**Institution:** Plymouth University

**Unit of Assessment:**

**Title of case study:** Formula Funding of Public Services and the Goal of Equity

**1. Summary of the impact** (indicative maximum 100 words)

This body of research, led by Plymouth University, has challenged the model used for NHS resource allocation because it does not promote 'equal opportunity of access to health care for equal needs', a core principle of the NHS. The research has stimulated debate amongst policy makers on NHS resource allocation and the team's mental health estimates were used to allocate £8billion of NHS funding. The Department of Health described this as a "step-change improvement". Their research is also one of the factors which led to the end of the Four Block Model, the £29 billion formula grant at the centre of the local government finance system.

**2. Underpinning research** (indicative maximum 500 words)

This case study is based upon research carried out by a multidisciplinary team across several universities and led by Plymouth University. The Plymouth team were Prof Sheena Asthana (1995-to present), Dr Alex Gibson (2005-present), Dr Joyce Halliday (2000-to present), Dr Paul Hewson (2004-to present); with Prof. Trevor Bailey University of Exeter, Prof. Graham Moon University of Portsmouth then Southampton and Dr Chris Dibben University of St Andrews. The impact reported here relates to the research contribution of the Plymouth staff within this programme.

The research programme dates from 1999 to the present and rests on methodological and technical expertise in the analysis of large data sets and in the linkage of different datasets to common units of analysis. A particular focus has been the use of techniques to develop robust methods for estimating the prevalence of specific diseases and disease risk factors. An important part of the research includes an examination of the ways in which new methods can inform systems of resource allocation and equity auditing.

This research has its origins in an ESRC-funded project (1999-2001) that looked at practice-level estimates of coronary heart disease (CHD) in the UK and compared these estimates to activity data. It found that hospitalisation and surgical intervention rates were higher than would be expected when practices were socially disadvantaged, while activity rates fell off dramatically with age and appeared to be suppressed in rural areas. The findings led the team to question the implicit assumption that, because urban deprived (but young) populations suffer profound health inequalities, they have a greater claim on NHS resources. At the time, the possibility that demographically ageing rural and/or coastal areas might have a legitimate need for more resources was rarely given serious consideration.

One of the consistent findings of the research is that, because rural areas are less deprived on average, they receive less funding (per capita) for health and local government services. Yet, because they have older populations, they are grappling with higher crude burdens of illness and disability. The team has worked with a range of bodies (including Cornwall and Isles of Scilly Health Authority, Rural Health Allocations Forum, South West Public Health Observatory and the Rural Services Partnership) to examine potential mismatches between need and resource allocation; and to offer innovative solutions to the difficulties of achieving economies of scale. Further research found that PCTs serving the most rural and least deprived populations were significantly more likely to be in financial deficit, reinforcing the hypothesis that the resource allocation formula responded well to the needs of urban populations, but failed to reflect the higher crude needs of older affluent populations. Very recent research has shown that hospitals serving catchments that are demographically older and receive lower allocations have significantly higher standardised hospital mortality rates.

In 2007, the researchers were funded by Department of Health/NIHR to undertake a feasibility study examining whether direct (epidemiological evidence) could be used as a basis for setting health care capitations (Asthana et al, 2008). Following this, the team was commissioned to develop the Practice-based Commissioning formula for Mental Health.

Prof Asthana and Dr. Gibson at Plymouth used this expertise to examine formula funding in other sectors, most notably the Local Government Four-Block model which is used to allocate £29billion from central to local government in the UK. This complex formula-based funding mechanism aimed to ensure that all local authorities are able to provide individuals with a broadly comparable level of public service. Previous objections were based on charges of complexity, lack of transparency and unaccountable political interference. In 2008, Gibson and Asthana produced a report that, drawing attention to methodological shortcomings, explained why the resulting distribution of the grant was both arbitrary and inequitable.

**3. References to the research** (indicative maximum of six references)
All journal articles are in scholarly academic journals with rigorous peer review processes. Plymouth authors shown in bold.

**Asthana, S. Gibson, A., Halliday, J**. The medicalisation of health inequalities and the English NHS: the role of resource allocation. *Health Economics, Policy and Law*. DOI: http://dx.doi.org/10.1017/S1744133112000126. International in scope, publishes both theoretical and applied work, and contains articles on all aspects of health policy. Impact factor 1.326. Peer reviewed

**Gibson, A,** and **Asthana, S.** (2012): A Tangled Web: Complexity and Inequality in the English Local Government Finance Settlement*, Local Government Studies*, 38(3): 301-19. DOI:10.1080/03003930.2011.642947 The leading journal for the study of local politics, policy, public administration and management and governance. Impact factor of 0.429. Peer reviewed.

**Asthana, S.** and **Gibson, A**. (2011). Setting health care capitations through diagnosis-based risk adjustment: a suitable model for the English NHS? *Health Policy* 101(2): 133-39. Journal for articles relating to health policy and health system. Rigorous peer review system and impact factor of 1.506

**Asthana, S.**, **Gibson, A., Hewson, P.,** Bailey, T., Dibben, C. (2011). Devolved commissioning, population size and budgetary risk: evidence from the modelling of 'fair share' practice budgets for mental health. *Journal of Health Services Research and Policy* 16(2): 95-101. The journal includes the latest scientific research, insightful overviews and reflections on underlying health services issues. Impact factor 1.730. Peer reviewed

**Gibson, A.** and **Asthana, S.** (2011). Resource allocation for English local government: a critique of the four block model. *Journal of the Royal Statistical Society, Series A*. 174(3): 1-18

The *Journal of the Royal Statistical Society* is a high profile, peer-reviewed scientific journal of statistics

***Peer reviewed research grant support***

**S. Asthana,** G. Moon, J. Dicker and **A. Gibson**. Inequalities in Health Service Utilization at the General Practice Level. Economic and Social Research Council, 1999-2001 £81,481

**4. Details of the impact** (indicative maximum 750 words)

The body of research has challenged the way NHS resources are allocated on philosophical, technical and empirical grounds. The research concerns the redistribution of very significant amounts of public money, the end result of which are huge variations in per capita funding and expenditure. Although the research is challenging and politically difficult, the research team built a successful case for a new model to be used to the extent that the NHS commissioned the team to develop mental health estimates. This informed the setting of practice-level budgets from 2009-11

and accounted for approximately £8 billion of NHS funding. This is the first time that such a methodology has been used to distribute NHS resources in England.

The Department of Health guidance to PCTs (2009/10) states that the mental health component is based on a new methodology developed by Plymouth University that models types of individual patients. It continues with '*the new methodology has undergone extensive testing by the researchers and DH and we believe it provides a step-change improvement in the way we model mental health need*.' The guidance for 2010/11 includes an enhanced version of the same methodology and again credits it to Plymouth university. Due to the restructuring of PCTs and changes in the system of funding, the methodology has not been continued for 2011/12 although the research team continue to advise the Government via meetings on how the methodology should be used to ensure a fairer redistribution of NHS funding.

The research continues to build and influence Government thinking around the redistribution of NHS funding. The work is cited in Research Paper 11/16, The Local Government Finance Settlement, 2011-13 as part of a series designed to brief Members of Parliament in support of their parliamentary duties. The briefing states *'There are concerns that the methodology used to allocate funds are flawed, particularly the concepts of distributing on the basis of additional (above threshold), not actual, need and resource. This technical issue will not be discussed any further here, but those who wish to look into this in more detail are directed to the reports (*Gibson and Asthana 2011*) sourced in the footnote.'*

The research has been quoted in Parliamentary and Lords Debates and in news/opinion pieces in the British Medical and Health Services Journals. The researchers were also asked to write a briefing paper for the Right Honourable Jeremy Hunt, Secretary of State for Health. Graham Stuart MP, Chair of the All Party Parliamentary Group for Rural Services and the Rural Fair Share campaign has stated that 'Professor Asthana's work has been crucial to informing Parliamentary debate about the allocations of health and local government funding from central government. It has been all the more commendable for challenging the prevailing orthodoxies in both fields. In a time of austerity the equity with which limited resources are distributed takes on a greater importance than when overall budgets are increasing year by year. That's why the forensic, needs based understanding promoted by Professor Asthana has had such influence and significance. I have discussed Professor Asthana's work with both the previous and current Secretary of State for Health, and the latter has read and commented positively on her research.'

Their research highlighted the technical shortcomings of the Four Block Model and seriously damaged its credibility as a method of allocating revenue support to local authorities. The Local Government Baseline Sub Group considered that it contributed to the understanding that the model was no longer tenable. David Illingworth, part of the Local Government Baseline Sub Group drew upon Asthana's research as part of the review. He states:

*'the work that they did contributed to the decision to end the four block model*' and continues *'Their work on threshold authorities did lead to what became widely understood as the "Wokingham effect". This simple example about threshold levels illustrated the excessive, complicated and unexpected consequences of a very small change in the figures for a small and otherwise unremarkable authority in the Thames Valley. These effects were clearly indefensible and this was one factor that led to the end of the four block model.*'

The research on rural areas and the potential mismatches between need and resource allocation has impacted on a range of rural organisations which have either commissioned Plymouth University to look at their particular issues or drawn upon the research. As the Acting Director of Public Health Dorset & Somerset Strategic Health Authority stated on the work commissioned by the Rural Health Allocations Forum :

*'This report has had a real impact on the thinking within the NHS, has been extensively used by rural health authorities and I believe contributed to the requirement of 'rural-proofing' the*

*introduction of new services in the NHS including resource consequences.'*

The body of work carried out has impacted widely and has raised difficult questions about NHS resource allocation. It remains an active area of work at Plymouth and the team will continue to ensure its reach and significance impacts at all levels.

**5. Sources to corroborate the impact** (indicative maximum of 10 references)

1. A description of where the 'Plymouth Model' was first used to determine mental health allocations is given in the following Department of Health Publication: *Practice-based commissioning budget guidance for 2009/10.* This describes our methodology as a 'step-change improvement in the way we model mental health need' The web link to this is as follows (see pages 10-11). http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_094364

2. The following document describes how an 'improved' version of the Plymouth Model was used: *Practice-based commissioning budget guidance for 2010/11*. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_111057

3. Briefing paper designed to debrief Members of Parliament in support of their parliamentary duties and cites Gibson and Asthana as sources for further understanding of concerns about the flaws in methodology used to allocate funds. www.parliament.uk/briefing-papers/RP11-16.pdf

4. Financial Manager, Chief Executive's Office, Corporate Finance Team, Oxfordshire County Council, County Hall, New Road, Oxford, OX1 1TH. Statement stating how he used the research as part of the Local Government subgroup and how the research was a factor in the end of the Four Block Model.

5. Investigative Journalist, Financial Times (previously chief reporter and news editor of the Health Services Journal). Statement relating to how Asthana's research has led to an improved understanding of the flaws in allocation models and shifted thinking in health policy.

6. Former Director of Public Health, South West Dorset Primary Care Trust and Acting Director of Public Health Dorset & Somerset Strategic Health Authority. Statement on how the research on additional costs of service provision to rural population had an impact on the thinking in NHS, has been extensively used by rural health authorities and contributed to the requirement of 'rural-proofing' the introduction of new services in the NHS including resource consequences.

7. Lead Statistician, SCT, PATS & CCN Technical Support Team, B1 East, County Hall, Taunton and previously a member of the Local Government Funding Settlement Working Group. Statement that the research gave local authorities independent, academic, well informed and thorough evidence that the Four Block Model was massively flawed and made 4BM untenable.

8. Report from the National Audit office from 2010 describing the research on health resource allocation as 'having so far informed practice-based commissioning, and may also form the basis for allocations to clinical commissioning groups in the future'. The National Audit Office. *Cross-government landscape: Formula funding of local public services,* July 2010 www.official-documents.gov.uk/document/hc1012/hc10/1090/1090.pdf).

9. Written statement on impact in parliamentary debates and Ministerial briefings from from Chair, All Party Parliamentary Group for Rural Services and the Rural Fair Share campaign.

10. Chief Economist / Deputy Chief Analyst, Department of Health. Reports that the method proved practical and a new formula was developed and implemented for mental health and GP level.