Health Economics Research Centre

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Improving access to diagnostic tests

Project team: Jane Wolstenholme, James Buchanan, Yaling Yang, Lucy Abel

Researchers at HERC are currently collaborating with health economists in the Oxford Diagnostic Evidence Co-operative (DEC) at the Nuffield Department of Primary Care Health Sciences on a new programme of work focused on improving access to diagnostic tests. The main aim of the Oxford DEC is to collect evidence to support the development and implementation of effective and cost-effective diagnostic tests in the NHS. From a health economics perspective this primarily involves early-stage cost-effectiveness modelling and this has led to a number of ongoing projects.

The first of these projects, the multiple myeloma project, is a collaboration between Jane, Yaling, and Lucy (supported by NIHR Research Capacity Funding), the Churchill Immunology lab, Binding Site Ltd and the Oxford DEC. This comprises a lab-based prospective observational study which will inform a cost-effectiveness analysis (CEA). This CEA will explore whether adding a diagnostic test to the existing primary care diagnosis pathway would be cost-effective, reduce diagnostic delay and improve outcomes for patients with this notoriously difficult-to-diagnose cancer.

A second project, funded by the Small Business Research Initiative, will consist of an early assessment of the costeffectiveness of a point of care test to detect Chronic Obstructive Pulmonary Disease exacerbations. This will enable patients to monitor their own condition, prevent exacerbations which lead to patients becoming housebound and enable stratification of patients to appropriate therapies.

A third project, funded by the NIHR Oxford Collaboration for Leadership in Applied Health Research and Care, will evaluate the cost-effectiveness of using Serum Natriuretic Peptides as part of a new algorithm to identify patients at risk of heart failure, and then stratify these patients to different interventions in primary care.

Alongside these applied projects, Yaling, Lucy and James are also conducting a review and critical appraisal of the use of decision analytic modelling in Health Technology Assessments of diagnostics. This review will demonstrate the current state of play, identify areas in need of methodological development, inform future studies, and further enhance the value of these collaborative projects.

For more information: http://www.phc.ox.ac.uk/research/ medical-statistics/projects/assessing-the-accuracy-andcost-effectiveness-of-diagnostic-tests

Health economics of integrated care

Project lead: Apostolos Tsiachristas

Integrated care is the most promising concept in redesigning care to tackle the increasing threat of chronic diseases to population health, society, and economy. The World Health Organization defines integrated care as "a concept bringing together inputs, delivery, management and organization of services related to diagnosis, treatment, care, rehabilitation and health promotion. Integration is a means to improve services in relation to access, quality, user satisfaction and efficiency". Several European countries have already experimented with integrated care models, and decision makers are increasingly interested in the impact of these initiatives on outcomes and costs for patients and healthcare systems.

HERC researchers are currently undertaking a programme of work which aims to provide decision-makers with evidence on integrated care, focusing on two areas of research. The first area includes a) the development of methodological approaches to evaluate integrated care models, b) the exploration of variation in their implementation, costs, and outcomes, and c) the estimation of their cost-effectiveness. The second area of research is related to the financial incentives provided to stimulate the implementation of integrated care and the impact of such interventions on health care expenditure.

There are indications that integrated care is cost-effective and financial incentives are necessary to align stakeholders' interests towards integrated care. However, further work is needed to overcome the challenges in performing economic evaluation of integrated care and define an optimal mixture of financial incentives to ensure its successful implementation. These research questions are being addressed by Dr Apostolos Tsiachristas via the Oxford Collaboration and Leadership for Applied Health Research and Care, through the evaluation of several models of integrated care.

Integrated care is a complex intervention that requires complex research questions and scientific methods. Managing this complexity is a key challenge within this portfolio of work. Keep an eye on our website later in 2016 for further publications in this area.





Managing missing Patient Reported Outcome Measure data in randomised controlled trials

Project team: Ines Rombach, Oliver Rivero-Arias, Alastair Gray

Patient reported outcome measures (PROMs) are designed to assess patients' perceived health states or health-related quality of life and are increasingly used in clinical research. However, PROMs can be susceptible to missing data, which can affect the validity of conclusions reached in randomised controlled trials (RCTs).

Recent guidelines have proposed a set of minimum standards for the study design, conduct, statistical analysis and presentation of results to prevent and handle missing data in PROMs, and HERC researchers have recently completed a study which compared current practice to these standards.

A structured literature review was conducted to identify RCTs with a minimum of 50 participants per arm which utilised one of eight widely used PROMs (EQ-5D-3L, HUI, EORTC QLQ-C30, OHS, OKS, PDQ, SF-12 or SF-36). 237 records (4-76 per relevant PROM) were included in the review.

The HERC team found that considerable discrepancy exists between approved methodology and current practice in the handling, analysis and reporting of missing PROMs outcome data in RCTs. Specifically, opportunities to minimise the amount of missing data during the design, recruitment and follow-up phases were found to have been missed (or were not described), and reporting on the reasons for missing data was often found to be of insufficient quality. Furthermore, single imputation methods that cannot account sufficiently for the uncertainty around missing data continue to be used. Few papers described the assumed missing data mechanism, reported how changes in the assumptions made about the missing data mechanism would change conclusions or discussed the impact of missing data on the study results.

Greater awareness is needed of the potential biases introduced by inappropriate handling of missing PROMs data, as well as the importance of sensitivity analysis and clear reporting so that RCTs can more appropriately inform decision-making in healthcare.

For more information: http://www.ncbi.nlm.nih.gov/pubmed/26821918

Wellbeing over the age of 50

Project team: Paul Anand, Alastair Gray, Laurence Roope, Ranjeeta Thomas

Many studies have found a strong association between age and "happiness", which typically dips in middle age and then gradually increases. However, relatively little is known about other aspects of wellbeing later in life, and a recent study involving HERC researchers attempted to address this research question. This work formed part of a wider project, funded by the Leverhulme Trust and led by the Open University, which sought to demonstrate how Nobel Laureate Amartya Sen's capabilities approach could be applied to illuminate our understanding of wellbeing across the life course, from early childhood until old age. Using panel data from the English Longitudinal Survey of Aging, our study illustrated how the capabilities approach can be used to shed light on wellbeing in older age.

We estimated models related to three aspects of a person's wellbeing: daily activities, happiness and capabilities. A recurring theme in our results was the importance of engagement in activity for quality of life in older age. We found that the extent to which people describe themselves as being "happy" is related to taking part in a wide variety of activities. However, having the capability to participate in activities can be constrained by lack of financial resources, socio-economic status and gender. In addition, different groups react to the growing constraints of old age in different ways. For example, men experience increasing frustration as they enter their 80s, possibly due to declining health, whereas women with no post-school education appear to adjust gradually and continually to their changing health status throughout their 80s.

The overall picture that emerged from the study is that happiness in older age is related to many different facets of life, including health, marital status, and how people spend their time, and it is also related to involvement in social activities and institutions – especially for women.

For more information: http://www.sciencedirect.com/science/article/pii/S2212828X1500002X

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Spotlight on JOEL SMITH

I joined HERC in September 2015 as a Senior Researcher to lead, promote and coordinate the economic research of the NIHR Oxford Biomedical Research Centre (OxBRC). The diverse clinical activity of the OxBRC has allowed me to further develop my interest in methodological research and complements my existing research portfolio in vascular disease and cancer. My current research within OxBRC includes the development of a discrete event simulation model for hospital process change and a dynamic transmission model to assess the cost-effectiveness of a vaccine, as well as methods for quantifying the economic value of early phase medical research. Before joining HERC, I was a Health Economist at the University of Edinburgh providing economic support across the Edinburgh Clinical Trials Unit, Centre for Population Health Sciences, Edinburgh Health Services Research Unit and NHS Lothian. The role involved providing advice on study design and methodological support. I was also a member of the NHS Lothian Joint Formulary Committee. My research portfolio at the University of Edinburgh adopted econometric methods for experimental, quasi-experimental and observational study designs. I was course coordinator and sole lecturer on the Resource Allocation and Health Economics module of the Masters in Public Health course at the University of Edinburgh and also contributed to teaching on the undergraduate Medical School programme. My research has been supported by the ESRC, NIHR, CSO and the European Commission.

staff • visitors • students • funding • publications • presentations • seminars

Staff News – Welcome to:



Paige Barrows Paige, an NHS junior doctor on a four-month rotation with HERC, is currently working with Filipa Landeiro on a systematic review of interventions that have proved effective in reducing social isolation



in individuals aged over 60 worldwide. **Katharina Schwarze** Katharina is a postgraduate student who has joined HERC on a three-month research placement from her home institution, University Duisburg-

Essen, where she is studying for a Master's in Management for Health Professionals. Katharina will be hosted by Sarah Wordsworth and James Buchanan and the title of her thesis will be Estimating the costs and outcomes associated with whole genome sequencing in the UK NHS.

Recently Funded

Analysis of the cost-effectiveness of LiverMultiScan vs. state of the art in diagnosis and management of suspected fatty liver disease.

This EU Horizon2020 grant funded project will begin in June 2016. HERC will be collaborating with Perspectum Diagnostics, an Oxford based, university/ NHS invested company, who will be conducting a diagnostic tool, LiverMultiScan (LMS). LMS is a non-invasive imaging device which looks at liver disease progression. The economic analyses will be led by Boby Mihaylova and Joel Smith and the health economics work will include a literature review and liver disease modelling.

HERC Seminars

Convenor: Laurence Roope

HERC runs a series of seminars with invited speakers from the health economics community who talk on a wide range of applied and methodological topics.

During Hilary Term, Paula Lorgelly, Deputy Director, Office of Health Economics visited HERC to give a talk on Predicting cancer patients' quality of life: an analysis of the relationship between utility, treatment regimes and time.

In April 2016 we welcomed Frank Sandmann, from the London School of Hygiene and Tropical Medicine who gave a presentation on Opportunity costs of healthcare beds: How to estimate them properly?

To complete this series of talks, in May, Thomas Siedler, Professor in Economics, University of Hamburg presented on Banning alcohol sales at night and hospital admissions in Germany which explored the effect of a novel policy measure to curb excessive drinking in Baden-Württemberg.

Details of forthcoming talks can be found on the HERC website: **HERC** To be added to our mailing list for future seminars, email us at:

Presentations by members of HERC

Diabetes UK conference Glasgow, March 2016

Peter Eibich Poster presentation Costs and pathways of medication therapy for type

2 diabetes in the UK: the scope for stratification **NIHR Health Protection Research Unit in** Gastrointestinal Infections annual

scientific meeting Oxford, March 2016

Mara Violato Family income and exposure to Norovirus in

childhood: Findings from the UK Millenium Cohort Study

The impact of the genomics revolution on global health - how can governments respond? Foreign Office, London, March 2016

Sarah Wordsworth The economics of genomics technologies

PUBLICATIONS

Anand P, Gray A, Liberini F, Roope L, Smith R, Thomas R. Wellbeing Over 50. The Journal of the Economics of Ageing 2015. 6:68-78. doi:10.1016/j. ieoa.2014.12.001

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Morris S, Patel NV, Dobson J, Featherstone RL, Richards T, Luengo-Fernandez R, Rothwell PM, Brown MM, International Carotid Stenting Study investigators. Cost-Utility Analysis of Stenting Versus Endarterectomy in The International Carotid Stenting Study. Int J Stroke. 2016 Feb 15. PMID: 26880056. [Épub ahead of print]

Cholesterol Treatment Trialists' (CTT) Collaboration (Writing committee: Reith C, Blackwell L, Emberson J, Mihaylova B, Armitage J, Fulcher J, Keech A, Simes J, Baigent C, Collins R). Protocol for Analyses of Adverse Event Data from Randomized Controlled Trials of Statin Therapy. American Heart Journal 2016 January 176: 63-69. doi:10.1016/j. ahi.2016.01.016

Rombach I, Rivero-Arias O, Gray AM, Jenkinson C, Burke Ó. The Current Practice of Handling and

Personalised Medicine Family Evening St Anne's College, Oxford, March 2016

James Buchanan Challenges associated with implementing personalised medicine in the NHS: a health economics perspective

8th Institute of Mathematics and its **Applications Conference on Quantitative** Modelling in the Management Of Health and Social Care

London, March 2016

Jacqueline Murphy

Estimating the long term effects of introducing FIT for colorectal cancer screening in England using decision analytic modelling

Health Economics Research Group, **Brunel Universitv**

London, May 2016

James Buchanan

Identifying the most appropriate economic evaluation approach in genomics: a comparison of methods

Reporting Missing Outcome Data in Eight Widely Used Proms in Rct Publications: A Review of the Current Literature. Qual Life Res. 2016 Jan 28. [Epub ahead of print]

Rose TC, Adams N, Taylor-Robinson DC, Barr B, Hawker J, O'Brien S, Violato M, Whitehead M. Relationship Between Socioeconomic Status and Gastrointestinal Infections in Developed Countries: A Systematic Review Protocol. Systematic Reviews 2016 5:1. doi: 10.1186/s13643-016-0187-7

Slade I, Hanson H, George A, Kohut K, Strydom A, Wordsworth S, Rahman N; MCG programme. A Cost Analysis of a Cancer Genetic Service Model in the Uk. Journal of Community Genetics. 2016 Feb 27. [Epub ahead of print]

Storrar W, Fogg C, Brown T, Dennison P, Yu LM, Dewey A, Luengo-Fernandez R, Dean T, Rahman N, Mansur A, Howarth PH, Bradding P, Chauhan AJ. Temperature-Controlled Laminar Airflow in Severe Asthma for Exacerbation Reduction (The Laser Trial): Study Protocol for a Randomised Controlled Trial. Trials. 2016 Jan 8;17(1):15. doi: 10.1186/s13063-015-1134-y

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