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Genomics meets economics: HERC research programme expands

Project team: Sarah Wordsworth, Jilles Fermont and Mara Violato

HERC's portfolio of work linking health economics and genomics is expanding rapidly. Work has recently begun on three new genomics studies, each evaluating the cost-effectiveness of a form of next-generation sequencing technology. We are collaborating with Dr Anna Schuh, Dr Jenny Taylor, and Professor Derrick Crook from the Oxford Biomedical Research Centre on these projects, which are funded by the Technology Strategy Board and Health Innovation Challenge Fund.

As genomic technologies present a number of methodological challenges to health economists, each study uses a range of economic evaluation techniques, including modelling and preference elicitation methods. The first study examines a targeted sequencing technology that can simultaneously test a selected range of genetic markers in cancer patients. These markers can provide information on tumour behaviour and response to therapy. It is anticipated that tests based on this technology will help clinicians to select appropriate treatments for these patients.

Two further studies evaluate whole-genome sequencing, which can be used to examine an entire genome in a hypothesis-free

manner, and can be applied to both patients and other organisms (such as the MRSA bacterium that causes severe infections in hospitals). Study 2 explores whether this technology could be a cost-effective way to improve diagnostic speed and accuracy in a wide range of conditions such as inherited diseases, cancer and immunological disorders, leading to improvements in patient outcomes.

Study 3 evaluates the use of whole-genome sequencing to sequence bacterial genomes in NHS microbiology laboratories. Currently, slow, labour-intensive methods are used to identify the cause of an infection and establish which treatments could be effective. The information provided by whole-genome sequencing could transform the way these laboratories work, helping clinicians to diagnose patients with suspected infections faster and aid hospitals to better manage outbreaks of infections.

This represents an exciting new chapter in health economics and genomics work in Oxford, and we hope to be able to report the first results from these studies in late 2013.

For more information: **HERC**



HERC at iHEA SYDNEY 2013 see back page



Realigning patient and provider incentives to improve primary health care in rural China: preliminary results

Project team: Timothy Powell-Jackson, Winnie Yip, Wei Han

Health system reforms often involve the introduction of several changes simultaneously. A good example is China's ambitious US\$125 billion health care reform, launched in 2009. This involved a shift from a reliance on markets to the reaffirmation of the central role of the state in financing and providing health care to the population.

Preliminary results are now available from a recent study in which we evaluated two key features of China's health care reform via a social experiment conducted in Ningxia province, one of the least developed areas of the country. Working with the provincial government, we designed two health system interventions. The first policy change was an expansion in the benefit package of China's flagship health insurance scheme, with a particular emphasis on re-orientating incentives away from inpatient care towards outpatient care. The second was a shift from a fee-for-service payment method to a capitation budget with rewards for better quality primary care.

We designed the study such that the policy changes were implemented in some counties and not others and used data from two waves of a household survey. Preliminary findings show that expanding the insurance benefit package increased the likelihood of people using outpatient care at village clinics by almost 50%, in line with much of the international evidence. However, the two policy changes in combination showed no additional effect on the utilisation of village clinics over and above that generated by the expanded insurance benefit package, implying that the supply-side intervention did not improve care seeking behaviour. It may be that the study period was too short and it will take longer for improvements in quality to raise demand for health care.

For more information: **HERC**

“ ...expanding the insurance benefit package increased the likelihood of people using outpatient care at village clinics by almost 50%. ”

Impact of cardiovascular and other adverse events on quality of life and hospital costs

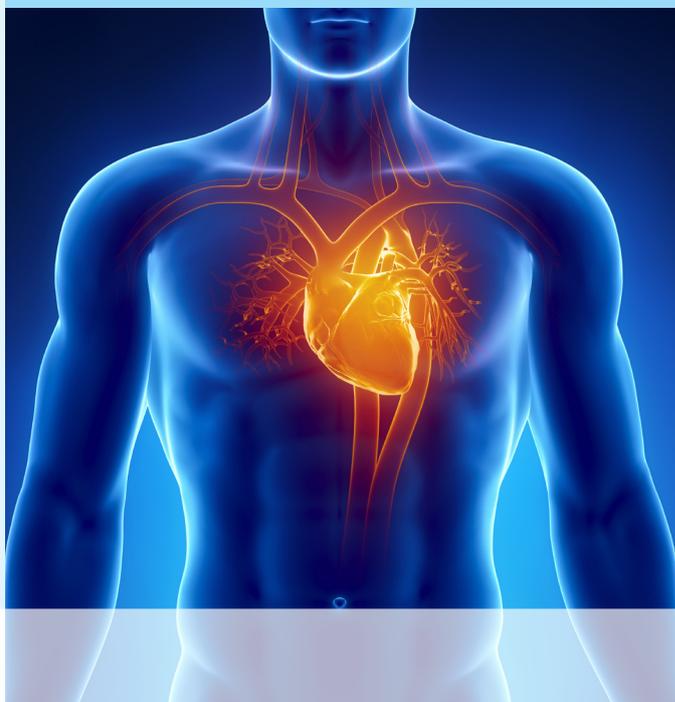
Project team: Seamus Kent, Boby Mihaylova and Alastair Gray

HERC researchers Seamus Kent, Boby Mihaylova and Alastair Gray are collaborating with researchers from the Clinical Trial Service Unit at the University of Oxford to study the impact of cardiovascular and other serious adverse events on health-related quality of life and hospital resource use and costs. This project uses data from the HPS2-THRIVE study, in which 25,673 participants at increased risk of cardiovascular disease were randomised to an extended release niacin/laropiprant combination therapy or matching placebo and followed for an average of four years.

The main study results, reported in March 2013, indicated that the extended release combination therapy did not reduce the rate of major vascular events (i.e. non-fatal heart attacks, coronary deaths, strokes and revascularisations) and caused a range of side-effects such as skin rashes, gastro-intestinal problems, complications with the management of pre-existing diabetes and increased risk of developing diabetes, infections and gastrointestinal/intracranial bleeding.

As some of these side effects occur with other preventative cardiovascular disease interventions (e.g. aspirin, COX-2 inhibitors and statins), the HERC team will estimate the effects of these events on health care costs and health-related quality of life in order to assess the net benefits of such interventions.

For more information: **HERC**



HERC hosts workshop to discuss methods for temporal extrapolation in economic analyses

Local organisers: Bobby Mihaylova and Alastair Gray



Health economists need to evaluate the full impact of interventions on health care costs and length and quality of life over time periods that are often much longer than the follow-up time in primary efficacy studies. This temporal extrapolation could have a substantial effect on cost-effectiveness estimates.

A workshop discussing methods for extrapolation from clinical trials data to inform economic analyses took place on 22nd January 2013 at St Anne's College, University of Oxford. The workshop was co-organised by HERC members Bobby Mihaylova and Alastair Gray in collaboration with Nicky Welton (University of Bristol), Linda Sharples and Chris Jackson (MRC Biostatistics Unit, Cambridge) and was supported by the MRC Hubs for Trials Methodology Research. Forty-six participants from academic institutions, consultancy companies and the pharmaceutical industry attended the workshop.

Workshop presenters and delegates discussed diverse methods for extrapolating trial data, including: use of external data to inform long-term disease progression; parametric survival models; disease models based on trial

data; combinations of these approaches. Novel approaches presented included: use of non-fatal disease events as determinants of future disease risks (via time-updated covariates in statistical models); applying constraints on survival curves to ensure that extrapolation is consistent with external data; use of general population cause-specific survival to inform extrapolation for a particular population of interest, while accounting for different causes of death; and use of expert opinion on patients' likely future life course. Workshop attendees also discussed the importance of consistently assessing evaluative frameworks and taking account of uncertain future events (such as changes in the size of target populations, intervention prices and the emergence of competitor interventions).

The workshop raised awareness of existing methods, as well as methods in development, and stimulated discussions of future research needs. Ideas for research collaborations are currently being discussed and workshop organisers welcome comments and suggestions.

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Spotlight on LIZ STOKES



I joined HERC in November 2009, after having worked at both Keele and Liverpool John Moores Universities. Within HERC, I work mainly in the area of blood transfusion, on two large NIHR Programme Grants for Applied Research.

The programme grants require decision modelling to assess the cost-effectiveness of introducing bedside tests of blood clotting abnormalities to guide appropriate transfusion therapy in two clinical areas where excessive bleeding is common: cardiac surgery (with Sarah Wordsworth) and trauma (with Helen Campbell). Drawing in part on these projects, I am also undertaking a DPhil on the economics of blood transfusion in the NHS.

As part of my DPhil, I aim to generate reliable cost estimates of administering transfusions using a detailed micro-costing approach. These cost estimates will be used in the decision models developed to simulate the cost-effectiveness of bedside tests in both clinical specialties. I will also use the decision model for cardiac surgery to investigate whether it is always appropriate to adopt a lifetime perspective for short-term interventions. This work will be presented at the 2013 iHEA conference in Sydney, Australia.

I have really enjoyed my time in HERC thus far, and am very grateful for the opportunities I have had to develop my career. Working on projects with a common clinical theme has provided the basis for a thesis topic and enabled me to undertake a DPhil. I have also been able to broaden my experience by undertaking economic decision modelling as well as economic evaluations alongside clinical trials.

Staff News

Welcome to the new members of the HERC Admin team:



Barbara Kitchener

Administrator and Assistant to Professors Gray and Yip. This new post includes co-ordinating the three-day courses which HERC run twice a year. Barbara joins us from Oxford Brookes, where she was PA to two Heads of Department. Prior to that, she was a Projects Co-ordinator and Events Manager at AEA, Harwell, for 10 years.



Ginny Burch

Administrative Assistant
Ginny is replacing Mandy Fruin while Mandy is on maternity leave, looking after our one day course, seminars, website updates and much else. Ginny graduated from Oxford Brookes last summer with a BSc in Nutrition.



HERC at iHEA Sydney 2013

Organised Sessions

Helen Dakin and Oliver Rivero-Arias: Mapping to EQ-5D: Recent Developments and Best Practice To include **Helen Dakin** presenting: *Response mapping to the EQ-5D: methods and comparative performance*

Iryna Schlackow and Borislava Mihaylova: Estimating the Impact of Disease Events on Health-Related Quality of Life Using Individual Participant Data: Allowing for Heterogeneous Impacts in Estimation. To include **Iryna Schlackow** presenting: *Estimating the effects of cardiovascular complications on health-related quality of life in chronic kidney disease patients*, and **Helen Dakin**



presenting: *Calculating quality of life and QALY reductions from clinical events: impact of measuring utility after adverse events*

Individual Sessions

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

Reem Hafez: *The impact of health insurance on financial risk protection: Do design features matter?*

Elizabeth Stokes: *Time horizons in short-term interventions: is it always appropriate to adopt a lifetime perspective?*

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Presentations

by members of HERC

Research in Progress Seminars

Department of Public Health
University of Oxford, January 2013

Reem Hafez

The impact of health insurance on financial risk protection in rural Ningxia

J.E. Cairnes School of Business & Economics

National University of Ireland, March 2013

Alastair Gray

Economic aspects of chronic disease: modelling diabetes and its complications

School of Health and Related Research (ScHARR)

The University of Sheffield, March 2013

The Office of Health Economics (OHE)

London, April 2013

Helen Dakin

The influence of cost-effectiveness and other factors on NICE decisions

Centre for Health Economics (CHE)

University of York, April 2013

Helen Dakin

Heterogeneity and rationing of knee replacement

OCTET End of Study Conference

London, March 2013 and **Webinar**,

April 2013 for HDCA Health and Disability Thematic Group

Judit Simon, Paul Anand, Alastair Gray, Jorun Rugkåsa,

Ksenija Yeeles, Tom Burns and the OCTET Team

Operationalising the capabilities approach for outcome measurement in the OCTET study

10^o Simpósio do Nucleo Estudantes de Ciências

Farmaceuticas (NECF) do Instituto Superior de

Ciências da Saude Egas Moniz (ISCSEM)

Portugal, April 2013

Jose Leal

Health economics and the allocation of healthcare resources

Royal Economic Society Annual Conference

University of London, April 2013

Indranil Dutta, Laurence Roope and **Horst Zank**

The Endogenous Poverty Line: Existence and Implications

Recently Funded

Competitive Memory Training for the Treatment of Depression in Schizophrenia (CoMet)

Principal Investigator Dr Craig Steel, University of Reading. Funded by NIHR Research for Patient Benefit. Economic analysis led by Judit Simon

The Effectiveness of Community vs. Hospital Eye Service follow-up for patients with neovascular age-related macular degeneration with quiescent disease: a virtual trial (ECHOES)

Principal Investigator Professor Usha Chakravarthy, Queens University Belfast. Funded by NIHR Health Technology Assessment. Economic analysis led by Sarah Wordsworth

StereoTactic radiotherapy for wet Age-Related macular degeneration (STAR): RCT comparing low-voltage X-ray irradiation and as needed bevacizumab, with as needed bevacizumab monotherapy

Principal Investigator Tim Jackson, Kings College London. Funded by NIHR Efficacy and Mechanism Evaluation. Economic analysis led by Sarah Wordsworth

Benefit to patients and the NHS of cardiovascular magnetic resonance imaging (CMR) after primary percutaneous coronary intervention (PPCI) - Feasibility study

Principal Investigator Professor Barney Reeves, University of Bristol. Funded by NIHR Health Services Research. Economic analysis led by Sarah Wordsworth

HERC Seminars

Convenor: Jingky Lozano-Kühne

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. From December 2012 to March 2013 we welcomed **Mónica Hernández Alava**, Research Fellow in Econometrics, Health Economics and Decision Science, School of Health and Related Research, University of Sheffield, who spoke about 'A comparison of direct and indirect methods for the estimation of health utilities from clinical outcomes', and **Professor Philip Clarke**, Professor of Health Economics, Centre for Health Policy, Programs & Economics, Melbourne School of Population Health, University of Melbourne, who gave an interesting talk 'Edgar Sydenstricker: The first health economist?'

To be added to our mailing list for future seminars, email us at herc@dph.ox.ac.uk

Recent Publications

For a complete list of HERC-authored publications to date and in press, visit our website.

Dakin, H, Gray, A, and Murray, D (2013). Mapping analyses to estimate EQ-5D utilities and responses based on Oxford Knee Score Qual Life Res, 22(3):683-94

Paul, NLM, Koton, S, Simoni, M, Geraghty, OC, **Luengo-Fernandez, R,** and Rothwell, PM (2013). Feasibility, safety and cost of outpatient management of acute minor ischaemic stroke: a population-based study. J Neurol Neurosurg Psychiatry, 84(3):356-61

Breeman S, Campbell MK, **Dakin H,** Fiddian N, Fitzpatrick R, Grant A, **Gray A,** Johnston L, MacLennan GS, Morris RW, Murray DW (2013). Five-year results of a randomised controlled trial comparing mobile and fixed bearings in total knee replacement. Bone Joint J, 95-B(4):486-92.

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