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“ NICE commonly recommends treatments costing well above £20,000-£30,000/QALY ”

## What drives NICE decisions?

Helen Dakin

**A collaborative study between researchers from HERC, the Office of Health Economics (OHE), King's College London and University of York, found that cost-effectiveness is the main driver of NICE decisions, with the cost-effectiveness ratio correctly predicting 82% of decisions. The work also showed that NICE commonly recommends treatments with cost-effectiveness ratios well above their £20,000-£30,000/QALY ceiling ratio, predicting that NICE would say “yes” to 50% of technologies costing £40,000/QALY.**

NICE evaluates the clinical and cost-effectiveness of selected medical interventions within its technology appraisal programme, producing guidelines that are intended to improve the quality and value of NHS care. This research study used data from all NICE technology appraisal decisions published by December 2011, giving a total of 513 NICE decisions with cost-effectiveness data. Regression analyses were used to assess the extent to which NICE decisions are affected by publication date, appraisal process, severity, innovation, disease area, orphan status, lack of alternative treatments and amount of clinical evidence, as well as cost-effectiveness and its associated uncertainty.

The odds of NICE saying “yes” were significantly higher for musculoskeletal disease and cancer, and significantly lower for respiratory disease. No other variables were found to significantly affect NICE decisions. However, NICE's decision to recommend these treatments with high cost-effectiveness ratios could have been driven by factors that are either difficult to quantify within the model developed in the study or that drive a small number of NICE decisions. Although there was a non-significant trend towards NICE saying “yes” more often in recent appraisals, there was no evidence that the threshold has changed over time.

The findings of the study, published as a research paper simultaneously by HERC, OHE and York, will help to place the results of NICE appraisals in context, and may prompt further debate about what NICE's threshold should be and the extent to which its past decisions are consistent with its stated value judgements.

For more information:

**HERC**



## Are value of information methods ready for prime time?

Seamus Kent

The methods used to select appropriate sample sizes for clinical trials are well established. However, economists have long argued that these methods are not fully consistent with the health-maximisation objective of the healthcare system. Instead, they have proposed techniques collectively known as value of information (VOI) methods, which compare the costs and benefits associated with additional recruitment, and require decision makers to be explicit about the assumptions made in designing trials. However, such methods are not used in practice to inform trial design.

A study funded by the Chief Scientist Office for Scotland has recently explored the practical usefulness of VOI methods in the context of a real clinical decision problem relating to the alternative diagnostic strategies for individuals with a recent non-ST elevated myocardial infarction (NSTEMI). Measurement of fractional flow reserve using a pressure wire has the potential to improve cardiologists' understanding of the causes of MI and identify appropriate treatment responses, but there is little understanding of its cost-effectiveness in an NSTEMI population.

A pre-trial economic model was built and used to consider the optimal design of a future clinical trial. The study showed that VOI techniques offer a flexible method with which to consider optimal trial design, but found that sample size was highly sensitive to unknown parameters, such as the lifetime of the technology, and to the decision context assumed. The real-world usefulness of these methods depends on the extent to which decision contexts can be realistically and practically represented. In this respect, an important challenge remaining to enable robust application of these methods is evidence for the relationship between trial evidence and implementation.

This study was an international collaboration between Seamus Kent (now at HERC), Professor Andrew Briggs (Glasgow), Professor Simon Eckermann (Wollongong) and Professor Colin Berry (Glasgow) and the results have recently been published in *The International Journal of Technology Assessment in Health Care*.

For more information:



## Long-term outcomes after transient ischaemic attack and stroke

**Project team:** Ramón Luengo-Fernandez, Alastair Gray with the Oxford Vascular Study (OXVASC) team

HERC researchers, in collaboration with Professor Peter Rothwell from the Stroke Prevention Research Unit at Oxford, have estimated long-term outcomes following transient ischaemic attack (TIA) and stroke. This project used data from a UK population-based study (OXVASC) to estimate five-year outcomes, including survival, disability, institutionalisation and quality of life (QoL) after any first incident or recurrent TIA or stroke.

The study included 440 TIA and 748 stroke patients. Results showed that 48% of TIA patients and 70% of stroke patients were either dead or disabled 5 years after the event. The 5-year risk of care home institutionalisation was 11% after TIA and 19% after stroke, with the average cost per institutionalised TIA patient being £67,765 and £85,093 for stroke patients.

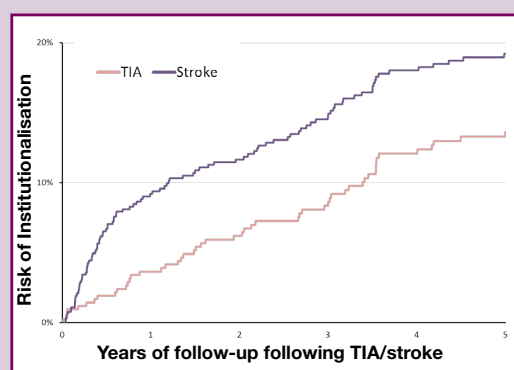
QoL was assessed over 5 years using the EuroQol EQ-5D, with responses converted into a single index score, ranging from -0.59 (worse than death) to 1 (perfect health) using UK population valuations. QoL remained constant at around 0.78 over the 5 years following TIA and improved from 0.64 one month after stroke to 0.70 at 6 months, remaining at around 0.70 thereafter. Matched-controls had considerably higher utility levels than stroke/TIA patients. 5-year quality-adjusted life-expectancy was 3.32 QALYs after TIA and 2.21 after stroke, varying considerably by severity (minor: 2.94, moderate: 1.65 and severe: 0.70).

Despite stroke being a leading cause of death worldwide and a principal cause of disability, and TIA requiring treatment and diagnostic testing, there are few data available on the long term outcomes and QoL of these conditions. Results from this study make an important contribution to understanding the longer-term health impact of stroke and TIA. Findings have been published in *Stroke and Neurology* and form part of the longstanding collaboration between HERC and Professor Rothwell's team at the Nuffield Department of Clinical Neurosciences, University of Oxford.

For more information:



### 5-year risk of institutionalisation



“ Results from this study make an important contribution to understanding the longer-term health impact of stroke and TIA ”

“ Clarification is required because different approaches may lead to very different adoption decisions ”

## Evaluating genomic technologies: Can health economics improve its methodological toolbox?

**Project team:** James Buchanan, Sarah Wordsworth

News reports of exciting advances in genetics are becoming increasingly common, and genomic technologies now exist which can provide detailed information on the combined influence of multiple genetic changes across an individual's whole genome. These technologies have a variety of applications in medicine. Examples include Oncotype DX (a diagnostic test to guide patient management in breast cancer), which has recently been approved by NICE in the UK.

However, adoption rates for genomic tests vary widely, partly due to a lack of economic evidence. Health economists are yet to agree on whether existing economic evaluation methods (e.g. the extra-welfarist approach) are sufficient to evaluate genomic technologies, or whether an overhaul of our methodological toolbox is necessary. Clarification is required because different approaches may lead to very different adoption decisions.

James Buchanan at HERC has been awarded an NIHR Doctoral Research Fellowship to undertake a program of work contributing to this debate. James is examining the issues surrounding the economic evaluation of genomic technologies, and the first paper resulting from his work has recently been published in *Pharmacogenomics*,

summarising the methodological issues in this context. Challenges include selecting an appropriate study perspective and timeframe, and collecting a broad range of costs in a data-limited environment. Measuring outcomes is problematic as standard measures such as QALYs have limited applicability, but alternative measures (e.g. personal utility) are underdeveloped. Effectiveness data quality is also weak, while we know little about patient and clinician behaviour in this context.

Future work will build on the findings from this paper. Three economic evaluations are underway evaluating a new genomic test for chronic lymphocytic leukaemia patients (cost-utility, cost-effectiveness and cost-benefit analysis), and the results of these analyses will be compared to provide information on the most appropriate economic evaluation approach for genomic technologies. Keep an eye on our website for further updates on this exciting project in 2014!

For more information:

**HERC**

### Spotlight on **INGRID SLADE**



I joined HERC in October 2013 as part of an academic placement in my specialist training in Public Health. I am very excited about my two-year placement working with the Health Economics Research Centre and Ethox. My work focuses on issues of resource allocation in genomic medicine. In particular I will be working with Sarah Wordsworth, James Buchanan and Jilles Fermont on the health economic evaluation of genomic technologies and models of service delivery in genomic medicine.

I trained in medicine at the University of Bristol and started out my medical career training in paediatrics before moving to London as a specialist registrar in clinical genetics. It was during this time that I undertook a PhD in the Section of Genetics and Epidemiology, Institute of Cancer Research, London. My research focused on the identification and characterisation of genes that confer susceptibility to childhood embryonal tumours.

My time in clinical genetics spanned a period of significant scientific and technological advance. This sparked an interest in the process of translating and implementing scientific advances into the national healthcare setting. The practicalities of determining effective resource allocation and defining the clinical pathways required to deliver healthcare integrated with genomic information continues to motivate me.

To consolidate my skills in public health genomics, I moved to Oxford to train in public health in 2011. Health economics is a new area to me and I have embarked on a steep learning curve. However I have found the people and the environment within HERC very supportive. There is always someone who is willing to help with my questions! I am very much looking forward to the work that I will undertake in this growing and exciting field.

## Staff News



### Alison Gater

At the end of December 2013 we said goodbye to Alison Gater, who retired after almost 15 years as HERC's Senior Administrator. Alison was always one of HERC's foremost promoters and defenders, holding to high standards in all of our activities as a matter of personal as well as professional pride. She was our top go-to person for a huge range of

queries, from ordering computers to costing applications to arranging a conference. She was also our public face, overseeing the annual reports, the web-site, the teaching materials, the workshops and events. Above all she was a people-person, interested in all of us and our lives as well as our work.

So, she will be greatly missed by all, and we wish her all the best for the future.

Meanwhile, life and work will continue, and our office is now in the more than capable hands of Barbara, Mandy and Ginny.

## Congratulations to:

**Sarah Wordsworth** and **Ramón Luengo-Fernandez** who have been awarded the title of University Research Lecturer by The Medical Sciences Board, University of Oxford. The title is conferred on research workers who can demonstrate substantial independent research achievements, including their publication record, success in obtaining research grants independently, commitment to teaching, and a sustained and continuing contribution to the general work of the Medical Sciences Division.



## Recruitment:

**Summer 2014 Internship in Health Economics.** HERC has an exciting opportunity for an enthusiastic and quantitatively minded undergraduate to gain summer research experience in the field of disease modelling, health economics and economic evaluation. Fixed term for 10 weeks in the period 1 July to 30 September 2014. Deadline for applications is noon 27 February 2014.

For more information: **HERC**

## HERC Seminars

Convenor: Jacqueline Murphy

From November 2013 to December 2013 we welcomed **Lindsay Mangham-Jefferies** from the London School of Hygiene and Tropical Medicine who presented *Economic evaluation of a cluster-randomized trial of interventions to improve health workers' practice in diagnosing and treating uncomplicated malaria in Cameroon* and **Dr Hiroaki Matsuura**, from the Nissan Institute of Japanese Studies, who presented *The Effect of a Constitutional Right to Health on Population Health; the Role of Democratic Governance; Evidence from 157 Countries*.

Hilary Term 2014 seminars began with a presentation in January from **Koonal Shah**, a Health Economist and PhD student at the University of Sheffield, *Valuing health at the end of life: a stated preference discrete choice experiment*. In February **Dr Victoria Serra-Sastre**, Lecturer, Director BSc Economics, Department of Economics, City University London presented *Adaptation to health states: sicker but better off?*

To be added to our mailing list for future seminars, email us at [herc@dph.ox.ac.uk](mailto:herc@dph.ox.ac.uk)

## Recently Funded

### Benefits of Aldosterone Receptor Antagonism in Chronic Kidney Disease (BARACK D) Trial

This is a Prospective Randomised Open Blinded Endpoint-PROBE trial in a primary care setting to determine the effects of aldosterone receptor antagonists (ARA) on mortality and cardiovascular outcomes (onset or progression of cardiovascular disease) in patients with stage 3b CKD. HERC is collaborating with the Department of Primary Health Care Sciences (DPHCS) and the economic analysis is led by Jane Wolstenholme. Funded by the NIHR Health Technology Assessment (HTA) programme.

### Diagnostics Evidence Co-operative (DEC)

In partnership with the DPHCS, the objective of the DEC is to identify and evaluate diagnostic tests /in vitro diagnostic medical devices (IVDs) used in primary care and to provide evidence on their clinical validity, clinical utility, cost-effectiveness and care pathway benefits and explore their potential to lead to improvements in healthcare services and the quality of life of NHS patients. Economic analysis led by Jane Wolstenholme. Funded by the NIHR. For more information: <http://www.nihr.ac.uk/infrastructure/Pages/DECs.aspx>

### NIHR Health Protection Research Unit (HPRU) in Gastrointestinal Infections

A 5-year inter-disciplinary research programme to generate new strategies for control of diarrhoeal diseases. Jointly awarded to the Universities of Liverpool, Oxford and East Anglia in collaboration with Public Health England. Economic analyses led by Mara Violato and Alastair Gray.

### NIHR HPRU in Healthcare Associated Infections and Antimicrobial Resistance

The aim of the study is to exploit new technologies for data linkage and whole pathogen genome sequencing to improve surveillance and management of infectious disease in the UK. Jointly awarded to the University of Oxford and Public Health England. Economic analysis lead by Sarah Wordsworth.

## Presentations by members of HERC

### 2nd Clinical Trials Methodology Conference

Edinburgh, November 2013

#### Iryna Schlackow, Borislava Mihaylova

*Developing a lifetime disease model from RCT data using parametric models with time-updated covariates*

### National University of Ireland, Galway

Ireland, November 2013

#### Ramón Luengo-Fernandez

*Economic Burden of Cancer across the European Union: a population-based cost analysis*

### Translational Research Institute (TRI)

Brisbane, November 2013

#### José Leal

*Estimating the cost-effectiveness of prostate cancer screening in the UK and Ireland: Validation of the synthesis framework*

### Centre for Health Policy, Programs and Economics

Melbourne, December 2013

#### José Leal

*Synthesis framework to estimate cost-effectiveness of newborn screening for a rare metabolic condition in the absence of direct evidence*

### Royal Brisbane and Women's Hospital

Brisbane, December 2013

#### José Leal

*Early detection/prevention of neutropenic sepsis in cancer patients: a cost utility evaluation*

### Institute of Health and Biomedical Innovation

Brisbane, December 2013

#### José Leal

*Cost-effectiveness of DNA testing for hypertrophic cardiomyopathy*

### Health Economics' Study Group

Sheffield, January 2014

#### James Buchanan, Sarah Wordsworth

*Welfarism versus extra welfarism: Does choice of economic evaluation approach impact on adoption decisions?*

#### Helen Dakin

*Decision making for healthcare resource allocation: Joint versus separate decisions on interacting interventions*

### Academic Unit of Health Economics

Leeds, January 2014

#### James Buchanan

*Evaluating genomic technologies: Can health economics improve its methodological toolbox?*

### National University of Ireland, Galway

Ireland, January 2014

#### Seamus Kent

*A comparison of statistical models for the estimation of hospital costs of common complications in a secondary cardiovascular disease population*

### Department of Economics

Oxford, January 2014

#### Laurence Roope

*The Endogenous Poverty Line: Existence and Implications*

## Recent Publications

**Kent, S, Briggs, A, Eckermann, S, and Berry, C (2013).** *Are Value of Information Methods Ready for Prime Time? An Application to Alternative Treatment Strategies for Nstemi Patients.* International Journal of Technology Assessment in Health Care, 29(04).

**Buchanan, J, Wordsworth, S, and Schuh, A (2013).** *Issues surrounding the health economic evaluation of genomic technologies.* Pharmacogenomics, 14(15):1833-1847.

**Dakin, H, Devlin, N, Feng, Y, Rice, N, O'Neill, P, Parkin, D (2013)** *The influence of cost-effectiveness and other factors on NICE decisions.* HERC Research Paper 01/13; Oxford: Health Economics Research Centre <http://www.herc.ox.ac.uk/downloads/NICE>.

**Simon, J, Anand, P, Gray, A, Rugkásad, J, Yeeles, K, and Burns, T (2013)** *Operationalising the capability approach for outcome measurement in mental health research.* Social Science & Medicine, 98:187-196.

**James, M, and Stokes, E (2013)** *Spending by primary care practices - does it show what we expect?* Int. J. Health Plann. Mgmt. doi: 10.1002/hpm.2224.

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