Health Economics Research Centre

HERC news

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Issue 18 February 2017

Surgical management of rotator cuff tears: improving the evidence base

Project team: Jacqueline Murphy, Alastair Gray and the UKUFF trial team

HERC researchers have recently completed a five-year study which aimed to generate better clinical and health economic evidence for shoulder surgery to repair rotator cuff tears. The work revealed that both available techniques (open and arthroscopic surgery) offer comparable clinical benefit in terms of shoulder functionality and quality of life improvement, and are associated with similar economic outcomes for the NHS after surgery.

The rotator cuff is a group of muscles and tendons in the shoulder that control movement, and degenerative tears of the tendons are common in those aged over 50 years. These tears can be repaired surgically, using either arthroscopic ("keyhole") techniques or traditional "open" surgery, where the joint is accessed through a larger incision in the skin. There is uncertainty around which is the best technique because reliable evidence of the comparative health and cost outcomes associated with these techniques is limited.

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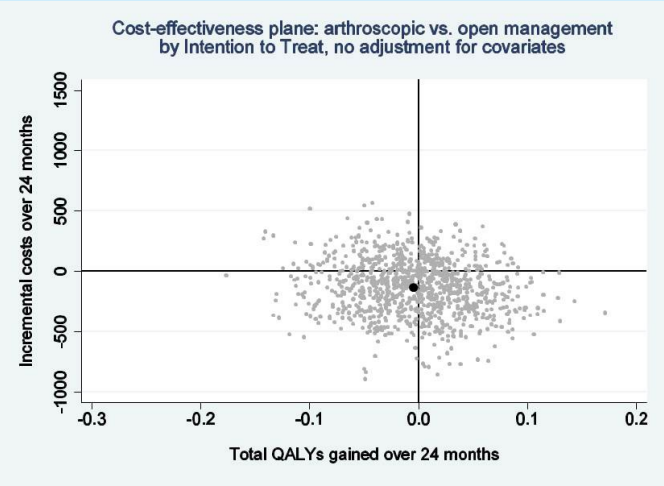
In the United Kingdom Rotator Cuff Trial (UKUFF), funded by the NIHR HTA Programme, 273 patients aged over 50 years were randomised to open or arthroscopic repair and followed up over 24 months. Despite the use of preoperative imaging, it is often only possible to determine whether a surgical intervention will be possible or not (for example, if the tear is too large) once surgery has begun. For this reason, the results were analysed according to the randomised groups, i.e. by intention-to-treat.

HERC researchers carried out an economic evaluation alongside the trial. We observed surgical procedures to produce a micro-costing of surgery, and used information from study questionnaires to assess NHS resource use during follow-up. We found that there was no difference between the randomised groups in terms of costs or quality of life, either for initial hospitalisation or during follow-up **(see Figure)**. There was also insufficient evidence that one surgical management choice was more cost-effective than the other.

These results aligned with the main trial outcomes reported by colleagues at the Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (University of Oxford), and the Health Services Research Unit (University of Aberdeen). The trial results showed no difference in clinical outcomes, measured using the Oxford Shoulder Score, over the course of follow-up, although both groups did demonstrate an improvement after surgery.

The results of the trial suggest that when making a choice between open and arthroscopic rotator cuff repair, surgeons and patients can be reassured that both repair procedures offer comparable benefit, and have similar overall cost-effectiveness up to two years following surgery.



These results have just been published as both a NIHR HTA report and in *The Bone and Joint Journal*. A Continuing Medical Education (CME) training module for orthopaedic surgeons based on the HERC publication is available on *The Bone and Joint Journal* website until April 2018.

For more information: HERC

> “There was insufficient evidence that one surgical management choice was more cost-effective than the other”

High street optometrists and age-related macular degeneration monitoring

Project team: Mara Violato, Helen Dakin, Sarah Wordsworth and the ECHoES trial team

Neovascular age-related macular degeneration (nAMD) is a common disorder of the ageing eye and may cause severe sight loss and blindness. After treatment with anti-VEGF therapy, patients are currently monitored regularly at the hospital eye service (HES) in case the disease reactivates, at which point further treatment is needed. Monitoring at the HES is burdensome to patients, their carers and the NHS.

The ECHoES trial was conducted jointly by the Universities of Bristol, Queen’s Belfast and Oxford, and was funded by the NIHR HTA programme (ref 11/129/195). The trial investigated whether high-street optometrists, after appropriate training, can make decisions about disease reactivation that are as accurate as those of hospital-based ophthalmologists, and whether a shared care delivery model between hospital ophthalmologists and community optometrists is cost-effective.

Forty-eight high-street optometrists with no prior experience of retina clinics and 48 ophthalmologists with prior experience were given the same short training. They were then asked to assess 42 real-life vignettes through a virtual internet-based application to establish whether the disease had reactivated or not. Their answers were compared with those of three medical retina experts, who acted as the reference standard. Resource use and cost information were then applied to these reactivation/retreatment decisions.

In the base-case analysis, the differences in mean cost per assessment (£14; £411 for community optometrists and £397 for hospital-based ophthalmologists) and the percentage of correct disease assessments (1%; 84% for optometrists and 85% for ophthalmologists) were not statistically significant. While the base-case analysis nominally favoured hospital-based ophthalmologist services, sensitivity analyses reflecting different practices across eye hospitals suggested that a shared delivery model involving monitoring by community optometrists could be cost-effective for some hospitals/regions. If delivered efficiently, shared care with community optometrists is a promising strategy to meet the challenge of a shortage of ophthalmologists in the HES.

For more information: HERC

Improving access to malaria treatment in rural communities in Africa

Project lead: Borislava Mihaylova

A high burden of malaria persists in many areas of Africa, with timely access to malaria diagnosis and treatment crucial for complete recovery and avoidance of disability and mortality. Increased efforts are, however, needed to improve access to effective care in the typically rural and remote areas of increased malaria incidence. A large study, carried out in 172 villages in Burkina Faso, Nigeria, and Uganda between 2009 and 2015, investigated the feasibility of training and using Community Health Worker (CHW) volunteers to provide rapid malaria diagnosis, oral artemisinin combination therapy and rectal artesunate treatment for children in their communities. The detailed results of this study were published as a supplement in Clinical and Infectious Diseases in December 2016.

HERC Associate Professor Boby Mihaylova collaborated with Joelle Castellani (a PhD-candidate at Maastricht University), Dr Melba Gomes (World Health Organisation), other researchers from WHO and Maastricht University, and local collaborators in Burkina Faso, Nigeria, and Uganda, to evaluate the time that CHWs spent providing health care and the impact of this increased access to care in the community on private household costs. The study found that CHWs provided healthcare for an average of 60 to 80 minutes daily with the total contributed time over a year valued at US Dollars (USD) $52 in Burkina Faso, USD $295 in Nigeria and USD $141 in Uganda. Furthermore, the improved access to care in the study more than halved private household costs per illness episode in each country. Using the most recent population figures for each study district, the intervention was estimated to have saved households a total of USD $29,965, USD $254,268, and USD $303,467, respectively, in the study districts in Burkina Faso, Nigeria, and Uganda.

These results indicate that CHW-based provision of care is a feasible, effective and efficient way to improve malaria management in high burden rural communities. However, the CHWs in this study were volunteers, and it is likely that an effective reward system is needed for sustainable community care provision.

For more information: HERC

Cholesterol- and blood-pressure-lowering medications underused for secondary cardiovascular prevention in Europe

Project team: Borislava Mihaylova, Alastair Gray

HERC researchers have previously contributed to the literature on the effectiveness and cost-effectiveness of cholesterol- and blood pressure-lowering medications in a wide range of people at increased cardiovascular disease risk. However, in a recent study carried out in collaboration with Dmitrij Achelrod from the Hamburg Center for Health Economics, and David Preiss from the Nuffield Department of Population Health at the University of Oxford, we find that these drugs are still substantially underused across Europe.

The study, published in the European Journal of Preventive Cardiology, used data from a large longitudinal cohort study in middle-aged and older Europeans (the Survey of Health, Ageing and Retirement in Europe) to investigate trends in cardiovascular drug use in people at high cardiovascular risk due to previous heart attack or stroke.

While cholesterol- and blood pressure-lowering treatment has been recommended for the vast majority of these participants throughout the study period, only 40% and 60% of them, respectively, reported using these medications at study entry, and cross-sectional rates increased only moderately (odds ratios of use in 2013 vs. 2004, 1.6 and 1.5, respectively) with larger increases in higher gross national income countries.

In a further panel data analysis among people who had ever used the medications, controlling for time-invariant patient characteristics, the use of both drug classes declined over time and with increasing duration from the latest acute cardiovascular event. Those who were obese, retired, with hypercholesterolaemia, hypertension, worse self-perceived health, or, in the case of lipid-lowering medication, with diabetes, were more likely to use these medications. Conversely, “healthier” secondary prevention participants were less likely to use such drugs. We conclude that physician- and patient-centred strategies are needed to strengthen use of effective preventive interventions and improve population health.

For more information: HERC

> “…among people who had ever used the medications…the use of both drug classes declined over time”

Cost-effectiveness of models of hip fracture care

Project team: José Leal, Alastair Gray

Hip fractures are a major public health problem, with high morbidity, mortality, and health and social care costs. Hip fractures usually occur as a result of a low-impact falls in individuals with underlying bone fragility due to osteoporosis. HERC researchers previously estimated that hip fractures account for £1.2 billion per year in UK primary and hospital care costs.

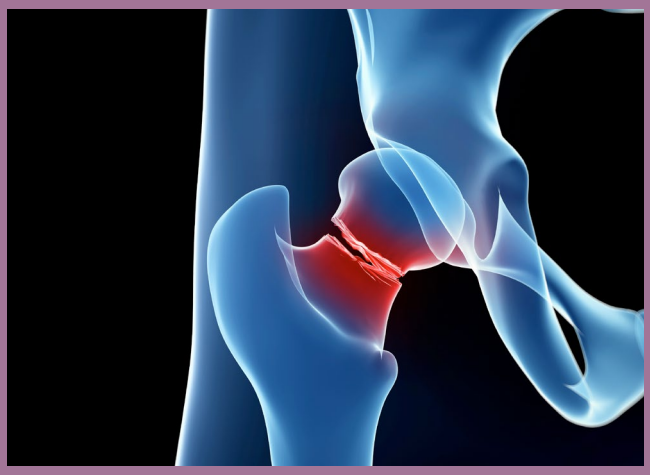
The recommended model of hip fracture management focuses on optimal recovery and secondary fracture prevention. However, clinical practice varies considerably across the NHS as robust evidence of effectiveness and cost-effectiveness is lacking for the different care models.

To address this uncertainty, we recently completed an economic evaluation to estimate the 'real-world' impact of different care models in the NHS in England. This was part of a larger mixed-methods project combining qualitative research with statistical and health economic analysis using large routinely collected datasets from primary and secondary care. The work was funded by the NIHR Health Services and Delivery Research Programme.

The economic evaluation utilised data from the Hospital Episode Statistics and Clinical Practice Research Database datasets, a systematic review of utility data, and a detailed evaluation of hospital hip fracture services in a UK region. A Markov model was then constructed to evaluate the lifetime costs and life expectancy of different models of care. The model structure was defined using an iterative process involving discussions with clinical experts and epidemiologists, and was supplemented by a literature review of economic models in this disease area.

We found that the introduction and/or expansion of orthogeriatric and nurse-led fracture liaison services was more effective and cost-effective than usual care, and was associated with reductions in mortality rates. However, the introduction of these services was not cost-saving relative to usual care as the benefits in terms of longevity translate into higher costs and re-fractures. We also noted the need for further research to reduce decision uncertainty, which would require clinical trials performing unbiased comparisons of the different care models.

For more information: HERC



> "The introduction of orthogeriatric and nurse-led fracture liaison services was not cost-saving relative to usual care"

Reforms at the Scottish Medicines Consortium: making better decisions for cancer drugs?

Project team: Liz Morrell (CASMI), Sarah Wordsworth

The Scottish Medicines Consortium's 2014 reforms aimed to increase patient access to new drugs for end-of-life and rare conditions. A key feature is the introduction of a Patient and Clinical Engagement (PACE) meeting, to identify any additional value not captured by QALYs. With other HTA agencies interested in the effectiveness of these reforms, HERC and the Centre for the Advancement of Sustainable Medical Innovation (CASMI) have recently collaborated to evaluate the new process and its access outcomes.

We found that the greatest impact of the reforms was in cancer. Reviewing all decisions since the reforms, we identified 38 cancer drugs that were at risk of rejection under the standard process, but with the new route, had gained some level of market access. Although this is probably an overestimate, the reforms appear to have achieved their aim of funding more new drugs.

But were these drugs value for money? The PACE meeting focuses on a new drug's additional benefits, implying that the comparator has no additional benefits that should also be given weight in the decision. This might be appropriate in some cases, but becomes problematic in areas of high innovation: last year's new drug becomes next year's comparator, when its unique non-QALY benefits are no longer discussed. The non-QALY benefits of the marginal displaced health are also ignored. So the PACE process risks bias in favour of "new" – a choice reflected in the name of its funding mechanism (the New Medicines Fund).

Analysis of the PACE discussions found that whilst some of the main themes are explicitly part of cost-effectiveness analysis (e.g. overall survival), some are not (e.g. effect on the family) and many are indirectly covered (e.g. severity, unmet need). Furthermore, the topics overlap with the ideas considered by NICE in 2010 for value-based pricing. It is perhaps reassuring that these preferences remain stable, and suggests that value-based pricing might need dusting off and reconsidering in order to consistently reflect these concerns in decision-making.

For more information: please contact **Liz Morrell** at **liz.morrell@casmi.org.uk**

Economic impact of early intervention in psychosis services

Project team: Apostolos Tsiachristas, José Leal

Psychosis is a common and severe mental illness with a large health and economic impact on societies worldwide. Early Intervention in Psychosis (EIP) services are community based multidisciplinary teams that seek to reduce duration of untreated psychosis and improve outcomes. Although the NHS in England has dedicated EIP services to treat first episode psychosis and NICE recommends their implementation, there is limited 'real world' evidence about these services.

HERC researchers recently completed a study in which they estimated the impact of EIP services on health and social outcomes and costs, based on a longitudinal retrospective observational study. This study provided health service utilisation and outcome data over a 3-year period for 4,104 people aged 16-35 with a diagnosis of psychosis who were treated by EIP or community mental health teams in England. Multiple imputation was performed to deal with missing data, with propensity score matching used to reduce confounding caused by differences in severity and socio-demographic characteristics between the treatment groups. Generalised estimating equations were fitted to estimate mean differences in costs, and generalised linear models were used to estimate differences in the likelihood of events such as becoming employed. Parameter uncertainty was captured using bootstrapping and scenario analyses considered the economic impact of widespread provision of EIP services.

Users of EIP services had significantly better social and functional outcomes compared with those using non-EIP services: they were 116% more likely to gain employment and 17% more likely to experience an improvement in emotional well-being. The mean annual NHS cost savings associated with EIP were £4,031 per patient, mainly driven by lower mental health inpatient costs. If all people with first episode psychosis across England were treated by EIP services, the savings in societal costs would be £63 million per year, of which £33 million would be NHS cost savings.

This study suggests that EIP services, as implemented in the healthcare system in England, are associated with better health and social outcomes, and reduced costs.

For more information: HERC

> "If all people with first episode psychosis across England were treated by EIP services, the savings in societal costs would be £63 million per year"

Spotlight on DAVID JONES

I joined HERC as a Researcher in October 2016. My current work focuses on the disease and economic modelling of non-alcoholic fatty liver disease, a rapidly emerging condition associated with obesity and metabolic syndrome. I will be working primarily alongside the RADIcAL trial which is funded by the EU Horizon 2020 programme. This randomised controlled trial will explore the impact of introducing multi parametric MRI for the diagnosis and staging of non-alcoholic fatty liver disease compared to current clinical practice across multiple centres in Europe.

My academic background is in Economics, receiving my Bachelor's Degree in the subject from the University of York. I continued at the University, completing a Master's Degree in Health Economics with support from a NIHR studentship. Prior to joining HERC I worked as a Health Economist Intern at The Global Fund in Geneva. My research estimated the effect of human rights interventions on the health and behaviour of marginal population groups in low and middle income countries. I also participated in a WHO conference on the development of official guidance to help countries, such as those introducing universal health care, build suitable HTA mechanisms to inform their healthcare decision making.

Despite being at HERC for a relatively short time, the centre has already provided me with excellent training opportunities and are very supportive of my development as a health economist. I am currently interested in the use of Bayesian methods for the evaluation of disease areas with limited data and knowledge of natural history, such as non-alcoholic fatty liver disease. I also remain interested in global health issues.

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

Staff News – Welcome to:

Brett Doble
Brett joined HERC in November 2016 after working at the Cambridge Centre for Health Services Research, University of Cambridge as a Research Associate in Health Economics. Brett received his PhD from the Centre for Health Economics, Monash University in Australia, where he assessed the economic impact of genomic medicine as part of Cancer 2015, a prospective, longitudinal, genomic cohort study. Brett's main work at HERC will involve an economic evaluation comparing different approaches to bariatric surgery for the treatment of severe obesity and assessing the impact of bleeding events on the cost-effectiveness of different antiplatelet regimens after coronary interventions.

Lok-Yin Cheng
Lok, an NHS junior doctor on a four-month rotation with HERC, is currently working with José Leal and Jacqui Murphy on a systematic review of hip and knee replacements.

Alexandra Roche
Alex, also an NHS junior doctor on a four-month rotation with HERC, is currently working with Filipa Landeiro and José Leal on a project looking at the impact of recent health care reforms on improving transfers of care between hospitals and the social care system.

Farewell to:

One of our Editorial Team… Barbara Kitchener. At the end of December 2016 we said a fond farewell to Barbara Kitchener who, for the last three years, held the position of Administrator and Assistant to Professors. As well as contributing greatly to the production of the newsletter, Barbara, was involved in a wide range of Unit activities from providing PA support to HERC's senior professors to costing grant applications for funding bids, and not least administering HERC's three day Applied Methods teaching course. Following a promotion, Barbara, has left HERC to take up a position within the Nuffield Department of Population Health's finance team. She was a valued member of HERC, a real pleasure to work with and will be missed by everybody. We wish her every happiness and success in the future.

HERC Seminars

Convenor: Apostolos Tsiachristas

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 December, **Lefteris Floros**, Health Economist, National Guideline Centre, Care Quality Improvement Dept. Royal College of Physicians, London visited us to give a talk on: *Cost-effectiveness modelling of the liver disease pathway.*

In January, **Diana Quirmbach**, Research Fellow in Health Economics at the London School of Hygiene and Tropical Medicine visited us to present her work: *What is the impact on alcohol purchases of increasing the price of sugary drinks?*

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 HERC

Presentations by members of HERC

'A decade of research: contributing to the evidence base for primary care' NIHR School for Primary Care Research, Wellcome Collection
London, November 2016
Richéal Burns
Assessing the economic impact of oral dexamethasone for symptom relief of sore throat: the TOAST study

Health Economics Research Unit (HERU), University of Aberdeen, External Seminar Programme
Aberdeen, December 2016
Peter Eibich
The effect of retirement on (health) behaviour.

Health Economists' Study Group (HESG) Winter 2017 Meeting, University of Birmingham
Birmingham, January 2017
Helen Dakin
Uncertainty within trial-based economic evaluations extrapolated using patient-level simulation models.

A number of HERC researchers presented at the annual Nuffield Department of Population Health, Medical Sciences Division, Annual Symposium, University of Oxford, Saïd Business School
Oxford, January 2017

5-by-5 Talks (5 slides in 5 minutes)
Seamus Kent
Hospital costs in relation to body mass index in 1.1 million middle- aged and elderly women in England.

Speed Geeking (10 minute small group presentations)
Borislava Mihaylova
Cholesterol-and-blood – pressure-lowering drug use for secondary cardiovascular prevention in 2004 – 2013 Europe

Elizabeth Stokes
Case report forms versus existing datasets: which is best for an economic assessment?

Peter Eibich
Retirement, intergenerational time transfers, and fertility

15 Minute Presentation
José Leal
Combining large datasets with service and qualitative evaluation to identify cost-effective models of care for hip fracture patients

Poster Presentations
Kusal Lokuge
A systematic review of procedural risks of carotid endarterectomy (CEA) and carotid artery stenting (CAS) in observational cohort studies: Have the risks changed?

Filipa Landeiro
Delayed hospital discharges and social isolation among elderly hip fracture patients in England.

Recent Publications

1. Achelrod D., **Gray A.**, Preiss D., **Mihaylova B.** (2016). *Cholesterol- and blood pressure-lowering drug use for secondary cardiovascular prevention in 2004 – 2013 Europe.* European Journal of Preventive Cardiology.

2. Bottomley N., Jones LD. et al. [includes **Rombach I.**] (2016). *A survival analysis of 1084 knees of the Oxford unicompartmental knee arthroplasty: a comparison between consultant and trainee surgeons.* Bone Joint J, 98-B, 22-27.

3. **Burns RM.**, Leal J. et al. [includes **Wolstenholme J.**] (2017) *The burden of healthcare costs associated with prostate cancer in Ireland.* GRHTA 2017; 4(1): e28 - e33.

4. Carr A., Cooper C. et al. [includes **Gray A.**, **Murphy J.**] (2017). *Effectiveness of open and arthroscopic rotator cuff repair (UKUFF): a randomised controlled trial.* Bone Joint J, 99-B, 107-115.

5. Castellani J., **Mihaylova B.** et al. (2016) *Quantifying and Valuing Community Health Worker Time in Improving Access to Malaria Diagnosis and Treatment.* Clin Infect Dis 2016;63:S298-S305.

6. Castellani J., Nsungwa-Sabiiti J., et al. [includes **Mihaylova B.**] (2016) *Impact of Improving Community-Based Access to Malaria Diagnosis and Treatment on Household Costs.* Clin Infect Dis 2016;63:S256-S263.

7. Esan O., Pearce M. et al. [includes **Violato M.**] (2017). *Factors Associated with Sequelae of Campylobacter and Non-typhoidal Salmonella Infections: A Systematic Review.* EBioMedicine. 15, 100-111.

8. Hawley S., **Leal J.** et al. (2016) *Anti-Osteoporosis Medication Prescriptions and Incidence of Subsequent Fracture Among Primary Hip Fracture Patients in England and Wales: An Interrupted Time-Series Analysis.* J Bone Miner Res. 2016 Nov;31(11):2008-2015. doi: 10.1002/jbmr.2882.

9. Herrington WG., Emberson J. et al. [includes **Mihaylova B.**] (2016). *Are statins useful in patients with advanced chronic kidney disease? - Authors' reply.* The Lancet Diabetes & Endocrinology. Dec 2016 (4); 12, 971–972. http://dx.doi.org/10.1016/S2213-8587(16)30266-2.

10. Judge AD., Javaid MK. et al. [includes **Leal J.**, **Gray A.**] (2016). *Models of care for the delivery of secondary fracture prevention after hip fracture: a health service cost, clinical outcomes and cost-effectiveness study within a region of England 2016)*, Health Services and Delivery Research, Volume: 4, Issue: 28.

11. Kitchener HC., Gittins M. et al. [includes **Tsiachristas A.**, **Gray A.**] (2016). *A cluster randomised trial of strategies to increase cervical screening uptake at first invitation (STRATEGIC).* Health Technol Assess 2016; 20(68).

12. **Leal J.**, **Gray A.** et al. (2017) *Cost-Effectiveness of Orthogeriatric and Fracture Liaison Service Models of Care for Hip Fracture Patients: A Population-Based Study.* J Bone Miner Res. 2017 Feb;32(2):203-211. doi: 10.1002/jbmr.2995.

13. **Leal J.**, Ahrabian D. et al. [including **Gray A.**] (2017) *Cost-effectiveness of a pragmatic structured education intervention for the prevention of type 2 diabetes: economic evaluation of data from the Let's Prevent Diabetes cluster-randomised controlled trial.* BMJ Open. 2017 Jan 9;7(1):e013592. doi: 10.1136/bmjopen-2016-013592.

14. Mills MC., Barban N. et al. [includes **Eibich P.**] (2016). *Genome-wide analysis identifies 12 loci influencing human reproductive behavior.* Nature Genetics 48;1462–1472.

15. **Murphy JFE.**, **Gray A.** et al. (2016). *Costs, quality of life and cost-effectiveness of open and arthroscopic repair for rotator cuff tears: economic evaluation alongside the UKUFF trial.* Bone and Joint Journal.

16. Reeves BC., Scott LJ. et al. [includes **Wordsworth S.**, **Violato M.**, **Dakin H.**] (2016). *The Effectiveness, cost-effectiveness and acceptability of Community versus Hospital Eye Service follow-up for patients with neovascular age-related macular degeneration with quiescent disease (ECHoES): a virtual randomised balanced incomplete block trial.* Health Technol Assess 2016; 20(80).

17. **Rouyard T**, **Kent S.** et al. [including Leal J., Gray A.] *Perceptions of risks for diabetes-related complications in Type 2 diabetes populations: a systematic review.* Diabet Med. 2016 Nov 16. doi: 10.1111/dme.13285.

18. Taylor J., Black S. et al. [includes **Stokes EA.**, **Wordsworth S.**] (2016). *Design and implementation of the AIRWAYS-2 trial: A multi-centre cluster randomised controlled trial of the clinical and cost effectiveness of the i-gel supraglottic airway device versus tracheal intubation in the initial airway management of out of hospital cardiacarrest.* Resuscitation, 109, 25-32.

19. **Tsiachristas A.** (2016). *Financial incentives to stimulate integration of care. International Journal of Integrated Care*, 16(4): 8, http://doi.org/10.5334/ijic.2532.

20. **Violato M.**, **Dakin H.** et al. [includes **Wordsworth S.**] (2016). *The costeffectiveness of community versus hospital eye service follow-up for patients with quiescent treated age-related macular degeneration alongside the ECHoES randomised trial.* BMJ Open, 2016; 6: e011121 doi: 10.1136/bmjopen-2016-011121.

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