diseconomies of scale effect for low list sizes was not made. This is to avoid practices seeking to disaggregate or avoid amalgamation so they can benefit from higher funding.

The allocations for local areas had been determined on the same basis as Carr-Hill's calculations for individual practices. NHS England asked ACRA to advise on a new formula for primary medical care, to be used to allocate budgets to CCG areas from 2016/17. Allocations consider both the workload and cost of meeting this workload. However, '... data were not available to update the relative costs, such as those related to rurality'. ACRA considered whether rurality should be included as a factor in determining workload. While there was an association between rurality and workload, ACRA considered that it should be excluded because of the lack of certainty over whether it was reflective of additional workload or systematic behaviour in rural practices not arising from workload (Gardiner and Everard, 2016). However, the allocations do adjust for the costs of providing services in rural areas. The effect of not including a rural adjustment in the calculations of the revised formula was, at the extremes, to increase funding to London by 1.1% and reduce it in the South West by 1.6%. A 2007 review also looked at rurality and, while it was not able to recommend whether or not a rurality adjustment should be included, its proposals suggest that, if it had been, it would have increased funding to the quartile of practices with the least dense populations by around 5% (see Appendix B).

The adjustment for patient needs has the effect of decreasing the target allocations for predominantly rural areas by around £28 million (see Figure 7). The health inequalities adjustment has a similar effect. Conversely, the pace of change formula generally 'favours' rural areas. Work by the University of Manchester suggests that practices in London and rural areas tend to receive a disproportionately high level of funding in comparison to the health needs of the populations that they serve (Burch, 2018; Kontopantelis and others, 2017).

Figure 7: The impact of weighted capitation needs and other adjustments on rural and urban CCG allocations for primary care (medical) services



Analysis based on NHS England's published data on allocations; actual allocations may have differed and, as such, the precise figures should be treated with caution.

Funding to practices

In 2016, NHS England published guidance which noted that there are some practice populations that are so significantly atypical that using the GMS funding formula would not ensure the delivery of an adequate service. The working group looked at three such atypical populations: unavoidably small and isolated; university practices; and those with a high ratio of patients who do not speak English. The intention is that by enabling local commissioners to identify and support the practices that serve these populations, patients will continue to receive effective primary care.⁸ The guidance suggested some data sources that commissioners may wish to consider when trying to define whether a population is atypical: population density and distance from patient residences; ambulance response times; current service profile; and financial

8 The guidance was produced by a working group comprising NHS England and CCG commissioners, Local Medical Committee representatives, a British Medical Association representative and a Royal College of General Practitioners representative.

position.⁹ It highlights whether additional or extra services could be captured in a bespoke enhanced service, set of key performance indicators or added formally into a Personal Medical Services (PMS) agreement.

Comparisons between the four nations of the UK

Wales, Scotland and Northern Ireland have areas of extreme rurality not found in England. They each take account of rurality in their allocation formulae. Since 2005, Northern Ireland has also had an adjustment for economies of scale in their formula. As a further comparator, we have also set out the allocation process for education in England (Appendix A).

9 For example, general practice expenses, GMS and Personal Medical Services contracts in England 2013/14 (NHS Digital, 2016); adjusting the GMS allocation formula for the unavoidable effects of geographically-dispersed populations on practice sizes and locations (Deloitte, 2006); NHS payments to general practice, England, 2015/16 (NHS Digital, 2016).

Table 7: Rurality-associated cost adjustments in NHS allocations across the UK

Country	Rurality adjustments
England	<p>The MFF is designed to address unavoidable geographic variations in costs of staff, land and capital.</p> <p>Has a rurality adjustment only for ‘remote’ hospitals.</p>
Scotland	<p>Has a rurality adjustment through the Artbuthnott formula. Identifies unavoidable excess costs of providing health care.</p> <p>Additional payments to staff as part of Scottish Distant Islands Allowance.</p> <p>The Carr-Hill type formula for Scotland includes an additional component relating to economies of scale for a limited number of practices.</p>
Wales	<p>The Townsend Review (2001) introduced an adjustment for Wales using the same method as Scotland. Analyses of economies of scale adjustment are hampered by poor data (Gordon and others, 2003) .</p> <p>Rural cost adjustment is applied to community services expenditure (7.5% of the total)</p>
Northern Ireland	<p>The Capitation Formula Review Group developed a rurality cost adjustment in 2000, and an economies of scale adjustment in 2004.</p> <p>The rurality adjustment redistributed £104 million of resources in 2014/15, but a review of the formula reduced this to under £50 million (Health and Social Care Board, 2015). This was a result of changes in provision and staff locations, together with lower than projected travel costs. The rurality pot covers a range of community services. The adjustment is to compensate areas for the unavoidable costs associated with the unproductive time spent by staff when travelling to clients’ homes and the cost of this excess travel.</p> <p>Upon introduction, the economies of scale adjustment redistributed £37 million (MSA-Ferndale, 2003).</p>

Other international examples on allocations to rural areas

In general terms, several countries’ funding adjustments favour urban hospitals for direct labour market costs, based on local evidence. Much research acknowledges other workforce issues for rural hospitals, but this has not been explicitly targeted in resource allocations. Notable adjustments

include one for travel time of district nursing (New Zealand), isolated providers (US) and patient-level adjustments for those living in remote areas (Australia). Further examples are given in Table 8.

In the US, the Medicare funding approach uses the pay difference of real health care workers, which the NHS resource allocation method does not. The English NHS method uses the general labour market and has methodological advantages in reflecting resource needs. Where the pay of real health care workers is used, the model reflects existing costs instead of providing insights of the true costs.

Table 8: International examples of rurality cost factors in health care

Health system	Adjustment
USA – Medicare funding	<ul style="list-style-type: none"> • Labour costs: hospitals are assigned a ‘wage index’ based on salaries in the local metropolitan area, which has a minimum value to reduce the impact of adjustments for low pay areas. Hospitals can appeal for exceptions on the basis of, for example, population density¹⁰; competition and pay at nearby hospitals; and levels of commuting in the population. • The capital share of total costs has a similar approach, but uses a method which results in less geographic variation than the labour share approach. • Isolated services – hospitals qualifying as sole community hospitals receive some favourable financial terms. Sole community providers are isolated from other hospitals, for example those greater than 35 road miles or more than 45 minutes’ drive time. They may also be eligible for additional payments if they experience a reduction in discharges of more than 5% for reasons beyond the hospital’s control. • Smallness – low-volume hospitals payments are based on both geographical and volume criteria. Hospitals more than 25 road miles from another general acute hospital with fewer than 200 discharges receive a 25% premium for each Medicare discharge (US Department of Health and Human Services, 2016).

¹⁰ Hospitals in frontier states (Alaska, Montana, Nevada, North Dakota, South Dakota and Wyoming), where at least 50% of the counties within a state have an average population density of six people per square mile or fewer, cannot be given a wage index below the national average.

Australia	<ul style="list-style-type: none">The Independent Hospital Pricing Authority in Australia attempts to correct for unavoidable costs at the patient level, as well as at a hospital level.There are cost adjustments applied when an admission occurs for patients living in outer regional areas (8%), remote areas (18%), or very remote areas (23%). An additional 5% adjustment is applied for particular (aboriginal or Torres Strait Islander) populations.Some block funding adjustments are made at a provider level for around 400 smaller hospitals. In metropolitan areas, hospitals providing 1,800 or fewer NWAUs (National Weighted Activity Units) receive additional funds. Outside of metropolitan areas, hospitals providing 3,500 or fewer NWAUs are eligible for this payment.
New Zealand	<ul style="list-style-type: none">New Zealand's funding formula includes adjustments for diseconomies of scale relating to rurality, overseas visitors and unmet need. This also includes premiums paid to rural maternity providers where the number of births is low.The New Zealand funding formula takes unproductive travel time into account for funding for district nursing.In 1995/96, the net additional costs of rurality were estimated to be \$39 million (Sutton and others, 2006).
Canada (Alberta)	<ul style="list-style-type: none">For inpatient services, a cost adjustment factor is applied based on a number of factors including patient remoteness.A Cost of Doing Business Factor of 25% is applied for two regions, and 12% for another region for all non-inpatient services (Sutton and others, 2006)

Summary of limitations in the formula

Our review of allocations in England revealed a number of limitations in the current process, including:

- The needs adjustments for some of the allocations may not appropriately capture additional needs in rural areas.** While the core CCG allocations have been suggested to favour urban areas (Asthana and others, 2003), recent work suggests that, in primary care, practices in London and rural areas tend to receive a disproportionately high level of funding in comparison to the health needs of the populations that they serve (Kontopantelis and others, 2017). Quantifiable evidence is needed in order to make progress on this issue.

- **The allocations do not fully capture costs in community services.** A formula for community health services has been developed for use in allocations for the first time from 2019/20, and while welcome, no adjustments for additional travel time in rural areas is made. ACRA (2018) have indicated that future work will consider whether increased travel times and costs in remote areas for community nurse visits are required.
- **Some of the adjustments which indirectly affect the distribution of funding remain a matter of judgement and are not based on clear evidence.** ACRA's recommendations are principally based on research and modelling. However, due to the lack of robust quantitative evidence which is comprehensive and consistent between services and across the country, ACRA's recommended measure to be used for the unmet need adjustment was largely pragmatic and based on judgement.
- **The adjustments for rurality are also based on judgement.** For the recent adjustment on unavoidable smallness for remote services, NHS England accept that these assumptions are largely matters of judgement. A population of around 200,000 was considered as the minimum required to achieve economies of scale and one-hour drive time the maximum for clinical safety reasons for emergency care. These parameters are 'based on some, albeit limited, advice' (Smyth and Chaplin, 2015). Decreasing the drive time threshold to 30 minutes would see 27 sites, rather than seven, considered to be unavoidably small.
- **There are inconsistencies across the UK.** For example, the Carr-Hill formula adjusted for rurality but not unavoidable smallness, whereas Scotland took the opposite approach (adjusting instead for economies of scale).
- **Adjustments to local area allocations are not always reflected in the funding received by the providers who are deemed to have the additional costs.** In particular, York Teaching Hospital NHS Foundation Trust receives its CCG's uplift (£2.8 million); the increased tariff (prices) for University Hospitals of Morecambe Bay is equivalent to around four times the level the CCG receives via a local modification (£20–£25 million); and other trusts receive no additional funding at all.

6 Conclusions

Analysing the causes of cost pressures for rural health care providers is important, but the nature and level of reimbursement for any additional costs is, ultimately, a policy matter. Certainly, different philosophies regarding resource allocation imply different resources for rural areas. However, given the stated aim of moving care closer to home and the new Secretary of State's vision that 'the era of moving all activity into fewer, larger hospitals – and blindly, invariably closing community hospitals – is over', it is clear that there is an implicit ambition to support the provision of care in rural and remote areas.

Our search of existing literature on the additional costs faced by rural providers found mixed results. One of the problems is that we did not have time to assess the similarity of study populations to the English population. For example, adjustments made in northern Canada or Alaska in the US have only limited policy relevance to rural England. Part of the issue is that there is still an incomplete understanding of the exact nature and cause of additional costs. Common features of, but not unique to, rural providers (smallness, isolation) may be more important than rurality itself. Certainly, this appears to be an under-researched area.

During our review, we identified a number of different approaches – at provider and national levels – to calculate and reimburse for unavoidable costs related to rural and remote services. This has already resulted in inconsistencies in the levels of funding received by providers. Without coordination, there is a significant risk of duplication of effect. As such, there appears to be scope for the National Centre for Rural Health and Care to act as a focus and forum for remote and rural NHS trusts on the issue of unavoidable costs.

There are also serious questions about the effect that some of the aspects of the general allocations formula and funding mechanisms, which remain a matter of judgement, are having on rural funding. In addition, there appear

to be inconsistencies in how those services that have been identified as having additional costs associated with rurality are being compensated (or not).

Moreover, we have identified a number of areas where national bodies could improve their approach around the funding of rural services, including:

- NHS England and the Department of Health and Social Care being more transparent about the nature and scale of the current mechanisms for compensating for rural costs.
- NHS Improvement being more transparent around the calculations of, and decision-making to approve or reject, local modifications.
- ACRA continuing to revisit evidence on costs in consultation with rural trusts, including non-acute providers, and commissioning further research if required.
- In addition to any review of funding arrangements, national bodies should also be providing non-financial support to rural commissioners and providers to overcome the unique challenges they face.

Areas for further research

- Defining the envelope for adjustments for rurality by, for example:
 - calculating the consequences of different allocation decisions (including using other UK nations and international precedent) in terms of identifying hospitals with unavoidable costs and also the extent of the cost
 - calculating the consequences of applying Morecambe Bay's tariff elsewhere.
- Further work to unpack:
 - any associations between rurality and performance and financial pressures, including for non-acute providers
 - the distribution of the various key funding streams to providers, such as money to support medical training placements and salary costs.

References

- Advisory Committee on Resource Allocation (ACRA) (1998) *History of the Staff MFF, Resource Allocation Working Papers 1.* http://webarchive.nationalarchives.gov.uk/20120503151423/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4109400.pdf
- Advisory Committee on Resource Allocation (ACRA) (2015a) *Unavoidable smallness due to remoteness: Identifying remote hospitals,* ACRA(2015)18A, Advisory Committee on Resource Allocation.
www.england.nhs.uk/publication/advisory-committee-on-resource-allocation-acra-2015-18a-unavoidable-smallness-due-to-remoteness-identifying-remote-hospitals
- Advisory Committee on Resource Allocation (ACRA) (2015b) *Unavoidable smallness due to remoteness: Identifying remote hospitals,* ACRA(2015)24B, Advisory Committee on Resource Allocation.
www.england.nhs.uk/wp-content/uploads/2016/04/acra-2015-24b-identfy-remote-sites-upd.pdf
- Advisory Committee on Resource Allocation (ACRA) (2016) *Costs of unavoidable smallness due to remoteness,* ACRA (2015)36. www.england.nhs.uk/wp-content/uploads/2016/04/acra-2015-36-costs-unavoidable-smallness-upd.pdf
- Advisory Committee on Resource Allocation (ACRA) (1999) *A brief history of resource allocation in the NHS, Resource Allocation Working Papers 4.* http://webarchive.nationalarchives.gov.uk/20120503151425/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4109403.pdf
- Asthana S, Gibson A, Moon G, Dicker J and Brigham P (2002) Rural areas may need more health care resources too, response to Carr-Hill et al, Risk adjustment for hospital use using social security data: cross sectional small area analysis, *BMJ.* www.bmjjournals.com/rapid-response/2011/10/28/rural-areas-may-need-more-health-care-resources-england-too

- Asthana S, Brigham P and Gibson A (2002) *Health Resource Allocation in England: What case can be made for rurality?* University of Plymouth Press.
- Asthana S, Gibson A, Moon G and Brigham P (2003) Allocating resources for health and social care: the significance of rurality, *Health Soc Care Community* 11(6), 486–493
- Bardsley M and Dixon J (2011) *Person-based Resource Allocation: New approaches to estimating commissioning budgets for GP practices.* Research summary. Nuffield Trust. www.nuffieldtrust.org.uk/files/2017-01/person-based-resource-allocation-web-final.pdf
- Bevan RG (2008a) *Review of the Weighted Capitation Formula, A report submitted to the Secretary of State for Health.* http://webarchive.nationalarchives.gov.uk/20110907181824/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_093167.pdf
- Bevan RG (2008b) *Supplement to the Review of the Weighted Capitation Formula, A Supplement to the report submitted to the Secretary of State for Health.* http://webarchive.nationalarchives.gov.uk/20120503151417/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_093166.pdf
- Brems C, Johnson ME, Warner TD and Roberts LW (2006) Barriers to healthcare as reported by rural and urban interprofessional providers, *Journal of Interprofessional Care* 20:2, 105–118
- Brezzi M, Dijkstra L and Ruiz V (2011) OECD Extended Regional Typology: The Economic Performance of Remote Rural Regions, OECD Regional Development Working Papers, 2011/06, OECD Publishing. <http://dx.doi.org/10.1787/5kg6z83tw7f4-en>
- Bull CN, Krout J, Rathbone-McCuan E (2001) Access and Issues of Equity in Remote/Rural Areas, *The Journal of Rural Health.* <https://doi.org/10.1111/j.1748-0361.2001.tb00288.x> (Last accessed: 17/01/2019)
- Burch P (2018) *NHS funding's north-south divide: why the 'sicker' north gets less money.* University of Manchester. www.manchester.ac.uk/discover/news/nhs-fundings-north-south-divide-why-the-sicker-north-gets-less-money

Campbell NCE, AM Sharp, L Ritchie LD and others (2001) Rural and urban differences in stage at diagnosis of colorectal and lung cancers. *Br J Cancer* 84(7), 910–914

Carr-Hill RA, Hardman G, Martin S, Peacock S, Sheldon TA and Smith P (1994) *A formula for distributing NHS revenues based on small area use of hospital beds*, University of York www.york.ac.uk/che/pdf/op22.pdf

Carr-Hill RA, Jamison JQ, O'Reilly D, Stevenson MR, Reid J and Merriman B (2002) Risk adjustment for hospital use using social security data: cross sectional small area analysis, *BMJ* 324, 390

Chaplin M, Lau Y, Beatson S and Smyth C (2015) ACRA(2015)28 *Refreshing the current CCG formula (Revised), Report to the meeting of the Advisory Committee on Resource Allocation.* www.england.nhs.uk/wp-content/uploads/2016/04/acra-2015-28r-refresh-ccg-formula-upd.pdf

Chester AN, Penno EC and Gauld RD (2018) A media content analysis of New Zealand's district health board Population-Based Funding Formula. *New Zealand Medical Journal*, 131(1480), 38–49

Crilly T, Crilly J, Conroy M, Carr-Hill R and Parkin D (2007) *Review of Specific Cost Approach to Staff Market Forces Factor, Report to the Department of Health.* http://webarchive.nationalarchives.gov.uk/20120503151412/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_093170.pdf

Deloitte (2006) *Adjusting the General Medical Services Allocation Formula for the unavoidable effects of geographically-dispersed populations on practice sizes and locations. A report for NHS Employees* https://www.nhsemployers.org/~media/Employers/Documents/Primary%20care%20contracts/GMS/GMS%20Finance/Global%20Sum/fr92_deloitte_final_report_rurality_adjustment_cd_120209.pdf
(Last accessed: 17/01/2019)

Deloitte (2016) *Scottish Allocation Formula – General Medical Services Unit cost formula review*

Department for Education (2017a) *The national funding formula for schools and high needs*, Executive summary. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/648533/national_funding_formula_for_schools_and_high_needs-Exec_summary.pdf

Department for Education (2017b) *Schools block national funding formula: technical note*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/647789/Schools_block_national_funding_formula_technical_note.pdf

Department for Environment, Food and Rural Affairs (2018) *Official Statistics – Rural population 2014/15*. www.gov.uk/government/publications/rural-population-and-migration/rural-population-201415

Department of Health Resource Allocation Working Party (1976) *Sharing resources for health in England: Report of the Resource Allocation Working Party* http://webarchive.nationalarchives.gov.uk/20130123205152/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4121873

Department of Health (2005) *Rurality and the service cost of acute trusts: a review of the literature and some empirical analysis, internal briefing paper* (not available online)

Department of Health (2006) *Our health, our care, our say: a new direction for community services*

Department of Health (2007) *Maternity Matters*

Department of Health (2011) *Resource allocation: weighted capitation formula* (Seventh Edition). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/216320/dh_124947.pdf

Department of Health and Social Security (DHSS) (1970) *The Future of the National Health Service*, HMSO (2nd Green Paper)

Department of Health and Social Security (DHSS) (1980) *Report of the Advisory Group on Resource Allocation (AGRA)*

Department of Health and Social Security (DHSS) (1988) *Review of the Resource Allocation Working Party Formula - Final report by the NHS Management Board* http://webarchive.nationalarchives.gov.uk/20130123205158/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4121877

Elliott B, Ma A, McConnachie A, Morris S, Rice N and Skåtun D (2010) *The staff market forces factor component of the resource allocation weighted capitation formula: New estimates, Report to the Advisory Committee on Resource Allocation (ACRA), Phase I.* http://webarchive.nationalarchives.gov.uk/20120503151418/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_122621.pdf

Frontier Economics (2017) *Review of the market forces factor, A report prepared for NHS Improvement and NHS England* https://improvement.nhs.uk/documents/3353/MFF_review_SupportingDocs.pdf

Gardiner L and Everard K (2016) *Primary medical care - new workload formula for allocations to CCG areas.* NHS England. www.england.nhs.uk/wp-content/uploads/2016/04/5-primary-care-allctins-16-17.pdf

Giancotti M, Guglielmo A, Mauro M. (2017) Efficiency and optimal size of hospitals: Results of a systematic search. PLoS ONE 12(3): e0174533. <https://doi.org/10.1371/journal.pone.0174533> (Last accessed: 17/01/2019)

Gordon D, Kay A, Kelly M, Nandy S, Senior M and Shaw M (2003) *Review of rural and urban factors affecting the costs of services and other implementation issues* www.bristol.ac.uk/poverty/downloads/healthinequalities/Wales%20Rural%20Urban%20Report%202003.doc

Health and Social Care Board (2015) *Proposed changes to the Northern Ireland Weight Capitation Formula, Sixth Review.* www.hscboard.hscni.net/download/Consultations/2015-16-Proposed-changes-to-the-NI-weighted-capitation-formula/Capitation%20Report.pdf

HM Government (2012) Health and Social Care Act, 2012. www.legislation.gov.uk/ukpga/2012/7/contents/enacted

Independent Hospital Pricing Authority (2018) *Understanding the NEP and NEC 2018-19.* www.ihsa.gov.au/sites/g/files/net4186/f/publications/understanding_the_nep_and_nec_2018-19.pdf

The King's Fund and University of York (2016) *Unavoidable costs: Approaches in other sectors and view of NHS Finance Directors* https://improvement.nhs.uk/documents/3353/MFF_review_SupportingDocs.pdf

Kontopantelis E, Mamas MA, van Marwijk H, Ryan AM, Bower P, Guthrie B and Doran T (2017) Chronic morbidity, deprivation and primary medical care spending in England in 2015-16: a cross-sectional spatial analysis. *BMC Medicine* 16, 19

Ma A, Elliott B, Morris S, Rice N and Skåtun D (2010) *The staff market forces factor component of the resource allocation weighted capitation formula: Refinements to method, Report to the Department of Health, Phase II* http://webarchive.nationalarchives.gov.uk/20120503151419/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_123703.pdf

Mallender Hancock Associates, Operational Research in Health Ltd (1997) *NHS Resource Allocation: A Study of Costs of Providing Health Services in Rural Areas* [RARP 14]. http://webarchive.nationalarchives.gov.uk/20120503151347/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4139609.pdf

Mays N and Bevan G (1987) *Resource Allocation in the Health Service. Occasional Papers on Social Administration*. Bedford Square Press-NCVO

Monitor (2013) *A guide to the Market Forces Factor* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300859/A_guide_to_the_Market_Forces_Factor.pdf

Monitor (2014) *Facing the future: smaller acute providers*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/320075/smalleracuteproviders-report.pdf

Monitor (2015a) *Notice of decision on local modification application(s)*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/453314/Decision_Note_UHMB_-220715.pdf

Monitor (2015b) *Monitor agrees deal to protect essential services at challenged rural hospitals* (Press release). www.gov.uk/government/news/monitor-agrees-deal-to-protect-essential-services-at-challenged-rural-hospitals

Morris S, Carr-Hill R, Dixon P, Law M, Rice N, Sutton M and Vallejo-Torres L (2007) *Combining Age Related and Additional Needs (CARAN) report*. http://webarchive.nationalarchives.gov.uk/20120503151400/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_093169.pdf

Morris S, Sutton M, Dixon P, Wildman J, Birch S, Raine R, Chandola T, Orr S, Jit M, Wolff J, Atkinson S and Marmot M (2010) *Research on the health inequalities elements of the NHS weighted capitation formula, Final report*. http://webarchive.nationalarchives.gov.uk/20120503151421/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_122620.pdf

MSA-Ferndale (2003) *Research on the differential costs of providing health and social services in areas across Northern Ireland arising through Economies of Scale, Final Report*. www.health-ni.gov.uk/sites/default/files/publications/dhssps/differential-costs.pdf

NAO (2014) Funding healthcare: Making allocations to local areas. <https://www.nao.org.uk/wp-content/uploads/2014/09/Funding-healthcare-making-allocations-to-local-areas.pdf> (Last accessed: 17/01/2019)

NHS Digital (2016) General Practice Expenses, GMS and PMS Contracts in England 2013/14. <https://digital.nhs.uk/data-and-information/publications/statistical/general-practice-expenses-gms-and-pms-contracts-in-england/general-practice-expenses-gms-and-pms-contracts-in-england-2013-14> (Last accessed: 17/01/2019)

NHS Digital (2016) NHS Payments to General Practice, England, 2015/16. <https://digital.nhs.uk/data-and-information/publications/statistical/nhs-payments-to-general-practice/nhs-payments-to-general-practice-england-2015-16> (Last accessed: 17/01/2019)

NHS England (2016) *Refreshing the Formulae for CCG Allocations, For allocations to Clinical Commissioning Groups from 2016-17, Report on the methods and modelling*. <https://www.england.nhs.uk/wp-content/uploads/2016/04/3-rep-elland-all-sections.pdf>

NHS England and NHS Improvement (2018) *Payment system reform proposals for 2019/20, A joint publication by NHS England and NHS Improvement*
https://improvement.nhs.uk/documents/3354/Payment_reform_proposals_201920.pdf

Organisation for Economic Cooperation and Development (OECD) (2011)
OECD Regional Typology, Directorate for Public Governance and
Territorial Development. [www.oecd.org/cfe/regional-policy/OECD_Regional_Typology_Nov2012.pdf](http://www.oecd.org/cfe/regional-policy/OECDRegionalTypology_Nov2012.pdf)

PBRA Team (2009) *Developing a person-based resource allocation formula for allocations to general practices in England*, Nuffield Trust. http://nuffield.dh.btemark.co.uk/sites/files/nuffield/document/Developing_a_person-based_resource_allocation_formula_REPORT.pdf

Posnett J (2002) Are bigger hospitals better? In McKee and Healy, eds *Hospitals in a changing Europe*. Oxford University Press

Rechel B, Džakula A, Duran A, Fattore G, Edwards N, Grignon M and others (2016) Hospitals in rural or remote areas: an exploratory review of policies in 8 high-income countries, *Health Policy* 120(7), 758–769.

Scott A, Gilbert A and Gelan A (2007). *The Urban-Rural Divide: Myth or Reality? Socio-Economic Research Group, Policy Brief, Number 2*. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.575.9729&rep=rep1&type=pdf>

Scottish Executive Health Department (SEHD) (1999) *Fair Shares For All: Technical Report. The National Review of Resource Allocation for the NHS in Scotland*

Scottish Executive Health Department (SEHD) (2000) *Fair Shares For All: Final Report*

Senior, ML. and Rigby, J. (2001) Unavoidable Costs of Rurality and Remoteness in NHS Resource Allocation: Applying the Scottish Evidence in Wales, Unpublished report for the National Assembly of Wales: Cardiff.

Skåtun D, Elliott B, Ejebu Z, McConnachie A, Rice N and Wetherall K (2017) *The staff market forces factor component of the resource allocation weighted capitation formula: new estimates 2013-2015, Final Report to NHS Improvement and NHS England*. https://improvement.nhs.uk/documents/3353/MFF_review_SupportingDocs.pdf

Smyth C and Chaplin M (2015) *Unavoidable smallness due to remoteness – identifying remote hospitals.* ACRA(2015)18A. [www.england.nhs.uk/
wp-content/uploads/2016/04/acra-2015-18A-unavoidable-smallness-upd.pdf](http://www.england.nhs.uk/wp-content/uploads/2016/04/acra-2015-18A-unavoidable-smallness-upd.pdf)

Strasser R (2003) Rural health around the world: challenges and solutions. *Family Practice* 20, 457–463

Sutton M, Gravelle H, Morris S, Leyland A, Windmeijer F, Dibben C and Muirhead M (2002) *Allocation of Resources to English Areas; Individual and small area determinants of morbidity and use of healthcare resources. Report to the Department of Health.* http://webarchive.nationalarchives.gov.uk/20120503091624/http://www.dh.gov.uk/en/Managingyourorganisation/Financeandplanning/Allocations/DH_4137767

US Department of Health and Human Services, Centers for Medicare & Medicaid Services, Medicare Learning Network (2016) *Acute care hospital inpatient prospective payment system.* www.cms.gov/Outreach-and-Education/Medicare-LearningNetwork-MLN/MLNProducts/Downloads/AcutePaymtSysfctshtTextOnly.pdf

Wilson R, Davies R, Green A, Owen D and Elias P (2002) *Spatial Variations in Labour Costs: 2001 Review of the Staff Market Forces Factor.* Institute for Employment Research, University of Warwick. http://webarchive.nationalarchives.gov.uk/20120503151355/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_064475.pdf

Wye Valley NHS Trust (2018) *Annual report and accounts: 2017/18.* www.wyevalley.nhs.uk/media/452020/annual-report-2017-18-final.pdf

Appendix A: Examples of additional costs associated with rural primary care services

- | | |
|------------------|---|
| Influence income | <ul style="list-style-type: none">Practices serving small but dispersed populations have limited ways in which to influence their income or costs, yet provide a vital primary care serviceTheir funding is governed by their registered list (global sum/Quality and Outcomes Framework[(QOF] payments) which, by the nature of their geography, cannot be expanded and may compromise the ability to deliver quality care and exacerbate workload pressures |
| Cost | <ul style="list-style-type: none">Because of their location they are often serviced by small B class roads, potentially making travel difficult and time consuming for patients and service providers |
| Workforce | <ul style="list-style-type: none">Engagement of GP locums or recruitment of successors to a contract can be problematic because of geographic isolation, income and potential workload pressures. It is recognised that country or island life is not everyone's preferenceHousing costs associated with 'desirable' or expensive country or island locations can also negatively impact recruitment of practice administrative staff |
| Demand | <ul style="list-style-type: none">Many such communities do not have easy access to a pharmacy or an A&E department. Ambulance access and response times can be longer than in an urban environment and community services are dilutedPublic transport makes it difficult for patients to attend outpatient departments and other health facilities. As a result, some patients tend to rely on practices to provide a wider range of services than is normally regarded as 'core' general practice, and staff require regular training to maintain their skills for providing first response in the absence of A&E. It may be hard to measure this effect, but it can be summarised as a greater independence by patients from hospital care and a higher level of intervention and support from the practiceSome rural locations attract itinerant workers who may not speak English, have no accessible medical record and consultations may take longer. |

Note: The examples are taken from NHS England, while the categories were determined by the Nuffield Trust.

Appendix B: 2007 review of GP funding

Over a decade ago, the British Medical Association (BMA) and NHS Employers reviewed the main payment scheme for primary care (the General Medical Services [GMS] global sum formula) and recommended that the payments be adjusted for costs of unavoidable smallness and possibly rurality. The former, on unavoidable smallness, was based on research by Deloitte to take account of lost economies of scale where isolated rural practice have unavoidably small list sizes. They proposed an adjustment which applied to practices with list sizes of 2,231 or fewer patients. The weighting reached 2.5 for practices with 377 patients or fewer, with those more than 4km from the next nearest practice receiving the full adjustment.

They were unable to recommend whether or not a rurality adjustment should be included in the revised formula due to a lack of evidence and rationale to support its inclusion.¹¹

The table below shows the magnitude of the potential adjustments on practice funding (Table B1). Just the adjustment on unavoidable smallness would increase some rural practices' funding by up to two-thirds (65%). In the end, the recommendations were not adopted.

¹¹ A review of the GMS global sum formula is available from NHS Employers at:
www.nhsemployers.org/~/media/Employers/Documents/Primary%20care%20contracts/GMS/GMS%20Finance/Global%20Sum/frg_report_final_cd_090207.pdf

**Table B1: Projected distribution impact of the recommended changes to the formula
(2006/07 data)**

Population density	Proposed without rurality	Proposed with rurality	Proposed with versus without rural adjustment
Least dense quartile	-6.99%	-2.66%	4.82%
Quartile 2	-0.35%	-0.45%	-0.08%
Quartile 3	1.66%	0.22%	-1.4%
Most dense quartile	7.58%	3.56%	-3.6%
Min/max practice effect	+65% to -30%	+83% to -19%	+18 to -13%

Appendix C: Allocations in the education sector

The Department for Education introduced a national funding formula for schools in 2018/19 (Department for Education, 2017a). Local authorities receive funding for schools based upon this formula, and then set their own formula to distribute funds to schools. The national funding formula starts with a minimum funding per pupil, adjusted for different age groups. Additional needs such as deprivation (£3 billion), low prior attainment, mobility, or pupils who speak English as an additional language increase the resources sent. There is also a school centred funding element to the national formula (even though the money is sent to local authorities), which includes a sparsity factor for the smallest, most remote schools involving £26 million of funding (less than 0.1% of all funding) (Figure C1). The sparsity factor is tapered (Department for Education, 2017b) to avoid small changes in pupil numbers between years resulting in ‘cliff-edges’ of funding (Figure C2). Finally, there is an area cost adjustment reflecting variation in labour market costs across the country.

Figure C1: The building blocks and factors in the national funding formula for schools

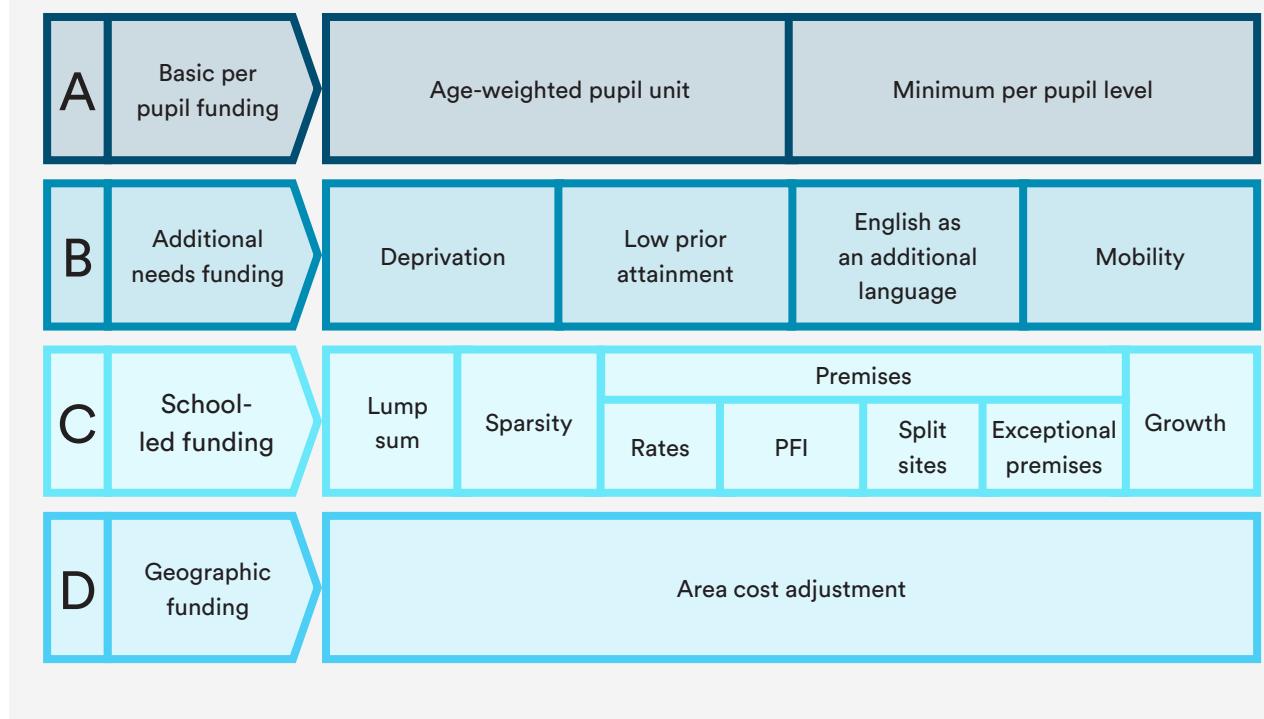


Figure from Department of Education (2017a)

Figure C2: Sparsity weighting for schools

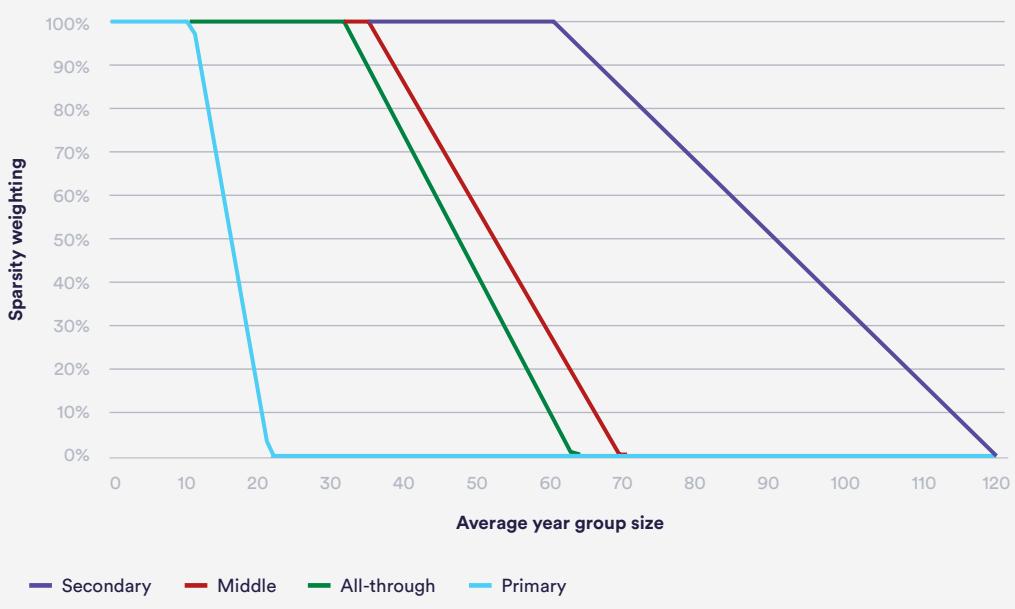


Figure from Department of Education (2017b)

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