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“...cancer costs the EU
€124 billion annually”

HERC research into the economic burden of cancer in the European Union makes news

Project team: Alastair Gray, José Leal, Ramón Luengo-Fernández

HERC made the news headlines in November 2012 when our work on the economic burden of cancer in the EU was covered by several international and national newspapers and news outlets. This work (carried out in collaboration with Professor Richard Sullivan at King's College London) showed that cancer costs the EU €124 billion annually, highlighting the significant impact of cancer on both European healthcare systems and society as a whole.

After cardiovascular disease, cancers are the main cause of death in Europe (1.7 million deaths annually) and have a considerable cost to society. The impact of cancer goes beyond the healthcare sector: some patients will stop working either temporarily or permanently, and many will have to rely on friends and family for unpaid support and care.

HERC researchers estimated the cost of cancer and the proportion of total cancer costs due to lung, colorectal, breast and prostate cancer for the 27 EU countries in 2009. Costs included healthcare costs, informal care costs by family and friends and lost earnings due to

absence from work and premature mortality. The same methodological approach was used across all countries with costs being estimated by identifying the annual volume of resources associated with cancer and their respective unit costs.

Healthcare accounted for 39% (€98 per EU citizen) of the €124 billion that cancer costs the EU each year and 4% of total EU healthcare expenditure was for cancer. Lost earnings due to premature mortality and absence from work represented 34% and 8% of total costs, respectively, while unpaid care accounted for the remaining 19%. Lung cancer represented 15% of the overall cancer costs, followed by breast cancer (12%), colorectal cancer (10%), and prostate cancer (6%). 'Cost of illness' studies such as this highlight the significant impact of cancer on healthcare systems and societies, and may inform the prioritisation of EU public research funds towards areas with the greatest expected returns.

Project information here: **HERC**

Hospital care costs after transient ischaemic attack and stroke

Project team: Ramón Luengo-Fernández, 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 UK hospital care costs following transient ischaemic attack (TIA) or stroke. Stroke is a leading cause of death worldwide and a principal cause of hospital and care-home use. TIAs are a strong risk factor for subsequent stroke and also require treatment and diagnostic testing. However, there are currently little data on the long-term costs of stroke or TIA.

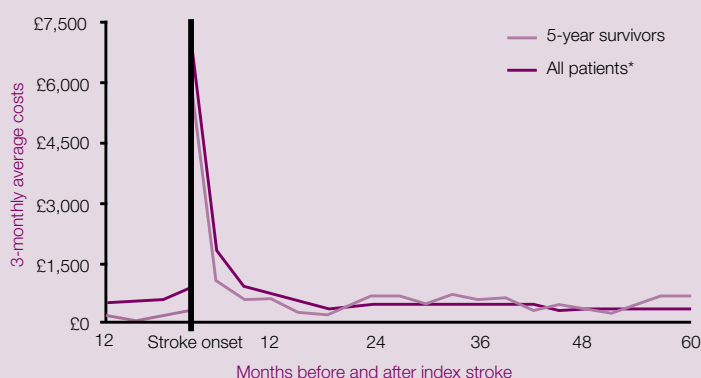
Population-based studies (which include minor events not admitted to the hospital and strokes resulting in death before hospital admission) are required to reliably determine such costs. This project, which was published in *Stroke* and funded by an ESRC/MRC/NIHR early career fellowship in the economics of health, used data from a UK population-based study (OXVASC) to estimate five-year hospital care costs after any first incident or recurrent TIA or stroke.

This study included 485 TIA and 729 stroke patients. Mean five-year hospital costs after stroke were £16,474 per patient (£13,526 after minor stroke, £21,196 after moderate stroke, and £18,273 after severe stroke). For the 239 patients who survived five years after stroke, mean costs were £15,601, with over half of costs (£8,302) being incurred in the first year after the event. After the first TIA occurring during the study period, the mean five-year costs were £11,578 (see figure). Although long-term hospital costs after TIA and stroke are considerable, this study showed that they are mainly incurred over the year following the first incident event. This work is part of a longstanding collaboration with Professor

“ Although long-term hospital costs after TIA and stroke are considerable, this study showed that they are mainly incurred over the year following the first incident event ”

Rothwell's team. Ongoing work includes evaluating long-term disability, institutionalisation and quality of life amongst stroke and TIA survivors.

Costs after first stroke occurring during the study period



Project information here: **HERC**

Database of mapping algorithms

Helen Dakin

Results of a systematic review of studies mapping to EQ-5D from other patient-reported outcome measures or clinical instruments are now publicly available from the HERC downloads page.

Helen Dakin has reviewed the literature to identify all studies developing new algorithms to predict EQ-5D utilities from other measures, which other researchers can use to estimate utilities for economic evaluation or health technology assessment, identify best practice in mapping studies and to identify or prevent duplicate publication.

The review identified 75 studies mapping to EQ-5D, of which 20 were published in 2012. The studies evaluated a wide range of model types and predicted EQ-5D utilities from a variety of other outcome measures, including the Health Assessment Questionnaire (HAQ) and the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30).

A journal article summarising the methods and results of the literature review will follow. The database currently presents the citation details and the source and target instruments that are mapped in each study, although more fields will

	Citation details	Quality of life measures		Related papers and resources
		From (source)	To (target)	
13	Gay A. M., Rivero-Arias O., Clarke P. M. (2006) Estimating the association between SF-12 responses and EQ-5D utility values by response mapping. <i>Med Decis Making</i> . 26 (1), 18-29.	SF-12	EQ-5D	Tool to estimate predicted utilities available at http://www.herc.ox.ac.uk/downloads/trupp_public172a2c5d . Early version presented at HESG. Validated by Poole (Poole, CD et al. (2009) <i>Br J Dermatol</i> . 161, 1335-40) and Rowen (Rowen, D et al. (2009) <i>Health Qual Life Outcomes</i> . 7, 27).
55	Gu N. Y., Botteman M. F., Ji X., Bell C. F., Carter J. A., van Hout B. (2011). Mapping of the Insomnia Severity Index and other sleep measures to EuroQol EQ-5D health state utilities. <i>Health Qual Life Outcomes</i> . 9, 119.	Insomnia Severity Index (ISI)	EQ-5D	
56	Gu N. Y., Bell C., Botteman M. F., Ji X., Carter J. A., van Hout B. (2012). Estimating preference-based EQ-5D health state utilities or item responses from neuropathic pain scores. <i>Patient</i> . 5 (3), 195-97.	11-point pain intensity numerical rating scale (PINSIS-11)	EQ-5D	Preliminary version presented as a poster at EuroQol plenary.
57	Haxton A., Green C., Telford C. J., Wright D. E., Zajack J. P. (2011) The use of multiple sclerosis condition-specific measures to inform health policy decision-making: mapping from the MSWS-12 to the EQ-5D. <i>Multi-Scler</i> . 18 (8), 853-61.	Multiple Sclerosis Walking Scale (MSWS-12)	EQ-5D	
58	Haxton A., Green C., Telford C., Zajack J., Wright D. (2012). Using the Multiple Sclerosis Impact Scale to Estimate Health State Utility Values: Mapping from the MSIS-29, Version 2, to the EQ-5D and the SF-6D. <i>Value Health</i> . 15 (8), 1084-91.	29-item Multiple Sclerosis Impact Scale (MSIS-29)	EQ-5D SF-6D	Previously presented at HESG
59	Hernandez Alava M., Wallon A. J., Ara R. (2012). Tails from the peak (abstract): adjusted limited dependent variable mixture models of EQ-5D questionnaire health state utility values. <i>Value Health</i> . 15 (3), 550-51.	Health assessment questionnaire - disability index (HAQ-DI)	EQ-5D	Pre-publication version including appendix giving methods for calculating predictions available at http://www.sheffield.ac.uk/colocoolv_fa112153541/1

be added to the database when this article becomes available, including the sample size and types of models explored. The database will be updated regularly as new studies are published.

Project information here: **HERC**

Our Summer Placements in Oxford

Two students from York visited us to research their MSc dissertations during July-September 2012

Missing data in EQ-5D: should we impute individual domains or the actual index?

Project team: Claire Simons, Oliver Rivero Arias, Judit Simon, Ly-Mee Yu



Claire writes: I was fortunate to undertake a placement at HERC under the supervision of Oliver Rivero Arias and Judit Simon from HERC, along with Ly-Mee Yu from the Centre for Evidence Based Medicine at the University of Oxford. My project aimed to evaluate whether there were

any advantages in imputing the EQ-5D-3L domains (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) compared with imputing the EQ-5D-3L index when missing patient-level data was available.

The project applied patient-level data from a cohort of patients in a large multinational RCT, the ISAT trial, who had complete EQ-5D data. First, we used bootstrapped samples of the original data and artificially imposed missing data in patterns that reflected established examples of real-life missingness. Then we carried out multiple imputation separately at domain and index levels. We examined the impact of different proportions of missing data (between 5% and 40%) and varying amounts of unit non-response and found no significant advantage in imputing the EQ-5D domains. Overall, the study showed that imputing the EQ-5D-3L index (rather than responses) is preferable due to its much reduced computational complexity and its superior fit when the proportion of missing data is lower than 40%.

During the placement, I was fully integrated into life at HERC and am very grateful for all the help, assistance and supervision given to me, not only by my supervisors but also other members of HERC. I am also pleased to say that the resulting dissertation was awarded a distinction and a publication is on the way.

B-AHEAD Breast – Activity and Health Eating After Diagnosis

Project team: Eleonora Lovato, Jane Wolstenholme, Helen Campbell

Eleonora writes: I had the opportunity to carry out my MSc dissertation at HERC under the supervision of Helen Campbell and Jane Wolstenholme. I worked on the B-AHEAD project, which was a trial-based economic evaluation of three weight control interventions for early stage breast cancer patients.



Previous data show that 60% of early breast cancer patients are overweight at diagnosis and 75% gain weight in the first year of treatment. As emerging evidence suggests that weight gain may increase rates of recurrence and mortality from co-morbid conditions, the B-AHEAD trial was set up to identify acceptable and cost-effective methods to control weight gain following diagnosis.

Three interventions for patients in their first year of adjuvant treatment were compared: 1) a healthy living booklet on diet and weight management (routine practice), 2) a 12-week home-based mail and telephone intervention and 3) a 12-week community-based diet and exercise programme.

We used the trial data to estimate and compare the costs, effects, and cost-effectiveness of the three interventions. I cleaned the trial data, obtained unit costs, imputed missing data and estimated costs and QALYs for each arm of the trial. Results showed the 12-week community-based exercise and diet programme, although more costly, did appear to be cost-effective when compared with the other two interventions. Work is planned to extrapolate trial results beyond one year.

I am thankful for the opportunity that HERC gave me and for the kindness and helpfulness of my supervisors and other people in HERC. On completion of my MSc placement I was offered a position as a research assistant at Brunel University; I'm sure that the excellent learning experience provided in Oxford contributed to my success.

Project information here: **HERC**

Spotlight on WEI HAN



I am a relatively new employee but a familiar face to HERC. I joined HERC as a researcher in June 2012, having completed my PhD in Economics at DEFAP Graduate School of Public Economics, founded jointly by the Catholic University of Milan and University of Milano-Bicocca. However, I had already spent around 18 months at HERC as a visiting PhD student.

I am currently involved in the Ningxia Project, funded by the Gates Foundation, which is conducting large-scale social experiments in rural China to test various interventions aiming to re-align health system incentives. Professor Winnie Yip heads the Oxford team on the Ningxia Project and several of my HERC colleagues are also working on it.

My primary responsibility is managing and analysing a three-wave longitudinal household survey dataset collected from the field. Currently, my research is two-fold: evaluating the impact of both demand and supply side interventions on improving health care utilisation of people with suspected TB; and modelling the impact of perceived service quality on the choice of health care provider.

It is my pleasure to start my academic career here. Not only does it allow me to further develop technical expertise on policy evaluation, which I am interested in, but also it provides me with a great opportunity to get involved in the whole process of evidence-based health policy research in developing countries, which I would like to specialise in.

Staff News

We welcome five new members of staff who have joined HERC in the last 3 months



Seamus Kent

Seamus joined HERC in November 2012 from Glasgow University. He is using the HPS2-THRIVE study to consider the cost and quality of life implications of cardiovascular and other serious adverse events.



Jacqueline Murphy

Jacqui joined HERC in November 2012 from HERON Health. She is working on economic evaluation in primary care, blood transfusion services and a shoulder surgery trial. She has an MMath degree from Durham (2010).



Laurence Roope

Laurence joined HERC in January 2013, after completing a PhD in Economics at the University of Manchester. Laurence's research interests are in the areas of income distribution and welfare economics. At HERC he is engaged in research associated with Sen's capabilities approach to welfare economics.



Danielle Bargo

Danielle joined HERC in January 2013. She is working on the ARCHIE project (see Recently Funded) and the cost-effectiveness of massive blood transfusions. She has a BA from Butler University and an MSc in Social Policy (Health Economics Concentration) from LSE.



Jilles Fermont

Jilles joined HERC in January 2013 from the MIRA institute for Biomedical Technology and Technical Medicine, and is working on the health economics of genetic and genomic technologies. He has an MSc in Health Sciences, from the University of Twente.

HERC Seminars

Convenor: Jingky Lozano-Kühne

HERC runs a series of seminars through the year with invited speakers from the health economics community who talk on a wide range of applied and methodological topics. In October-December 2012 we welcomed **Jeff Round** from UCL who spoke on *Is a QALY still a QALY at the end of life?* and **Dr Mylene Lagarde**, Lecturer in Health Economics, London School of Hygiene and Tropical Medicine, on *Do altruistic individuals choose rural jobs? Evidence from nurses in South Africa*.

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

Presentations by members of HERC

European Society of Medical Oncology (ESMO) Congress

Vienna, September-October 2012
Luengo-Fernandez R, Leal, J, Gray, AM, Sullivan R
Economic burden of malignant neoplasms in the European Union

8th National Cancer Research Institute Cancer Conference

Liverpool, November 2012
Leal J, Luengo-Fernandez R, Gray AM, Sullivan R
The economic burden of cancer across the European Union

Health Economists' Study Group (HESG)

Exeter, January 2013
Helen A Dakin, Alastair M Gray, Graeme S MacLennan, Richard W Morris, David W Murray
Independence, interactions and inference in partial factorial trials

MRC Hubs for Trials Methodology Research Annual Meeting

Oxford, February 2013
Claire Simons, Iryna Schlackow, Bobby Mihaylova
Review of methods to study heterogeneity & to extrapolate in clinical trial-driven cost effectiveness analysis

Workshop

Methods for Extrapolation from Clinical Trials Data to Inform Economic Evaluation

Oxford, January 2013
 A one-day event organised by Bobby Mihaylova and Alastair Gray (HERC, University of Oxford), Nicky Welton (University of Bristol) and Chris Jackson and Linda Sharples (MRC Biostatistics Unit, Cambridge). A report will appear in our May newsletter.

Recently Funded

Finding clinical negligence cases: access to justice at reasonable cost?

Led by Alastair Gray in collaboration with Prof Paul Fenn at University of Nottingham Business School and Prof Neil Rickman at University of Surrey, and funded by the Nuffield Foundation

Blood Transfusion: Do enhanced audit and feedback interventions increase the uptake of evidence-based transfusion practice?

NIHR Programme Grant for Applied Research. Economic analysis led by Helen Campbell

Early antibiotics use in 'at risk' children with influenza in primary care (ARCHIE)

HTA Programme Grant with Prof Anthony Harnden, Dept of Primary Health Care Sciences Oxford. Economic analysis led by Jane Wolstenholme

A pilot randomized controlled trial of a nurse-led psycho-educational intervention delivered in primary care to prostate cancer survivors (PROSPECTIV)

Jane Wolstenholme with Prof Eila Watson, School of Health and Social Care, Oxford Brookes University, funded by Prostate Cancer Charity

Do oral corticosteroids provide clinical and cost-effective symptom relief for sore throat? A double blind randomized placebo-controlled trial. Treatment Options without Antibiotics for Sore Throat (TOAST)

National School for Primary Care Research grant with Dr Gail Hayward. Economic analysis led by Jane Wolstenholme

Monitoring chronic kidney disease and heart failure in primary care

NIHR Programme Grant for Applied Research with Dept Primary Health Care Sciences Oxford. Economics led by Oliver Rivero Arias

Recent Publications

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

Dakin, H and Wordsworth, S (2013). Cost-minimisation analysis versus cost-effectiveness analysis, revisited. *Health Econ*, 22(1):22-34.

Asukai, Y, Baldwin, M, Fonseca, T, Gray, A, Mungapen, L, and Price, D (2013). Improving Clinical Reality in Chronic Obstructive Pulmonary Disease Economic Modelling: Development and Validation of a Micro-Simulation Approach. *Pharmacoeconomics*. [E-Pub Jan 13]

Luengo-Fernandez, R, Gray, AM, Rothwell, PM, on behalf of the Oxford Vascular Study, (2012). A Population-Based Study of Hospital Care Costs During 5 Years After Transient Ischemic Attack and Stroke. *Stroke*, 43(12):3343-3351.

Health Economics Research Centre
 Department of Public Health, University of Oxford
 Old Road Campus, Headington, Oxford OX3 7LF UK
 tel: +44 (0) 1865 289272/3
 fax: +44 (0) 1865 289271
 email: herc@dph.ox.ac.uk

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



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