Health Economics Research Centre

HERC news

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UNIVERSITY OF OXFORD

> "...programmes to keep frail older people out of hospital and cared for in their own homes may result in better survival and lower costs..."

How best to deliver Comprehensive Geriatric Assessment in a cost-effective way Project

Project team: Sasha Shepperd and Alastair Gray

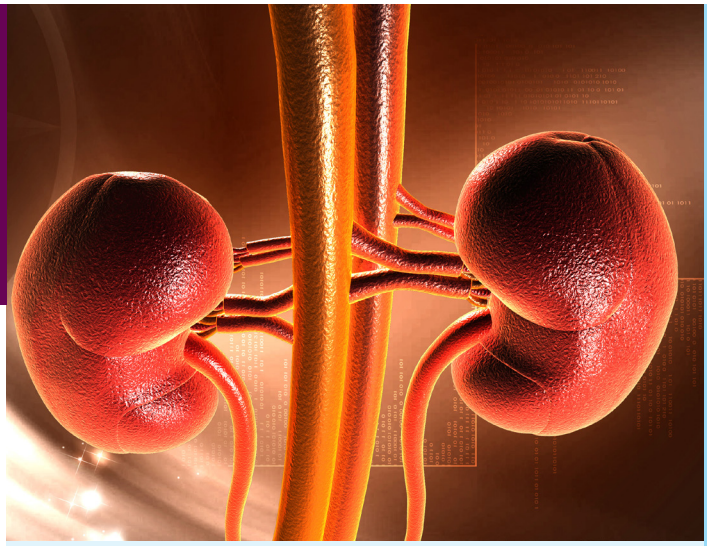
As the population ages, growing numbers of older people are admitted to hospital each year, creating a major challenge for the health services. Previous research suggests that frail older adults admitted to hospital will do much better if a specialist assesses their health problems and co-ordinates their care: this is known as Comprehensive Geriatric Assessment (CGA). Other research has suggested that programmes to keep frail older people out of hospital and cared for in their own homes (admission avoidance hospital at home) may result in better survival and lower costs, as well as being preferred by patients and their carers.

However, there is considerable uncertainty about how robust these findings are. HERC researchers, along with other colleagues within the Nuffield Department of Population Health and collaborators in the University of Glasgow and the NHS in Scotland, Wales and England, have recently received funding from the NIHR to undertake a study which will improve the evidence base used to plan health care for acutely unwell and frail older people.

The research will include a national survey and follow-up interview study to collect information on the different models of CGA already in use across the NHS, and the collection of data to calculate the costs of delivering these different models. We will also assess previous research in detail by contacting researchers from around the world to see if they will contribute their research data to a pooled analysis of all the data. This will help us to establish exactly which patients benefit the most from specialist care, how effective the different models of CGA are, and how much they cost the health service. This collaboration will build on a similar review group successfully established five years ago to evaluate the effectiveness of different ways of organising services designed to provide an alternative to hospital care.

Finally, this research will examine how CGA is implemented by healthcare professionals in the NHS and ask patients and caregivers to give their views on this type of care. The results will help in deciding how best to deliver CGA in the NHS, and what type of research is still needed.

For more information: HERC



Modelling chronic kidney disease: the SHARP lifetime outcomes model

Project team: Iryna Schlackow and Boby Mihaylova, with the SHARP collaborative group

Chronic kidney disease is highly prevalent in the general population. However, due to its complexity, the relatively recent developments in categorising disease stages and the paucity of suitable data, there are no established well-validated lifetime outcomes models. In collaboration with colleagues from the Oxford Clinical Trial Service Unit, we developed a lifetime model in moderate-to-severe chronic kidney disease using data from the 9,270-large Study of Heart and Renal Protection (SHARP).

The SHARP chronic kidney disease model incorporates the two-way interdependence between kidney and cardiovascular disease, namely more severe stages of kidney disease are associated with an increased risk of cardiovascular events, while cardiovascular events might in turn contribute to kidney disease progression. To achieve this, we developed two submodels (one for chronic kidney disease progression and another for cardiovascular outcomes) and combined them into an interactive Markov-type decision-analytic model. In all risk equations, in addition to a range of risk factors measured at randomisation, we considered the important contribution of within-trial kidney and cardiovascular disease events on subsequent disease risks.

The SHARP model simulates chronic kidney disease progression and cardiovascular complications, as well as participants' life expectancy, health-related quality of life and healthcare costs. It has been successfully validated in subgroups of participants within the study, and model predictions are in line with published renal registry data. We are now planning to further validate and extend the model using additional data.

We hope that the model will be used by health policy analysts and other health professionals interested in both the implications of kidney disease and its complications, as well as interventions to manage these effects.

For more information: HERC

Largest randomised trial of knee replacement: clinical and economic results published

Project team: Helen Dakin and Alastair Gray

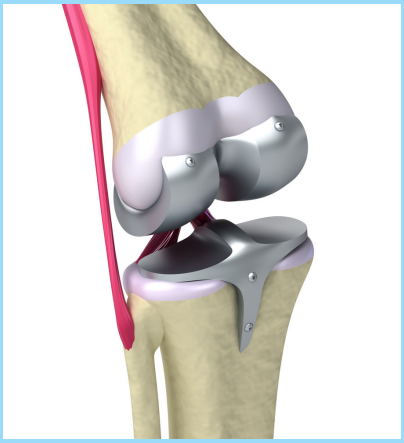
An economic evaluation conducted by HERC researchers on the largest randomised controlled trial of knee replacement ever conducted was recently published as a Health Technology Assessment Report.

The trial evaluated three study questions in overlapping patient populations: should surgeons resurface the patella (kneecap); should surgeons use fixed or mobile bearings; and should the prosthesis implanted in the tibia (shinbone) be all-polyethylene, or have a metal backing? More than 2,300 patients undergoing primary knee replacement at 34 hospitals were followed for a median of 10 years in this collaboration between the Oxford Nuffield Departments of Population Health and Orthopaedics and other institutions, including the University of Aberdeen.

No statistically significant differences in clinical endpoints were observed between randomised comparisons, although the within-trial cost-utility analysis suggested that patella resurfacing and metal backing were likely to be beneficial and cost-effective. Patella resurfacing non-significantly improved quality of life and decreased cost. Metal backing improved quality of life at a small cost, resulting in an incremental cost-effectiveness ratio (ICER) of £35 per QALY gained compared with all polyethylene. Mobile bearings were also associated with increased cost and small improvements in quality of life and an ICER of £1,666 per QALY gained, although there was substantial uncertainty around this conclusion.

The trial has generated a rich dataset containing information on costs and quality of life in patients undergoing knee replacement. This has been used to develop methods for analysing partial factorial trials, to explore selection criteria for knee replacement and to map from the Oxford Knee Score to the EuroQol EQ-5D. Other projects using the data are planned: both within HERC and elsewhere. An application for extending the study to 20 years is underway.

For more information: HERC



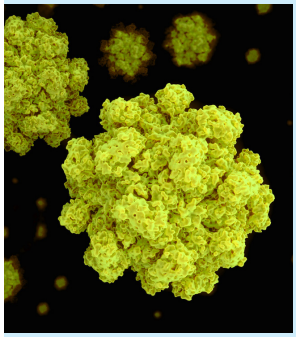
"...patella resurfacing and metal backing are likely to be beneficial and cost-effective"

HERC involvement in two new NIHR Health Protection Research Units

In December the NIHR funded several Health Protection Research Units (HPRU) that will act as multi-disciplinary centres of research excellence in a range of priority areas in England. HERC, in partnership with Public Health England (PHE) and other universities, will lead the Health Economics component of the HPRUs in 'Gastrointestinal Infections' and in 'Healthcare Associated Infections and Antimicrobial Resistance'. Both 5 year programmes of work started early in April.

HPRU in Gastrointestinal Infections

Project team: Mara Violato and Alastair Gray



Diarrhoeal diseases disrupt lives. Up to 17 million people are affected annually in the UK leading to at least 11 million working days lost to the economy and 8 million absences from school. Diarrhoeal diseases are also very common causes of outbreaks: norovirus outbreaks repeatedly close hospital wards, especially during the winter months when pressures on the NHS are at their height, and death or life-long disability can result from infection with Escherichia coli O157, the main impact being felt by children and the elderly.

Researchers from the Universities of Liverpool, Oxford, and East Anglia, and the Institute for Food Research in partnership with PHE have proposed a novel research programme in Gastrointestinal Infections that spans the translational spectrum from basic biology to applied public health research. This programme aims to develop new means of understanding and investigating diarrhoeal diseases in the context of people's lives, and to reduce the overall disease burden and the associated inequalities.

HERC researchers will lead the health economics component of the research programme and will co-supervise DPhil students. Differences in the clinical, health care utilisation and cost consequences of gastrointestinal infections will be analysed across different socioeconomic and demographic groups within the UK population. A model will also be developed to test the economic consequences of a number of intervention scenarios. All of this will be achieved using a variety of data sources (including routine laboratory data, disease notification, survey data, and administrative healthcare utilisation records) and economic and statistical methods (including cross-sectional and pseudo-panel methods, costing methods, record linkage, and economic modelling approaches).

It is expected that this integrated, inter-disciplinary research programme will generate new strategies for control, meeting PHE's main objectives of addressing inequalities, protecting the country from infectious diseases, and being an evidence-led organisation that provides answers to public health problems.

For more information: HERC

HPRU in Healthcare Associated Infections and Antimicrobial Resistance

Project lead: Sarah Wordsworth

Bacterial infections such as *C. difficile* can cause severe diarrhoea. Spores of the *C. difficile* bacteria can be passed in faeces (stools) and can survive for many weeks on objects and surfaces. Because the genetic sequences of the *C. difficile* bacteria vary greatly, this information can be used to determine where the infections come from. In addition, some bacteria can become "resistant" to an antibiotic, so specific antibiotics no longer stop the infection. Finding out which antibiotics bacteria are resistant to is crucial to ensure that patients do not get ineffective treatment.

This HPRU will focus on improving data linkage across hospitals for infectious diseases such as *C. difficile* and tuberculosis (TB) to better track infections, using the latest advances in genomic testing technologies such as 'whole genome sequencing' (WGS) to analyse the bacteria's DNA. The HPRU will also explore methods to improve the prescribing of antibiotics in hospitals and primary care. Researchers from several departments at the University of Oxford will work in collaboration with PHE in this HPRU, with Sarah Wordsworth leading the health economics component.

This health economics work will evaluate whether WGS is more cost-effective than current testing approaches in NHS laboratories for a range of infectious diseases. We will also help to assess the benefit and dis-benefit of immediate antibiotic use and consider the best way to incorporate the potential for substantial future harm from increases in microbial resistance into these analyses. Alongside disease modelling experts at PHE, we will construct health economic models for antimicrobial use in hospitals and primary care, and use simulation-based approaches to explore different methods to incorporate future harms. We will also use discrete choice experiments to estimate how much patients and doctors are willing to 'trade-off' reduced quality of life in the short-term from delays in symptom resolution, for possible future benefits from reductions in antibiotic use.

It is expected that this programme of research will make an important contribution to informing the prevention and control of healthcare associated infections and antimicrobial resistance.

For more information: HERC

Spotlight on FILIPA LANDEIRO

I joined HERC in January 2012 to undertake a DPhil in Public Health sponsored by two Portuguese institutions - Instituto do Envelhecimento and Fundação para a Ciência e Tecnologia. My work focuses on the costs of loneliness of older people to national health services, measured in terms of delayed discharges from acute care hospitals. In order to estimate these costs I have been collecting data from elderly patients diagnosed with proximal neck of femur fracture who were admitted to the Orthopaedic Units of the Hospital Universitário de Santa Maria in Lisbon and the John Radcliffe Hospital in Oxford. I have been following these patients from admission to discharge to assess the extent to which their discharges have been delayed due to lack of support from their social networks. Given my interest in social gerontology, I am interested in comparing the way in which these two different societies look after their elderly.

My data collection in Oxford has been conducted as part of the Fracture Free study. This study follows patients aged 50 years and over with fragility fractures, over a five year period, in order to identify the predictors of re-fracture and to determine the health and social care costs of fractures and re-fractures.

As a DPhil student at the University of Oxford, I am also a member of Oriel College where I take part in several extra-curricular activities. Among other things, I act as a mentor to five masters students, attend dinners at formal hall (with the opportunity to sit at the High Table once per term) and take part in exchanges with a sister college in Cambridge and Trinity College, Dublin. I must, therefore, say that my Oxford experience has been very rewarding both from an academic and a personal perspective.

Staff News

Thomas McConnell

Thomas, a foundation doctor, visited HERC on a four month rotation from December 2013 – April 2014. Thomas was working on a systematic review of the cost of hip fracture as well as collecting data for the fracture free project.

Francesco Fusco

Francesco visited HERC from January – May 2014, from Sant'Anna School of Advanced Studies, Pisa, Italy. He was involved in the Resurfacing Hip Arthroplasty (RHA) rehabilitation trial aiming to assess cost and quality of life of a new specific rehabilitation protocol for RHA patients.

Sam Hawley

Sam is a colleague from the musculoskeletal epidemiology group (NDORMS) and is visiting HERC from March – mid-July. He is evaluating how changes to the delivery of secondary fracture prevention have impacted on health outcomes.

Camilla Sortsø

Camilla is visiting HERC from April - July 2014 from the University of Southern Denmark. She is working on her PhD concerning cost-effectiveness of diabetes treatments evaluated using epidemiological and economic modelling and will apply the UKPDS model to Danish data.

Ramez Golmohamad

Ramez, a foundation doctor, is visiting HERC from April – August 2014 on a four month rotation in Public Health. He is assisting with data collection for the fracture free study at the John Radcliffe Hospital, and will be completing a literature review on quality of life of hip fracture patients.

Charity Climb

This summer Jilles Fermont, a research officer at HERC, will be climbing Mount Kilimanjaro to fundraise for charity. All donations go to the charities supported by the Oxford University Raise and Give Oxford (RAG). For more information, or to make a donation, please visit **http://tinyurl.com/rag2014**

HERC Seminars

Convenor: Jacqueline Murphy

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. In March 2014 we welcomed **James Lomas**, PhD Student, Centre for Health Economics, University of York, who spoke *about A quasi-Monte Carlo comparison of developments in parametric and semi-parametric regression methods for heavy tailed and non-normal data: with an application to healthcare costs*; and in April 2014 **Gavin Roberts**, Economic Adviser, Medicines, Pharmacy and Industry, Department of Health presented *A general mechanism for estimating the impact of health conditions and treatments on production and consumption by patients*.

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

Recently Funded

Nocturnal use of a Temperature Controlled Laminar Airflow (TLA) Device (Protexo®) in adults with poorly-controlled, severe allergic asthma: the LASER trial. This multi-centre randomised controlled trial will be using a sample size of 222 and using HES data. Economic analysis led by Ramón Luengo-Fernandez. Funded by the HTA.

How best to deliver Comprehensive Geriatric Assessment in a cost-effective way. A four year research study which will improve the evidence base used to plan health care for acutely unwell and frail older people. Economic analysis led by Alastair Gray. Funded by the NIHR HS&DR.

Presentations by members of HERC

University of Manchester
Manchester, February 2014
Rachael Morton
To dialyse or not? Physician preferences for the treatment of elderly patients with end-stage kidney disease: A discrete choice experiment.

Department of Economics
Oxford, February 2014
Laurence Roope
Missing dimensions in the measurement of wellbeing and happiness.

IX Congresso Português de Osteoporose
Portugal, February 2014
Filipa Landeiro
Retrato sócio-funcional das fraturas proximais do fémur (Socio-functional portrait of proximal femoral fractures).

University of York
York, March 2014
Seamus Kent
Cost regressions and trial data.

University of Newcastle
Newcastle, March 2014
Sarah Wordsworth
Economics and genomics.

Birmingham Health Economics Unit
Birmingham, March 2014
Rachael Morton
To dialyse or not? Physician preferences for the treatment of elderly patients with end-stage kidney disease: A discrete choice experiment.

University of Southampton
Southampton, March 2014
Rachael Morton
The impact of social disadvantage on equity of access to health services, kidney disease progression and cardiovascular outcomes for people with stage 3-5 chronic kidney disease.

Royal Economic Society Annual Conference
Manchester, April 2014
Laurence Roope, Paul Anand
Happiness and development in very young children.

Recent Publications

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

Morton RL, Webster AC. *Quality of Life in Chronic Kidney Disease*. In Management of Chronic Kidney Disease, Editor Mustafa Arici (2014). Springer.

Hunter J, **Rivero-Arias O**, Angelov A, Kim E, Fotheringham I, **Leal J**. *Epidemiology of Fragile X Syndrome: a Systematic Review and Meta-analysis*. Am J Med Genet A (in press).

Brierley R, Pike K, Miles A, **Wordsworth S, Stokes EA**, Mumford A, Cohen A, Angelini GD, Murphy GJ, Rogers CA, Reeves BC. *A multi-centre randomised controlled trial of Transfusion Indication Threshold Reduction on transfusion rates, morbidity and healthcare resource use following cardiac surgery: study protocol*. Transfusion and Apheresis Science (in press).

Campbell HE, Estcourt LJ, **Stokes EA**, Llewelyn CA, Murphy MF, Wood EM, Stanworth SJ for the TOPPS study investigators. *Prophylactic platelet transfusions in patients with blood malignancies: cost analysis of a randomized trial*. Transfusion (in press).

Murray DW, Maclennan GS, Breeman S, **Dakin HA**, Johnston L, Campbell MK, **Gray AM**, Fiddian N, Fitzpatrick R, Morris RW, and Grant AM (2014). *A randomised controlled trial of the clinical effectiveness and cost-effectiveness of different knee prostheses: the Knee Arthroplasty Trial (KAT)*. Health Technol Assess, 18(19):1-236.

Groothuis-Oudshoorn CG, **Fermont JM**, van Til JA, and Ijzerman MJ (2014). *Public stated preferences and predicted uptake for genome-based colorectal cancer screening*. BMC Med Inform Decis Mak, 14(1):18.

Rogers CA, Welbourn R, Byrne J, Donovan JL, Reeves BC, **Wordsworth S**, Andrews R, Thompson JL, Roderick P, Mahon D, Noble H, Kelly J, Mazza G, Pike K, Paramasivan S, Blencowe N, Perkins M, Porter T, Blazeby JM. *The By-Band study: gastric bypass or adjustable gastric band surgery to treat morbid obesity: study protocol for a multi-centre randomised controlled trial with an internal pilot phase*. Trials. 2014 Feb 11;15:53.

Walker R, Marshall M, **Morton RL**, MacFarlane P, Howard K. *The cost effectiveness of contemporary home haemodialysis modalities compared to facility haemodialysis: A systematic review of full economic evaluations*. Nephrology. (2014).

HERC

Health Economics Research Centre
Nuffield Department of Population Health, University of Oxford
Old Road Campus, Headington, Oxford OX3 7LF UK
tel: +44 (0) 1865 289272/3
email: herc@dph.ox.ac.uk

To receive this newsletter quarterly email **herc@dph.ox.ac.uk**

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