Institution: The University of Manchester

Unit of Assessment: 2

Title of case study: Needs-based formulae for distributing NHS resources

1. Summary of the impact

The Department of Health seeks to distribute the NHS budget to local commissioning organisations to achieve equal access for equal need and reduce health inequalities. The formula upon which it bases this distribution must be evidence-based, robust and up-to-date. We summarise four pieces of applied econometric research undertaken at the University of Manchester (UoM) and commissioned by the Department of Health that have developed the methodology for setting budgets fairly and determined the content of the formula in use in England from 2008-date. Adoption of the findings of this research by government has led to a substantial redistribution of NHS funding between areas.

2. Underpinning research

See numbered references in section 3.

The impact is based on research that has been undertaken at the UoM with national collaborators from 2008-date, with the key publications in 2010. The key researchers are:

- **Matthew Sutton** (Professor of Health Economics, 2008-date)
- **Stephen Birch** (Professor of Health Economics, 2004-date)
- **William Whittaker** (Research Fellow, 2008-date)

The aim of the research was (and continues to be) to develop the methods used to estimate the formula for allocating the NHS budget to local health care commissioning organisations. These econometric methods are applied to national datasets to derive up-to-date shares of resources for each organisation that reflect their population size, demographic composition, morbidity and socio-economic deprivation, and expected input prices. The main contributions since 2008 have been:

1. To test the General Labour Market theory and method that underpins the adjustment for variations in the expected costs of labour (called the Staff Market Forces Factor), which has been used in the English NHS funding formula for almost 30 years. The first publication (below) derived from a commissioned report for the Department of Health, involved analysis of spatial variations in vacancy rates, and found empirical evidence to support the theory for nurses but not for medical staff (1).
2. To review whether funding shares should be based on disease prevalence rather than needs estimates derived from regression models of variations in the utilisation of health care services to better reflect unmet need. Publication 2 derived from a commissioned report for the Department of Health, showed that there were methodological flaws as well as data availability problems with the prevalence-based approach. The proportionality assumption underpinning the prevalence-based approach was shown not to hold and adoption of this approach would under-allocate resources to rural areas, areas with younger populations, and deprived areas (2).
3. To review the approach taken in the English formula to meet its objective to contribute to the reduction of avoidable inequalities in health. In a report to the Department of Health (3), we highlighted the current lack of clarity in the distinction between the two objectives for the English funding formula and the purpose of the current Health Inequalities Adjustment, and the lack of a good evidence-base for making such an adjustment.
4. To derive in a report to the Department of Health (4) improved formulae for mental health services and prescribing by General Practitioners using more robust econometric methods, a wider range of variables, and more up-to-date data. We derived age-stratified models for mental health and prescribing formulae that were robust to the choice of population base.

Collaboration and Sustained Contribution

Sutton has undertaken research to improve the funding formulae used for the NHS in England and Scotland continuously since 1998. He has first-authored or co-authored six of the 11 Resource Allocation Research Papers published by the English Department of Health since 2002. All of this work has been undertaken in collaboration with researchers from other UK Universities, with **Sutton** taking the first or second project leadership role.

The research programme is ongoing, with recent grants from the Department of Health to develop formulae for setting budgets for Clinical Commissioning Groups for hospital and community health services and mental health services. These more local, non-geographically defined, commissioning organisations have required development of a Person-Based Resource Allocation approach.

3. References to the research

The research was published in leading international peer-reviewed journals. The project reports, once reviewed and approved by the Secretary of State for Health's *Advisory Committee on Resource Allocation* and its *Technical Advisory Group*, are published in the Department of Health's online library of key Resource Allocation Research Papers.

Key publications

1. Elliott R, Ma A, **Sutton M,** Skatun D, Rice N, Morris S, McConnachie A. The role of the staff MFF in distributing NHS funding: taking account of differences in local labour market conditions. *Health Economics* 2010;19(5):532-48. DOI: 10.1002/hec.1489

2. Vallejo-Torres L, Morris S, Carr-Hill RA, Dixon P, Law MR, Rice N, **Sutton M**. Can regional resource shares be based only on prevalence data? An empirical investigation of the proportionality assumption. *Social Science & Medicine* 2009;69(11):1634-42. DOI: 10.1016/j.socscimed.2009.09.020

3. Morris S, **Sutton M**, Dixon P, Wildman J, **Birch S**, Raine R, Chandola T, Orr S, Jit M, Wolff J, Atkinson S, Marmot M. Research on the health inequalities elements of the NHS weighted capitation formula. Final Report. October 2010. Resource Allocation Research Paper 36 [accessed 8 Jul 2013]. Available from:http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_122620.pdf

4. **Sutton M**, **Whittaker W**, Morris S, Glover G, Dusheiko M, Wildman J, Gravelle H, Burrows S, Simpson J, Fé-Rodríguez E, **Birch S**, Smith PCS. Report of the Resource Allocation for Mental health and Prescribing (RAMP) Project. Report to the Department of Health. December 2010. Resource Allocation Research Paper 35 [accessed 8 July 2013]. Available from: http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_122619.pdf

4. Details of the impact

See numbered references in section 3 with corroborating sources (S) in section 5.

Context

The Department of Health allocates the National Health Service budget (£85 billion in 2011/12) to local commissioning organisations (Primary Care Trusts, Clinical Commissioning Groups) on the basis of a funding formula, which is designed to meet two objectives: (i) to secure equal opportunity of access to healthcare for people at equal risk and (ii) to contribute to the reduction of avoidable inequalities in health. There are separate sub-formulae for different types of services (acute, maternity, mental health, prescribing by GPs and primary medical services), each containing elements to reflect variations in population size, population needs (age, morbidity and

socio-economic deprivation) and expected input prices. In addition, there was a specific adjustment for health inequalities until March 2013, which has now been passed to Local Government.

Pathways to Impact

A standing, independent expert body, the Advisory Committee on Resource Allocation (ACRA), supported by a Technical Advisory Group (TAG), makes recommendations to the Secretary of State for Health on changes to the funding formula. Based on this formula, the Department of Health issues annual allocations to local commissioning organisations (PCTs or CCGs). The Department of Health commissions academic research on behalf of ACRA to review the existing formulae and propose new needs-based estimates for each local area. This approach ensures that the formula and the budget shares for each area that result from it are independently produced and based on cutting-edge research methods and evidence.

Reach and Significance of the Impact

In their report issued in December 2008, ACRA recommended changes to the funding formula that included:

- adoption of the research team's recommendation to no longer apply the Staff Market Forces Factor to expenditure on medical staff and the MFF adjustments calculated by the research team (1);
- adoption of needs estimates produced by the research team using utilisation models for acute, maternity and GP prescribing rather than prevalence-based estimates for the reasons described in publication (2).

These recommendations were accepted and used by the Department of Health when setting the 2009/10 and 2010/11 allocations to Primary Care Trusts.

For the 2011/12 allocations, ACRA recommended:

- that there was currently no technical basis upon which to base the weighting applied to the Health Inequalities Adjustment (3);
- adoption of the needs estimates produced in the *Report of the Resource Allocation for Mental Health and Prescribing (RAMP) Project* for mental health services and for GP Prescribing (4).

When setting the 2011/12 allocations for Primary Care Trusts, the Department of Health accepted ACRA's recommendation to adopt the RAMP project estimates and reduced the weighting of the Health Inequalities Adjustment from 15% to 10%.

The impact of this adoption of the research findings by the Department of Health is for some PCTs to receive larger increases in their budget compared to others. This approach contributes to the NHS objectives to achieve equity in access to services and outcomes. Specifically, the impact of adopting the mental health needs component from publication 4 was to change total PCTs budgets by an average of 1.2%, with the largest increase of 4.0% for Islington PCT and the largest decrease of 3.1% for Tower Hamlets PCT. The impact on total PCT budgets of adopting the changes to the prescribing formula in publication 4 was smaller, with an average change of 0.2% and range of changes between -0.7% (Isle of Wight PCT) and +0.7% (Blackburn with Darwen Teaching Care Trust). The impact of the changes to the weighting of the Health Inequalities Adjustment was larger, with an average change in total budget of 1.5% and range of changes between -3.9% (Tower Hamlets PCT) and +3.9% (Surrey PCT).

The needs-weighted population figures derived for the funding formula are also used extensively by the Department of Health and NHS organisations when benchmarking levels of activity and expenditure and setting other budgets at PCT and general practice level (for example, the Programme Budgeting Benchmarking Tool).

5. Sources to corroborate the impact

The publication of the commissioned reports in the Department of Health's online library of Resource Allocation Research Papers demonstrates that these are key elements of the evidence-base on which decisions on the funding formula have been made.

Publication 4 was explicitly cited in three places as the source for the formulae for mental health services and prescribing by General Practitioners in The Department of Health's publication explaining the changes it had made to the formula for Primary Care Trust allocations in the 2011/12 financial year. See: Department of Health. *Resource Allocation: Weighted Capitation Formula. Seventh Edition*. February 2011. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_124946

The same Department of Health publication explicitly confirms that the Department of Health's decisions for the allocations since 2008/9 to (i) no longer apply the Staff Market Forces Factor adjustment to spend on doctors and hospital dentists was based on the research that was published in (1) and (ii) base the needs components on utilisation-models rather than prevalence estimates was based on the research that was published as publication 2. It also confirms that the relative weighting of the Health Inequalities Adjustment could not be determined technically because of the research published as publication 3.