# HESG SUMMER 2021 MEETING ABSTRACT BOOKLET

# UNIVERSITY OF CAMBRIDGE JUNE 30TH – JULY 2ND

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| **HESG ID#** | **2156** |
| First author | Caterina Alacevich |
| Affiliations | University of Oxford, Nuffield Department of Primary Care Health Sciences |
| Title | COVID-19, Health-related Quality of Life, and Mental Health |
| Key words | COVID-19, Mental Health, HRQoL, anxiety, depression |
| Abstract | Objective<br>A large number of studies have reported that mental wellbeing in the general population significantly worsened during the COVID-19 pandemic. The association between experiences of symptomatic episodes of COVID-19 and health-related quality of life and mental wellbeing is, in contrast, less well documented. The goal of this study was to analyse the relationship between ongoing and past COVID-19 illness and validated metrics of health-related quality of life and mental health (anxiety and depression).<br>Methods<br>The study relied on primary data from a large online survey and symptoms surveillance tool (N=53,412) collected in the UK between April and December 2020. COVID-19-related ill health definitions built on information on reported symptoms, subjective health assessment, and test results. Analyses of health-related quality of life outcomes (based on the EQ 5D-5L index and visual analogue scores), depression (PHQ-9), and anxiety (GAD-7) outcomes by COVID-19-related illness state were based on multivariable regressions, controlling for respondents' demographic and socioeconomic characteristics, comorbidities, pre-existing risky health conditions, national and local social isolation measures, as well as regional and time fixed effects.<br>Findings<br>The results showed that ongoing experiences of COVID-19 illness were associated with statistically significant increases in the probability of reporting moderate or higher levels of anxiety (+14.5 percentage points) and depression (+28.7 percentage points), and a reduction in the utility scale (-15.1), with respect to never-affected respondents. The findings are robust to sensitivity checks based on restricting the sample to test-based illness definitions. Further, respondents that experienced symptomatic illness episodes in the past reported an increased probability of reporting moderate or higher levels of anxiety and depression (+1.6 and + 3.4 percentage points, respectively), even after recovery.<br>Conclusions<br>Self-assessed, symptomatic, and test-defined COVID-19 ill health is associated with deteriorations of health-related quality of life and mental health. Anxiety and depression remain significantly higher among respondents with past episodes of COVID-19 illness after self-assessed health and physical health recover. The findings of this study highlight the need to implement measures to support mental health during and after COVID-19 illness episodes, to countervail the adverse consequences of the pandemic on mental wellbeing. |

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| **HESG ID#** | **2101** |
| First author | Majed Almutairi |
| Affiliations | Queen's University Belfast |
| Title | Satisfaction with publicly funded primary care services in Britain 1998-2018 |
| Key words | Dental, Satisfaction, Primary care |
| Abstract | Background<br>Changes to reimbursement arrangements for publicly funded dentistry between Scotland and the rest of Britain, combined with the economic shock that followed the financial crisis of 2008 had the potential to affect access to publicly funded dentistry and through it, satisfaction with publicly funded dentistry across Britain. In this paper we compare changes in client satisfaction over 21 years between Scotland and other parts of Britain and relate this to changes in reimbursement arrangements and the broader economic climate.<br><br>Methods<br>We use data on respondent satisfaction and socio-demographic characteristics taken from successive British Social Attitudes Surveys between 1998 and 2018. We exploit a change in reimbursement arrangements in England and Wales relative to those in Scotland and the economic downturn following the financial crisis in 2008 to create natural experiments. Logistic regression analysis with a time trend is used to compare satisfaction between Scotland and the rest of Britain controlling for a range of socio-demographic characteristics.<br><br>Results<br>Just over 35,500 responses with complete data were extracted from the surveys. On average 71% of respondents were satisfied or very satisfied with NHS dental services, the average age of the sample was 48.73 years, 17.89% had a degree or above, 56.16% were married and 32.85% had children living at home. Controlling for other variables, satisfaction in Scotland was higher than that in England/Wales throughout the 20 years. Relative satisfaction diverged between 2005 and 2009 and converged between 2010 and 2018 such that significant differences evident in earlier periods were eradicated by 2012.<br><br>Conclusion<br>Satisfaction with NHS dental services in England/Wales largely tracked that in Scotland diverging slightly in immediate prelude to and aftermath of a change in reimbursement arrangements in England/Wales. Changes in relative satisfaction were though dominated by the financial crisis with differences that preceded the introduction of new reimbursement arrangements in England and Wales being eradicated in the wake of the financial crisis. The results are consistent with the target income hypothesis; the attractiveness of public relative to privately funded dentistry will reflect the administrative and opportunity cost of publicly funded care. As these changed so too may access and with it client satisfaction. |

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| **HESG ID#** | **2072** |
| First author | Melanie Antunes |
| Affiliations | Health Economics Research Unit, Institute of Applied Health Sciences, University of Aberdeen, UK |
| Title | Selecting attributes and levels to design a Discrete Choice Experiment that allows the comparison of public and patients' preferences: a case study using Social Prescribing |
| Key words | Discrete choice experiment, Attribute development, Preferences, Social prescribing |
| Abstract | Background: There is an ongoing debate around which perspective to use when eliciting preferences for healthcare. Patient preferences should be used to design a person-centred service. It could be argued that public preferences should be used for resource allocation decisions as the public pays for healthcare. It is thus important to better understand differences in preferences between the public and patients. This paper will explore this issue in the context of Social Prescribing (SP). SP aims to address the social determinants of poor health by allowing health professionals to prescribe non-medical services to patients. SP is a complex intervention with benefits beyond health. Outcomes valued by patients and the public may thus differ. This means that the choice of perspective may matter. This study uses qualitative interviews with three groups (the public, patients with anxiety/depression, and patients with chronic pain) to explore the feasibility of developing a single Discrete Choice Experiment (DCE), to compare public and patients' preferences for SP. The choice of relevant attributes may vary and this would have implications on the DCE design and the comparability of preferences. It will also demonstrate the importance of using the same population to develop attributes and for the main DCE.<br><br>Methods: DCE is a stated preference method in which individuals are presented with hypothetical choices that vary in several attributes. Step 1 of designing a DCE study identifies appropriate attributes and levels. We designed a qualitative study and conducted 19 online semi-structured interviews with the public and two patient groups (anxiety/depression and chronic pain), to understand their views and preferences for SP. The data collected were analysed independently in the three groups to identify and develop attributes and levels. We aimed to both capture the specific attitudes of each group and to explore if it is possible to build one unified DCE to allow preference comparison.<br><br>Results: The analysis of the data collected is ongoing. Preliminary findings show both similarities and differences across groups. For example, both patient groups value a person-centred approach while confidentiality appears to be particularly important in the anxiety/depression group.<br><br>Conclusion: DCEs assume that the value of an intervention is based on the attributes of the intervention. However, the attributes that are important to people may vary between groups. The challenge is to select attributes for inclusion in a DCE to compare preference if the attributes that people value most within each group differ. |

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| **HESG ID#** | **2128** |
| First author | Nikita Arora |
| Affiliations | Faculty of Public Health and Policy, London School of Hygiene and Tropical Medicine |
| Title | Investigating the effect of motivation on stated job preferences of community health workers in Ethiopia using a hybrid choice model |
| Key words | Discrete Choice Experiment, Health worker, Hybrid Choice |
| Abstract | Introduction<br>It is believed that understanding the job preferences of health workers can help policymakers better align incentives and retain a motivated workforce in the public sector. However in discrete choice experiments (DCEs), perhaps surprisingly, one antecedent to health workers' job choices and behaviours that hasn't yet been incorporated, is their motivation to do the jobs. The simple inclusion of measures of motivation in the utility function underpinning a DCE can lead to endogeneity bias and measurement error. A Hybrid modelling approach is thus recommended when capturing latent characteristics like motivation. This paper is the first application of a hybrid choice model to measure the effect of multidimensional motivation on the job preferences of community health workers (CHWs).<br>Methods<br>We interviewed 202 CHWs in Ethiopia. Motivation was assessed quantitatively using a series of thirty questions, on a five-point Likert scale. Stated preferences for hypothetical jobs were captured using an unlabelled DCE. Each choice task in the DCE had three choices â€" two job alternatives comprising of differing levels of 6 attributes, and a status quo coded with only a constant. We first estimated a mixed multinomial logit (MMNL) model with random parameters as a base model. Then, to understand how motivation influences the job choices of CHWs, we estimated a hybrid choice model consisting of three, correlated latent variables identified by means of an exploratory factor analysis.<br>Results<br>The hybrid choice model provided additional behavioural insights into the preferences of CHWs, compared with the MMNL. CHWs who were likely to be intrinsically motivated and agreed to work in their role because they can help people, also strongly preferred 5 days of training, good facility quality, good health outcome and had strong disutility towards a higher than average salary. On the contrary, CHWs who seemed extrinsically motivated and said that they were likely to be motivated by the recognition they got from other people, strongly preferred a medium workload and had disutility attached to good facility quality, good health outcomes and good management.<br>Conclusion<br>We show a significant link between heterogeneity in preferences for hypothetical jobs and motivation, and that it is important to consider motivation as influencing health workers' job choices when modelling their preferences. Our results have implications for managers and can directly inform how respondents with different motivations can be attracted to different job profiles. |

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| **HESG ID#** | **2099** |
| First author | Ekaterina Bordea |
| Affiliations | University College London |
| Title | : Identifying Key Components of a Healthy and Positive Pregnancy and Birth |
| Key words | pregnancy, PROMs, attributes, online questionnaire |
| Abstract | Background. Patient Reported Outcome Measures are rarely used in evaluating maternal health services. The most common questionnaire used in economic evaluations, the EuroQol EQ-5D, does not reflect what is important to women during pregnancy, such as quality of care or the 2018 World Health Organisation recommendation on the importance of a positive childbirth experience.<br><br>Aims. Feasibility of identifying what women consider are the important attributes of a positive pregnancy and birth and asking them to rank them.<br><br>Methods. Women in the REACH Pregnancy Circles feasibility trial and who had recently given birth were asked to be involved in a patient and public involvement (PPI) session to identify what outcomes were important to them as part of pregnancy, birth and postnatal care. Based on the attributes a purposely designed questionnaire was built using a web-based survey tool Opinio. The online questionnaire was distributed to mailing groups and advertised on social media platforms. Best-worst scaling and a Balanced Incomplete Block Design was used for ranking the attributes and to provide estimates of their weights. A sample size of 400 participants was required for comparison between groups (women who recently gave birth (<12 months), medical professionals and general population).<br><br>Results. Women in the PPI group identified the attributes identified are mother's health, baby's health, choice, feeling in control, provision of information, feeling supported, continuity of care and feeding support. It was feasible to ask women who recently gave birth and the general population to rank these attributes, but we struggled to recruit medical professionals. We report provisional estimates for weights.<br><br>Conclusions. Women could identify the attributes most important to them as part of a positive pregnancy and were able to rank these attributes. Provisional estimates will be used in the REACH Pregnancy Circles trial, but further work is required to validate the attributes and weights. |

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| **HESG ID#** | **2109** |
| First author | Laia Bosque Mercader |
| Affiliations | University of York |
| Title | The Effect of a Universal Preschool Programme on Long-Term Health Outcomes: Evidence from Spain |
| Key words | Universal Preschool Programme, Long-Term Effects, Health Outcomes, Difference-in-Differences, Spain |
| Abstract | Motivation. Early life experiences both in utero and childhood are considered to be key cornerstones of the brain architecture accountable for determining long-term cognitive and non-cognitive skills, and physical and mental health (Duncan & Magnuson, 2013; Knudsen et al., 2006; Sapolsky, 2004), and have been found to have persistent effects on later-life child human capital development such as education, labour market, and health outcomes (Almond & Currie, 2011). Evidence has shown that some early life interventions can enhance child conditions in the first years of life as well as throughout the life course (Almond et al., 2018). In particular, early childhood education programmes are deemed to influence child outcomes in many domains ranging from education, income, and employment to health (Almond et al., 2018) both in the short and long run (Ruhm & Waldfogel, 2012).<br>Objective. This study evaluates a Spanish universal preschool programme, which implied a large-scale expansion of full-time high-quality public preschool for three-year-olds implemented in 1991/92 school year, and its effects on long-term health and healthcare outcomes.<br>Methods. Despite being nationally enacted, the implementation of the programme was the responsibility of the Spanish regions allowing to exploit the fact that the initial intensity of public preschool uptake varied across regions. To investigate the effect of the policy on long-term health outcomes, I employ a difference-in-differences (DiD) strategy exploiting the timing and geographical variation of the implementation of the reform. To be more precise, I compare long-term health outcomes of cohorts aged three before to those aged three after the start of the programme, across individuals residing/born in regions with varying initial intensity of three-year-old public preschool implementation.<br>Data. The study uses data on three-year-old enrolment rates for 1987/88-2002/03 from the Statistics of Non-university Education. Long-term health outcomes at the individual level are derived from the Spanish National Health Survey (2003 and 2006) and at the regional level from the Hospital Morbidity Survey (1999-2018) and the Death Registries (1999-2018).<br>Results. The results show that greater intensity in public preschool decreases the likelihood of having asthma and visiting the doctor for individuals aged three after the policy. In addition, I find a positive impact on hospitalisation rates mainly driven by women with pregnancy-related diagnosis. No effects are found on chronic allergy, mental disorders, consumption of drugs, stays in hospital and emergency service, and deaths per 10,000 individuals. Results are robust to a number of alternative specifications. |

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| **HESG ID#** | **2074** |
| First author | Philip Britteon |
| Affiliations | The University of Manchester |
| Title | Evaluating whole system reforms: A formal approach for selecting multiple outcomes |
| Key words | health systems, performance measurement, policy evaluation, multiple outcomes |
| Abstract | Whole system reforms have the potential to impact multiple dimensions of performance and health within healthcare systems. Despite the large literature on health systems performance measurement, there exists no formal approach for selecting outcomes when evaluating the impact of reforms. As a result, quantitative evaluations have often focused on a single measure of performance or narrow subset of outcomes deemed amenable to change. This approach is limited in its ability to: (i) identify the overall effect of the policy, (ii) identify the mechanisms through which system wide changes may have occurred, and (iii) avoid the selection of outcomes being driven by significant results.<br><br>To address these limitations, we propose a systematic approach for selecting multiple outcomes in the evaluation of whole system reforms.<br><br>Our developed approach exploits existing conceptual frameworks as the basis for selecting outcomes and utilises national indicator sets to capture different dimensions of care. The approach then maps the core policies and objectives associated with a reform, to identify explicitly targeted indicators and address concerns on the use and interpretation of multiple outcomes.<br><br>We then apply the approach in selecting outcomes for the evaluation of health and social care devolution in the Greater Manchester region of England. From a review of 551 indicators, we identify 166 indicators for inclusion in the evaluation. We use this application to discuss the advantages and limitations of the approach and any empirical challenges in its implementation.<br><br>We recommend the approach for selecting outcomes in the evaluation of future whole system reforms, including devolution and integrated care policies. The approach offers to improve the scope and transparency of future evaluations and the interpretation of their findings. |

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| **HESG ID#** | **2067** |
| First author | Paola Cocco |
| Affiliations | University of Leeds |
| Title | What properties should a hypothetical point-of-care test (POCT) for Clostridioides difficile infection (CDI) possess? Early economic modelling capturing capacity constraints to inform a Target Product Profile (TPP) |
| Key words | Early economic modelling, clostridioides difficile infection, diagnostics, target product profiles |
| Abstract | OBJECTIVES: CDI is a healthcare-associated infection which causes diarrhoea resulting in longer hospital length of stay and increased healthcare costs. In the UK, inpatients with suspected CDI are typically isolated in single rooms while awaiting test results to prevent transmission, until confirmation of non-infectious diarrhoea. Slow test-turnaround hinders de-isolation of non-infected patients, causing ineffective utilisation of infection control infrastructure. A rapid POCT for CDI is under development as part of a Medical Research Council-funded programme grant (MR/N029976/1). To ensure that the test is fit-for-purpose, a TPP will be developed outlining the necessary characteristics of the test. To inform the TPP, this study has the following objectives:<br>-To map the typical care pathway for CDI and identify any workflow bottlenecks.<br>- To explore the impact that a hypothetical POCT could have on infection control infrastructure, clinical decision-making, infection spread and costs.<br>-To identify the necessary characteristics of a POCT for CDI to be cost-effective compared to standard care from a UK NHS perspective.<br>METHODS: A discrete event simulation model is being built in SIMUL8 to reflect the Leeds Teaching Hospitals NHS Trust (LTHT) care pathway for patients with suspected CDI. The model compares the hypothetical test against the current two-step testing algorithm at LTHT over a two-month time horizon. Parameters are taken from observational data, a literature review of decision models for CDI diagnostics, and expert opinion.<br>Primary outcomes are the number of patients placed in single rooms, total number of secondary cases and quality-adjusted life years lost due to infection. Secondary outcomes assess the impact of the hypothetical test on the clinical workflow, CDI treatment and costs. Scenario analysis will explore different hospital sizes and positioning of the hypothetical test. Headroom, threshold and sensitivity analyses will be conducted to determine the characteristics for the hypothetical test to be cost-effective compared to standard CDI testing (e.g. diagnostic accuracy, speed of diagnosis, maximum cost).<br>RESULTS: To be confirmed in May 2021.<br>DISCUSSION: TPPs are increasingly of interest to healthcare decision-makers seeking to accelerate the innovation pipeline for new tests towards areas of clinical need. The COVID-19 pandemic has put a spotlight on the need for TPPs to provide clinically meaningful and evidence-based performance specifications for new diagnostics. This novel work applies early economic modelling to inform what requirements a new hypothetical test for CDI should possess to be clinically- and cost-effective, whilst exploring different test roles and positioning within the care pathway. |

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| **HESG ID#** | **2160** |
| First author | Gabriella Conti |
| Affiliations | Department of Economics, University College London |
| Title | Perceived Costs and Benefits of Compliance to the COVID-19 Social Distancing Measures: Evidence from Subjective Expectations |
| Key words | Costs and benefits, COVID-19, subjective expectations, compliance |
| Abstract | Management of ongoing pandemics and prevention of future ones requires quantifying and understanding the determinants of citizens' decisions to comply, or not, with the public health measures designed to prevent, contain, and contrast the contagion. When deciding on compliance, citizens will trade off the costs and benefits of alternative actions. For instance, if a citizen perceives a measure â€" say, social distancing â€" as effective at reducing own infection risk, the expected risk reduction represents a key benefit from complying. Compliance with public health measures, however, may have costs in addition to benefits, both monetary and psychological. Ultimately, whether a person complies and, if so, systematically or only in certain circumstances will depend both on the perceived costs and benefits and on how the person trades these off. Different people may have partially different costs and benefits and/or may weigh them differently, possible depending on their characteristics and experiences. Separately quantifying the roles of expectations and preferences in determining compliance decisions is fundamental for policy. In this paper we study these issues by leveraging recent advances in survey design and econometric analysis of probabilistic expectations. We run two surveys in the United Kingdom and in Italy during the first lockdown regarding the individuals' perceived costs and benefits from complying with the social distancing measures implemented - including subjective probabilities of contracting Coronavirus, being hospitalised or fined, becoming unemployed or socially isolated. We first develop and estimate a model of compliance behaviour and unpack the importance of expected costs and benefits, cost-benefit tradeoffs, and their heterogeneity across citizens' backgrounds and experiences. We then quantify the monetary compensation required to be socially isolated- providing key information to policymakers. Last, we evaluate the impacts of policy measures on citizens' risk perceptions and compliance behaviours through randomised information & sensitisation interventions and elicitation of individual responses to policy-relevant scenarios. |

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| **HESG ID#** | **2075** |
| First author | Chiara Costi |
| Affiliations | Lancaster University |
| Title | Health and quality of life among older adults: a structural equation modelling approach |
| Key words | health, quality of life, older age, structural equation modelling, SHARE |
| Abstract | The main objective of this paper is to explore the determinants of quality of life among older individuals by focusing on the role of health. While there is a large body of research on the determinants of quality of life, previous studies on older individuals do not often employ structural equation modelling and latent concepts, such as well-being and health, are usually inferred from self-assessed single items or composite indexes.<br><br>This paper investigates the effect of health and a wide range of socio-economic factors on the quality of life of elderly individuals using a structural equation modelling (SEM) approach. The application of structural equation models allows to measure abstract concepts in their entirety, overcoming the reliability issue of subjective variables and including both latent and observed variables into the same regression analysis. Specifically, the proposed model can reliably measure the underlying concepts of quality of life and health, the latter including cognition and physical status. On top of that, the model hypothesises that health and socio-economic factors affect quality of life, and this hypothesis is tested based on the fit of the model to real data drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE). The structural model is applied separately to waves 4, 5 and 6 to assess its validity and its fit to the overall survey. Inclusion criteria are respondents over 65 years old and without a clinical diagnosis of severe cognitive, physical or emotional diseases.<br><br>Results show that health is the largest contributor to enhance quality of life. Among broader socio-economic variables, participating in social activities and individual income also appear to play important roles. To further investigate the determinants of quality of life in different social contexts, a group analysis is conducted dividing European countries according to their national economies and geographic location. Findings show that health is still contributing the most to enhance quality of life for each group, while there are differences in the role played by some socio-economic variables.<br><br>Overall, this paper suggests the important contribution of health towards quality of life in older age through a structural equation modelling approach estimated on a large population-based sample of elderly Europeans. Health is confirmed to be the major driver of quality of life, even when different social environments are considered. Interventions aimed at improving health, particularly focusing on physical status, can be effective to enhance quality of life in advanced age. |

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| **HESG ID#** | **2149** |
| First author | Jeremy Fabes |
| Affiliations | University of Plymouth, UK |
| Title | Information asymmetry in hospitals: evidence of the lack of cost consciousness in clinicians |
| Key words | Cost awareness, healthcare costs. |
| Abstract | Background: Information asymmetries and the agency relationship are two defining features of the healthcare system. These market failures are often used as a rationale for government intervention. Many countries have government financing and provision of health care in order to correct for this, while health technology agencies also exist to improve efficiency. However informational asymmetries and the resulting principal-agent problem still persist, one example is the lack of cost consciousness amongst clinicians. While there is evidence that health professionals are aware of the need to be cost conscious, there is limited evidence to support that they practice this. Doctors have been found to consistently overestimate the cost of inexpensive drugs and underestimate the cost of expensive ones.<br>Methods: We undertook a multinational survey to assess clinician awareness of health care (both investigation and treatment) costs. We targeted four cohorts: medical students, Senior House Officers/Interns, Mid-grade Senior Registrar/Residents, and Consultant/Attending Physicians in six hospitals in the UK, US, Australia, New Zealand and Spain. The survey used a digital platform and applied a Kiosk technique. The survey asked a range of demographic questions and open-ended questions on the cost of different types of scans, visits, medications and tests. Subsequently we have received from each hospital site the actual cost of these health services. Our analysis focuses on the differential between the perceived and actual cost, exploring variation across speciality, country and other potential confounders.<br>Results: We have 707 complete responses from six sites (five countries). Preliminary analysis suggests that perceived costs are significantly different from actual costs. This is most acute for high cost interventions. Respondents acknowledged that they did not feel they had received adequate training in cost awareness.<br>Discussion: The current financial climate means that cost awareness and the appropriate use of scarce health care resources is more paramount than perhaps ever before. Much of the focus of health economics research is on high cost innovative technologies, yet there is considerable waste in the system with respect to overtreatment and overdiagnosis. Common reasons put forward for this include defensive medicine, poor education, clinical uncertainty and the institution of protocols. Given the role of clinicians in the health care system, both as agents for patients and for commissioners, more needs to be done to remove informational asymmetries and improve clinician cost consciousness. We welcome discussion of how health economics as a discipline can improve clinicians' awareness. |

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| **HESG ID#** | **2159** |
| First author | Luis Fernandes |
| Affiliations | Centre for Health Economics, University of York |
| Title | Doctors' Wages and NHS Activity: Evidence from a UK Pension Reform |
| Key words | Medical Labour Markets, Labour Supply, Secondary Care, Pension Reform |
| Abstract | There is little evidence about the responsiveness of doctors' labour supply to wage changes, particularly in health care markets, such as the English NHS, where doctors are employed rather than self-employed. We exploit the 2016 UK pension reform which introduced tighter annual allowances (that is, the amount in annual contributions to a pension pot that is exempt of tax) for individuals who have a yearly income in excess of £110,000, increasing their income taxation as a result, and ultimately reducing take-home pay. This reform provides a natural experiment to study whether this exogenous decrease in wages for doctors with higher pay affects their labour outcomes. We hypothesize that i) some doctors affected by the policy might reduce NHS activity, mainly by avoiding additional work, while ii) others may be pushed to early retirement or leaving the NHS altogether. We assembled a unique and rich dataset with doctor-level panel information on NHS inpatient activity and doctor characteristics, for the years between 2013 and 2018. We construct doctors pay using its two largest components, the Basic Pay Scale, and the national Clinical Excellence Awards. Using this as a measure of exposure to and the timing of the reform, we use a difference-in-differences approach combined with matching based on entropy balancing to provide robustness against observable and time-invariant unobservable heterogeneity. We measure doctors activity as the annual count of finished episodes of care per doctor, where a single episode is defined as a period of health care under one doctor in one hospital. To account for case complexity and doctors effort, we develop a new procedure that weights each episode of care using the national average of length of stay for the Healthcare Resource Group (HRG) over the entire sample period. We find that doctors affected by the new UK pension legislation experience a modest but statistically significant drop in activity rates. Doctors with annual income above £110,000 experience a post-reform decline of 16 episodes of care, and a reduction of work effort equivalent to 30 days of patient care relative to doctors below the threshold. Furthermore, we find that their response occurs gradually in post-reform years. These findings suggest that the UK pension reform may have had detrimental consequences for patient welfare in the English NHS. |

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| **HESG ID#** | **2133** |
| First author | Francesco Fusco |
| Affiliations | University of Cambridge |
| Title | Early Health Technology Assessment: is expert elicitation the only possible option? |
| Key words | Cost-effectiveness analysis, Early health technology assessment, Value of information, Uncertainty, |
| Abstract | Introduction: Early Health Technology Assessment (HTA) is defined as the collection of methods used to inform mainly manufacturers on the possible value of technologies under development. Unavoidably, technologies at their early stage of development lack of reliable evidence and this problem is often obviated by using elicitation methods. Consequently, the studies employing elicitation methods will provide valid estimates insofar future studies confirm the elicited values. This research proposes a framework able to solve this impasse by providing a structured approach to perform early HTA analyses without relying on elicitation methods.<br>Methods: A published Markov model simulating an intervention in orthopaedics is used to illustrate the proposed framework, which is based on a two-step approach. First, the cost-effectiveness function is determined by identifying the requirements (i.e. parameters value) needed by the intervention to be cost-effective. A sequence of threshold analyses is used to calculate empirically this function, which is defined by the combination of parameters values leading to an incremental cost-effectiveness ratio below £20,000 per quality adjusted life year. Second, multiple scenarios are run by increasing the standard errors of the requirements obtained in the first step and performing a Monte Carlo simulation per each of these scenarios. The output of the uncertainty analysis is presented in terms of the population expected value of perfect information, which is used to calculate the maximum acceptable uncertainty around these requirements. The uncertainty threshold is set to reflect the financial cost of clinical studies funded by government agencies, such as the National Institute for Health Research.<br>Results: Given the computational burden of the analysis is not possible to provide preliminary results at this stage. The final version of the paper will present the intervention requirements for being cost-effective (e.g. intervention cost, impact on quality of life of the intervention) alongside the output of the uncertainty analysis. Besides these outputs, a step-by-step exemplar will be presented to explain the process.<br>Discussion: Expert elicitation plays a vital role in decision-making but is not exempt from limitations, such as overconfidence and the availability of a sufficient number of experts. Given the early stage of development of new interventions, these problems could even exacerbate in early HTA context and urge for an alternative approach to solve this impasse. The methodology described in this research has the ambition to do so and suggest a way forward to perform early HTA analyses without relying on expert elicitation. |

| **HESG ID#** | **2151** |
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| First author | Alessio Gaggero |
| Affiliations | University of Granada |
| Title | The Effect of Heavy Smoking on Early Retirement: An Instrumental Variable Approach |
| Key words | Smoking; Retirement; Polygenic Risk Scores; Instrumental variable; Mendelian Randomization |
| Abstract | The extent to which heavy smoking and early retirement are causally related remains to be determined. To overcome the endogeneity of heavy smoking behaviour, we employ a novel approach by exploiting Mendelian Randomisation and use genetic predisposition to heavy smoking (polygenic risk score- PGS) as an instrumental variable. A total of 3578 participants from the English Longitudinal Study of Ageing (mean age 64.41 years) had data on smoking behaviour, employment and a heavy smoking PGS. Heavy smoking was indexed as more than 10 cigarettes a day. Early retirement was classified as retiring before state pension age. Employing the English Longitudinal Study of Ageing, our results show that being a heavy smoker increases significantly the probability of early retirement ($\hat{I}^2 = 0.617$, standard error = 0.193, $p < 0.01$). Results were robust to a battery of robustness checks and a falsification test. Overall, our findings support a causal pathway from heavy smoking to early retirement. |

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| **HESG ID#** | **2051** |
| First author | Evangelos Gkousis |
| Affiliations | RAND Europe, Cambridge, UK |
| Title | Inequalities in access to primary care experienced by people with multiple morbidities during the COVID-19 pandemic |
| Key words | Covid-19, multimorbidity, primary care, access, long-term health conditions |
| Abstract | Background: General practice in the UK underwent a rapid transformation in 2020, as a result of the COVID-19 pandemic, with a shift from face-to-face to online or telephone appointments. By April 2020 electronic healthcare records recorded that 56.6% of appointments were remote. This study investigates whether there were any inequalities in access to primary care, experienced by patients with multiple long-term health conditions during the COVID-19 pandemic.<br><br>Methods: We explored the impact of multimorbidity and other socio-demographic characteristics on access to primary care, NHS111 and prescription medication between April-November 2020. We accessed data from six COVID-19 waves of Understanding Society, a large UK household study, through the UK Data Service [204638]. The primary outcome measures were whether people had a problem for which they would normally see their GP during the previous four weeks, whether they tried to see a GP for this problem, whether they were able to access care, and whether their appointment was in person, as opposed to online or by telephone. Secondary outcomes included ability to access NHS111 and prescription medicines. We used logistic regression to examine the association between these outcome measures and multimorbidity, and additionally considered age, sex, ethnicity, rurality, employment, whether someone was shielding, and equivalised income quintile.<br><br>Results: We found that people with multimorbidity were more likely to need an appointment with a GP during 2020 (2 conditions OR 1.44, 3 conditions OR 1.88, 4+ conditions OR 3.80; $p<0.05$), but there was no evidence of variation in their ability to get an appointment. Our results also suggest that women were less likely to be offered a face-to-face appointment, as opposed to a remote consultation (online or telephone), compared to men (OR 0.81; $p<0.05$). People with multimorbidity were also more likely to need to access NHS111 (2 conditions OR 1.13, 3 conditions OR 1.69, 4+ conditions OR 2.96; $p<0.05$) and prescription medication (2 conditions OR 5.99, 3 conditions OR 11.77, 4+ conditions OR 12.77; $p<0.05$). There was no variation in ability to access NHS111, but patients with multimorbidity were more likely to be able to access prescription medication, compared to people without (2 conditions OR 3.22, 3 conditions OR 2.35, 4+ conditions OR 2.88; $p<0.05$).<br><br>Conclusions: People with multimorbidity reported higher healthcare needs during the second half of 2020 but we found no evidence of any impact on patients' ability to access GP/primary care. |

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| **HESG ID#** | **2116** |
| First author | Naijie Guan |
| Affiliations | PhD student, Health Economics Unit, Institute of Applied Health Research, University of Birmingham |
| Title | Numeracy and economic pathways to protecting against depression |
| Key words | Numeracy, Depressive symptoms, Household finances, Cross-lagged longitudinal mediation analysis |
| Abstract | Numeracy is associated with better economic decisions and outcomes. Emerging cross-sectional evidence also suggests numeracy and the related concept of financial literacy may have a protective effect on the mental health and wellbeing of adults. However, little is known about the causal pathways and whether such associations hold over time. Our study involves the first major longitudinal investigation of numeracy and depressive symptoms.<br><br>Our study uses data over the period 2002-2016 from the Health and Retirement Study (a nationally representative sample of adults aged 50 and older). We use correlated random effects models to examine the relationship between numeracy and depressive symptoms (measured by the CES-D scale). Then we use cross-lagged longitudinal mediation analyses with structural equation modelling to investigate the mediating roles of household income and wealth on the relationship between numeracy and depressive symptoms. This methodology helps us to understand and identify the possible temporal and contemporaneous pathways through which numeracy might relate to depressive symptoms.<br><br>Our results show that higher levels of numeracy are significantly associated with lower levels of depressive symptoms. The mediation analyses show that at each measurement point, there are negative and significant direct contemporary associations between numeracy and depressive symptoms and indirect contemporary associations between the two through household income and household wealth. The proportion of the indirect relationship between financial literacy and depressive symptoms operating through household income is larger than that operating through household wealth. In cross-lagged pathways, numeracy at baseline is associated with higher levels of household income and wealth 4 years later. Household income and wealth are negatively associated with depressive symptoms measured at the same time point, but not 4 years later. The reverse pathways are statistically supported, suggesting a cross-lagged influence of baseline depressive symptoms on follow-up household income and wealth, and then numeracy<br><br>Our findings highlight the importance of numeracy skills in reducing the risk of experiencing depressive symptoms through the accumulation of more income and wealth. Enhancing numeracy skills may be a useful supplementary approach to prevent depression in middle-aged and older adults. Further research is needed to examine whether these conclusions also apply to other settings. |

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| **HESG ID#** | **1960** |
| First author | Xidong Guo |
| Affiliations | University College Dublin |
| Title | The Investment Decision of Rural Hospitals under Different Diagnosis-Related Groups Payment Systems |
| Key words | refined DRG, rural hospitals, investment of hospitals, yardstick competition |
| Abstract | Objective: The Diagnosis-Related Groups (DRG) system provides hospitals with a fixed payment based on the average cost of treating patients within a specific group. Despite its advantage in controlling cost, DRG places financial pressures on rural hospitals. If they are at a disadvantage cost-wise, DRG may disincentivize their investment in better technology. Consequently, access to treatment can be curtailed for rural individuals. We analyse a rural hospitals investment strategy under distinct DRG processes. We contrast the optimal investment to the investments undertaken by the rural hospital under DRG refined by region system, DRG refined by severity system, and Mixed DRG system.<br><br>Method: We consider a one-period model with three stakeholders: patients (mildly or severely ill), two hospitals (one urban and one rural), and the Health Authority (HA). The HA chooses the DRG system that it wishes to implement, considering its impact on the rural hospital's incentive to invest. Mildly ill patients will attend the rural hospital and can always be treated locally. While severely ill patients have choice to attend the urban hospital and this choice is informed by the rural hospital's investment level. Moreover, the investment also has a positive impact on the probability of curing severely ill patients at the rural hospital. For these rural patients with severe illness, if they cannot be cured locally, then they have to be transferred to the urban hospital. However, transferring patients generates costs: 1) rural patients suffer from it; 2) the demand for care in the urban hospital grows, meaning that more patients require high cost treatments.<br><br>Conclusion: This paper establishes that the optimal investment level depends on exogenous factors such as the difference of treatment cost between hospitals, the travel cost, and the cost associated with the waiting list in the urban hospital. We find that these investments are worthwhile when these above costs are large. We show that DRG refined by region system breaks the Yardstick competition so that the investment only depends on the fixed revenue per patient, and this fixed payment can be used to trigger the first-best investment level. It is unclear which DRG introduces a higher investment level because the DRG refined by severity system and Mixed DRG system incur countervailing incentives. We find that using subsidy to incentivize the rural hospital is effective only when the rural hospital has a higher treatment cost compared with its urban competitor. |

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| **HESG ID#** | **2150** |
| First author | Helen Hayes |
| Affiliations | Health Organisation, Policy and Economics (HOPE), University of Manchester |
| Title | Responses of hospitals to unbundling of DRG-based payments for diagnostic imaging of suspected cancer patients |
| Key words | Unbundled payments, DRG, difference-in-differences, diagnostic imaging, early detection of cancer |
| Abstract | Background: Changes to the level and structure of provider payments can have significant impacts on the costs, quality and efficiency of healthcare services. Diagnosis Related Group (DRG)-based payment systems provide a standardised prospective payment based on clinical diagnosis and the expected interventions for a typical patient. Some services were bundled from DRGs in 2013 in England to address concerns over under-provision. Separate national prices were introduced across all diseases for outpatient diagnostic imaging services, generating additional reimbursements of between £45 and £748 per scan. The effects of this unbundling on the provision of services are unknown. We examine the effects of this policy change for patients with suspected cancer, as changes to the efficiency of diagnostic services in an outpatient setting could have important implications for early detection of cancer.<br><br>Methods: We use data on 39 million specialist visits from Hospital Episode Statistics on suspected cancer patients referred to be seen urgently within two weeks. We aggregate data to hospital-month level for all 219 NHS hospital Trusts in England, covering the period April 2010 to March 2018. We examine the impact of the policy change on average number of diagnostic tests per visit, the proportion of visits receiving at least one test, and the total volume of tests conducted. We use difference-in-differences methods, controlling for patient age and deprivation. We compare to a control group of diagnostic tests not subject to payment unbundling.<br><br>Results: Between April 2010 and March 2018, average tests per visit increased 161% (0.018 to 0.047), the proportion of visits with at least one test increased 135% (0.017 to 0.040) and the monthly average volume of tests per hospital increased 737% (14.18 to 118.73). In response to the payment unbundling, there was a 0.038 ($p<0.01$) increase in average tests per visit, a 0.032 ($p<0.01$) increase in the proportion of visits with a test and an increase in the volume of tests of 131.7% ($p<0.01$).<br><br>Discussion: When treating suspected cancer patients, hospitals increased the use of diagnostic imaging services in response to the unbundling of payments. The effects of unbundling some services from core DRG payments have been rarely explored but the increase in service use we identify is in line with the evidence on fee-for-service payments. Future work will look at attendance level analysis, as well as the implications of the increase in service use on longer-term patient outcomes and total service costs. |

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| **HESG ID#** | **2124** |
| First author | Rachael Hunter |
| Affiliations | University College London |
| Title | The impact of changes in mental health funding in England on the number of people sentenced to prison: the Hunter-Penrose Effect |
| Key words | mental health funding; prison; mixed effects model |
| Abstract | Background<br>Evidence from the early 20th century documented the inverse relationship between mental health inpatient beds and the number of people in prison, the Penrose effect: as the number of mental health inpatient beds decreases the number of people in prison increases. In the United Kingdom (UK) since the 1970s there has been a move a away from the institutionalisation of people with mental illness and a focus on high quality community mental health care and early intervention. As a result there is a question regarding if mental health funding rather than mental health beds follows the same pattern as the Penrose effect.<br><br>Methods<br>We use Clinical Commissioning Group (CCG) Programme Budgeting data from the Public Health England Spend and Outcomes Tool spanning the financial years 2009/2010 to 2014/2015 to evaluate if the austerity measures that were put in place in 2010/2011 and a real terms decrease in funding of 1% for mental health services resulted in an increase in the number of people sentenced or remanded to prison based on court data. We do this using a mixed effect model with police force areas and CCGs nested in Local Authorities, and calculating the change in funding and sentencing year on year within areas. We calculate the marginal effect of a unit change in mental health spending per head of the population on the number of people sentenced or receiving a suspended sentenced per 100,000 of the population, adjusting for factors related to crime and deprivation. A counterfactual of urological cancer is used to test if the same model and calculation, but with no hypothesised relationship with criminal sentencing, produces a similar result.<br><br>Results<br>An increase in £1 spent on psychosis services per head of the population was significantly associated with a decrease in the number of people sentenced to prison (-3.3 per 100,000 95% confidence interval -4.8 to -1.7). There is some evidence for a similar effect with substance misuse funding and but no relationship between sentencing and any other type of funding for mental health problems or for urological cancer.<br><br>Discussion point<br>This result suggests that an increase in funding for psychosis related mental health services could potentially constitute good value for money, particularly given a cost per person per year of approximately £40,000 of being in prison. The type of analysis and the existence of unmeasured confounders make an interpretation of causation problematic. |

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| **HESG ID#** | **2070** |
| First author | Genevieve Jeffrey |
| Affiliations | LSE Department of Health Policy |
| Title | The Intergenerational Impacts on Health of Gestational Exposure to the Introduction of the National Health Service in the UK |
| Key words | Foetal Origins, Health and Inequality, Social Mobility, Health Insurance |
| Abstract | Background: The introduction of the National Health Service on the 5th of July 1948 in the UK meant free access to healthcare for all residents. This free access to healthcare would have made healthcare more accessible especially to those of the lower socioeconomic status. In this paper I study the intergenerational health impacts of gestational exposure to the introduction of the National Health Service by studying the impact on the health outcomes of the second and third generations of those born around the introduction of the NHS. The main research question the paper will try to answer is if policy interventions or programs can reduce the disparities by socioeconomic group in the persistence of poor health outcomes across generations. Recent work in epidemiology finds that environmental factors can affect the gene expression (phenotype to phenotype transmission )This strengthens the case for investigating how policies, which proxy the environment, can impact second and third generations health outcomes.<br><br>Methods: Using linked census data, I construct multi-generational family units and using a fuzzy regression discontinuity design, using the date of birth to assign treatment, I study the impact on the education and birth outcomes, self-reported health outcomes and cancer incidence of the treated, the children and grandchildren of those exposed during gestation to the NHS introduction.<br><br>Results: I find negative impacts on the second and third generations self-reported health outcomes and positive impacts on the first, second and third generations education and employment outcomes for those of the lower socioeconomic status. I also analyse the impact it would have had on health mobility across generations by analysing how the parents health and education outcomes would impact those of their children and to study if there was indeed persistence of outcomes across generations, if this persistence would be impacted by the introduction of the NHS, since the persistence of poor health and educational outcomes are more prevalent in those of the lower socio-economic status and since the NHS introduction would have disproportionately benefitted this group, I would expect an increase in educational and health mobility across generations.<br><br>Conclusions: Policies that target the period of gestation and early childhood, can impact health and educational outcomes across generations, and while it would not be possible to claim causality through biological or income effects through this paper, the paper does illustrate the long run impacts across generations and the persistence of outcomes across generations. |

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| **HESG ID#** | **1943** |
| First author | Huajie Jin |
| Affiliations | Kings Health Economics (KHE), Institute of Psychiatry, Psychology & Neuroscience at Kings College London |
| Title | Overview and use of tools for selecting modelling techniques in health economic studies |
| Key words | Model selection tools, health economics, modelling method. |
| Abstract | Background: The availability and use of tools to guide the choice of modelling technique is not well understood. Our study aims to review existing tools and explore the use of those tools in health economic models. Methods: Two reviews and one case study were conducted. Review 1 aimed to identify tools based on expert opinion and citation searching and explore the value of the tools for health economic models. Review 2, based on citation searching, aimed to describe how those tools have been used in health economic models. Both reviews were conducted using Web of Science and Scopus. Two independent reviewers selected studies for inclusion. A case study, focused on economic evaluations of antipsychotic medication in schizophrenia, was conducted to compare the modelling techniques used by existing models with modelling techniques recommended by identified tools. Results: Seven tools were identified, of which the revised Brennan's toolkit, was assessed to be the most appropriate for health economic models. The seven tools were cited 126 times in publications reporting health economic models. Only 17 of these (13.5%) reported that they used the tool(s) to guide the choice of modelling technique. Application of these tools suggested discrete event simulation (DES) is most appropriate for modelling antipsychotic medication in schizophrenia, but DES was only used by 17% of existing models. Conclusions: There is considerable inconsistency between the modelling techniques used by existing models and modelling techniques recommended by tools. It is recommended that for future modelling studies the choice of modelling technique should be justified, this can be achieved by the application of model selection tools, such as the revised Brennan's toolkit. Future research is required to explore the barriers to using model selection tools in health economic models and to update existing tools and make them easier to use. |

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| **HESG ID#** | **1964** |
| First author | Mari Jones |
| Affiliations | Swansea University |
| Title | Rapid cancer diagnosis for patients with vague symptoms: a cost-effectiveness study |
| Key words | Cancer, non-specific symptoms, general practice, rapid diagnosis centre, cost-effectiveness, |
| Abstract | Background<br>A pilot Rapid Diagnosis Centre (RDC) allows general practitioners within targeted clusters to refer adults with vague and/or non- specific symptoms suspicious of cancer, who do not meet criteria for referral under an urgent suspected cancer pathway, to a multi-disciplinary RDC clinic where they are seen within one week.<br><br>Aim<br>To explore the cost-effectiveness of the RDC compared to usual care. Design and Setting Cost-effectiveness modelling using routine data from Neath Port Talbot Hospital, Wales<br><br>Methods<br>Discrete-event simulation modelled a cohort of 1000 patients from referral to radiological diagnosis based on routine RDC and hospital data. Comparator patients were those referred to an urgent suspected cancer pathway but then downgraded. Published sources provided estimates of patient quality of life and pre-diagnosis anxiety. The model calculates time to diagnosis, costs and quality-adjusted life years (QALYs) and estimates the probability of the RDC being a cost-effective strategy.<br><br>Results<br>The RDC reduces time to diagnosis from 84.22 days in usual care to 5.90 days if a diagnosis is made at clinic or 40.76 days if further investigations are booked during RDC. RDC provision is the dominant strategy (i.e. less costly and more effective) compared to usual care when run near or at full capacity. However, it is not cost-effective if capacity utilisation drops below 80%.<br><br>Conclusion<br>A Rapid Diagnosis Centre for patients presenting with vague or non-specific symptoms suspicious of cancer in primary care, reduces time to diagnosis and provides excellent value for money if run at >80% capacity.<br><br>Impact<br>The RDC has been given the go-ahead to roll-out over the whole of Wales. |

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| **HESG ID#** | **2119** |
| First author | Oliver Kaonga |
| Affiliations | University of York |
| Title | Road traffic injuries and Household economic welfare in Sub-Saharan Africa |
| Key words | Road traffic injuries, household, welfare |
| Abstract | Introduction<br>Road traffic injuries (RTIs) are a major cause of health loss and impose a huge burden on economies. The World Health Organisation (WHO) estimates that globally there are approximately 1.35 million fatal injuries and a further 20 to 50 million non-fatal injuries per year. The abrupt nature of RTIs coupled with costs of prolonged care for injury victims and the resulting disability, potentially impose significant financial pressures on households. This paper examines the effect of RTIs on five indicators of households' economic wellbeing; household health expenditure, non-health consumption expenditure, asset ownership, household indebtedness and labour force participation.<br>Methods<br>Using a multi-country household survey dataset, we employ a mix of matching and multilevel regression modeling techniques to isolate the effects of RTIs on household economic welfare. Households are first genetically matched to reduce selection bias. Matching variables include demographic, socio-economic, and health variables which are either theoretically or empirically associated with exposure to road traffic injuries and outcome variables. We then estimate a two-level generalized linear regression model with household and country as first and second levels respectively.<br>**Results**:Results show a mixed effect of RTIs on the indicators of economic welfare; we find evidence to suggest households are worse off in several ways following a RTI; households faced significantly higher health expenditure, reduced expenditure on competing basic needs and a higher likelihood to borrow at positive interest rates in order to purchase health services. Health expenditure is higher by US$ 3.25 while household non-health expenditure is lower by US$ 26 per month. The differences in non-health consumption could be due to substitution effect but also reduced overall consumption. RTI increases the likelihood of borrowing funds to purchase health services from 13% to about 17 %. We find no significant effect of RTIs on labour force participation while a positive effect on household's assets index is observed. The non-significant result on labour supply could be attributed to possibility that individuals work less while remaining in labour force following an RTI.<br>**Conclusion:**The study provides cost estimates and re-enforces the need to consider costs beyond the road accident victim in costing road traffic accidents. The incremental effect on health expenditure appears low, but relative to household mean monthly consumption for low-income households, it represents a high enough amount to push health expenditures to catastrophic levels. RTI-affected households face further economic loss through increased borrowing and reduced consumption of non-health commodities. |

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| **HESG ID#** | **2152** |
| First author | Erin Kirwin |
| Affiliations | University of Manchester, Institute of Health Economics |
| Title | The risk-based price: incorporating uncertainty and risk attitudes in health technology pricing |
| Key words | Economic Evaluation, Health Technology Assessment, Cost Effectiveness Analysis, Price, Surplus |
| Abstract | Cost-effectiveness analysis methods support decision makers in allocating scarce health system resources. Under threshold-based decision rules, analysis results are compared to a cost-effectiveness threshold (CET) value to determine if technologies should be adopted. Applying this rule, producers of health technologies are incentivized to maximize profits through value-based pricing: pricing so that the value of the technology is at or marginally below the CET value.<br><br>We aim to address two challenges which present under threshold-based decision rules. First, the rule implies that decision makers are indifferent between interventions which present the same incremental cost effectiveness ratio or net monetary benefit but with different underlying uncertainty. Such indifference to uncertainty and resulting risk is unlikely to hold in practice. Second, when the CET used for the value-based price is equivalent to the shadow price of the budget constraint, none of the consumer surplus (applying to payers and patients) is retained. Our proposal for risk-based pricing provides an improved decision rule which incorporates risk-averse attitudes of decision makers, with the potential to retain more of the consumer surplus.<br><br>The risk-based price concept draws from a standard value-of-information analysis output, the expected value of perfect information (EVPI). The EVPI is often interpreted as the value of completely reducing uncertainty so that the expected cost of making an incorrect decision (i.e., adopting a technology that is not cost-effective) is zero. The risk-based price relies on an augmented interpretation of the EVPI for adopted technologies, the payer risk tolerance: the per-patient monetary risk of making the wrong decision that payers are willing to accept. The risk-based price is the price at which, for any given CET, the EVPI is equal to payer risk tolerance. For risk-averse decision makers, use of the risk-based price implies a new decision rule: if the value of the technology is at or below the cost effectiveness threshold, and if the EVPI is less than or equal to the payer risk tolerance, the technology should be adopted.<br><br>The risk-based price incorporates decision maker risk attitudes: risk-averse decision makers have lower risk tolerance values, and therefore will require greater price reductions when there is sufficient uncertainty in the evidence base. For such decision makers, the risk-based price increases the value to the system through a retention of the consumer surplus. Risk-based pricing will incentivize improved evidence development and increases health system benefits under constrained resources. |

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| **HESG ID#** | **2080** |
| First author | Keyi Li |
| Affiliations | Department of Applied Health Research, Institute of Epidemiology and Health Care, University College London, London, UK |
| Title | Does a working day keep the doctor away? A systematic review and meta-analysis of the impact of unemployment and job insecurity on health and social care utilisation |
| Key words | Unemployment, job insecurity, health care utilisation, meta-analysis |
| Abstract | Background: The negative impact of unemployment on health and well-being is relatively well established. However, the extent to which that impact translates into changes in health care utilisation is less well understood. This paper critically reviews and summarises the direction, magnitude and driving factors of the impact of unemployment and job insecurity on health and social care utilisation across different care settings.<br>Methods: We searched for published studies on MEDLINE, EMBASE, Web of Science, Scopus, PsycINFO and CINAHL Plus from January 2000 to April 2021 (protocol registered in PROSPERO - CRD42020177668). Studies exploring health service use preferences, using aggregate data (e.g. unemployment rates), and not published in English were excluded. We used narrative synthesis to summarise the direction of the impact, and the factors driving the association between unemployment and health care utilisation. We then conducted a meta-analysis to quantify the magnitude of this impact. For consistency purposes, the meta-analysis included only studies that reported odds ratios and used unemployment as the exposure. Given that some studies reported more than one effect size, we considered a robust variance estimation to account for the within-study correlation. Risk of bias was assessed based on ROBINS-I checklist for non-randomised studies.<br>Results: This review included 28 studies, with 13 studies being included in the meta-analysis. The studies were geographically diverse, focused on unemployment (only two studies considered job insecurity), and primary/secondary care settings. A total of 79 estimates were extracted from the 28 studies, with over 50% of these (N=41) reporting a positive association between unemployment and health care utilisation. In the meta-analysis, the pooled odds ratio was 1.32 (95% CI 1.08 to 1.60), meaning unemployed individuals were about 30% more likely to use health care services compared to employed ones. However, this positive association was mostly driven by mental health service use (odds ratio was 2.27, 95% CI 1.69 to 3.04). Only nine studies reported potential factors driving the relationship between unemployment and healthcare utilisation, which included financial distress, health insurance, social relationships, disposable time and depression/anxiety. The risk of bias among included studies was low.<br>Conclusions: This is the first comprehensive review of the impact of unemployment and job insecurity on health and social care utilisation, and suggests that unemployment is associated with increased mental health service use, but not primary or secondary care utilisation. Further work to examine this impact across other settings, including community and social care, is needed. |

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| **HESG ID#** | **2091** |
| First author | Mario Martinez-Jimenez |
| Affiliations | Lancaster University |
| Title | THE LONG-TERM HEALTH EFFECTS OF PARENTAL UNEMPLOYMENT |
| Key words | parental unemployment, early life conditions, long-run health effects |
| Abstract | This paper explores the long-term health effects of parental unemployment spells during childhood. While the effects of unemployment on the health of the unemployed is well-documented, its spillover effects on the health of their relatives, especially children, remain poorly understood. This research focuses on the impact of parental unemployment during the early (0-5 years), mid- (6-10 years) and late- (11-15 years) childhood on young adults mental and physical health (20-35 years). The analysis exploits data drawn from the British Household Panel Survey (BHPS) and the UK Household Longitudinal Study (UKHLS) that jointly follow around 8,000 households for three decades (1991-2019) and include detailed socioeconomic and health-related information on both parents and children. This sample allows to examine the additional indirect effects of parents unemployment spells on the mental and physical children's future health (e.g., GHQ-12; self-reported illnesses; and biomarkers), as well as the possible mechanisms through which parental unemployment can influence children's psychological and physical well-being in the long-term. The channels included in this research are adult's child educational attainment and labour market status, household characteristics and childhood income variables. This paper employs a pooled OLS specification and a three-level mixed-effects linear model that allows to exploit the hierarchical levels of the data (i.e., individual, household and regional levels). Results indicate that experiencing parental unemployment during childhood is associated with a lower physical and mental health status in adulthood, even though there does seem to be considerable effect heterogeneity. More specifically, parent's gender, child's gender, and the age when parental unemployment is experienced appear to drive the relationship between parental unemployment during childhood and young adults health. These results will help policymakers implementing policies to mitigate the psychological and physical burden suffered from children and adolescents whose parents were unemployed during critical years of their development. |

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| **HESG ID#** | **1959** |
| First author | Maria Ana Matias |
| Affiliations | Centre for Health Economics, University of York |
| Title | Hospital Specialty Level Productivity: the case of paediatric departments and specialised children's hospitals |
| Key words | England, NHS, productivity, clinical specialty, paediatrics |
| Abstract | Background and Aims: In planning future funding of services, policy makers often assume some degree of productivity improvement over time. Measures of productivity growth of the English National Health Service (NHS) are well established, but mask variations across different healthcare providers and settings. This limits the potential to predict achievable future improvements from past performance. Measuring growth at the unit-specialty level has the potential to identify a plausible upper limit of productivity growth nationally, based on already achieved outcomes. It might also highlight exemplars of good practice with consistent high relative growth. In this study, we extend previous national and hospital productivity measurement index methods to calculate labour productivity growth of hospital paediatric departments and specialised children's hospitals for the English NHS. Paediatric departments are analysed specifically because they care for a third of the population and produce care more independently than specialties within adult care.<br><br>Method: This analysis covers four financial years, 2015/16 - 2018/19, and is performed at a national and Trust level. We measure labour productivity growth of healthcare provided to children and young people as the ratio of output growth to input growth. Outputs are identified from the Hospital Episode Statistics Admitted Patient Care dataset, comprising of all patients aged 1-18. Information on full time equivalent staff and earnings, the inputs, are taken from the Electronic Staff Record. We developed methods to apportion the time of staff responsible for both children and adult care.<br><br>Results: Preliminary results indicate negative labour productivity growth nationally across all years. Among general acute Trusts, productivity figures range from -3.4% to -2.3%; while for specialist hospitals they range from -2.1% to -0.39% over the study period. Within each year, substantial variation in productivity growth is observed between general acute Trusts, ranging from -4.4% (1st quartile mean) to 1.1% (3rd quartile mean). Some consistency over time is observed in the relative performance of general acute Trusts based on their ranking. This applies to both high performers (4th quartile) and low performers (1st quartile) of growth.<br><br>Conclusions: Our preliminary results show substantial variations in labour productivity growth between general acute and specialist providers. Unlike previous research at the hospital level, we find persistence in performance of general acute Trusts over time; i.e. low/high performers tend to remain in those positions over time. This provides scope for identifying exemplars of good practice as well as further scope to identifying potential drivers of performance. |

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| **HESG ID#** | **2104** |
| First author | Silvia Moler-Zapata |
| Affiliations | LSHTM (London School of Hygiene and Tropical Medicine) |
| Title | Evaluating the effectiveness and cost-effectiveness of emergency surgery for common acute conditions: an instrumental variable analysis using electronic health records |
| Key words | Instrumental Variables, Electronic Health Records, Cost-effectiveness, Heterogeneity, Emergency Surgery |
| Abstract | **Objectives** Electronic Health Records (EHRs) have the potential to provide evidence about the relative effectiveness and cost-effectiveness of health technologies in routine clinical practice. While Instrumental Variable (IV) methods such as two-staged least squares can be used in these studies to adjust for unmeasured confounding, they are inadequate in clinical settings where treatment effects are heterogenous and idiosyncratic gains are anticipated and acted upon in patients' treatment assignment (essential heterogeneity). Instead, recently-developed local IV methods can inform allocative-efficiency gains in these settings by providing estimates for overall populations and sub-populations, while accounting for heterogeneity and confounding. A setting that exemplifies the usefulness of this approach is in evaluating the cost-effectiveness of emergency surgery (ES) for emergency hospital admissions with common acute conditions. The aim of this paper is to critically examine a novel IV method for providing comparative evidence about the relative effectiveness and costs of health technologies using EHRs.<br>**Methods** This paper uses data from the Hospital Episodes Statistics (HES) database in England from 2009-2020. The target population includes five acute conditions: appendicitis, cholelithiasis, diverticulitis, hernia and intestinal obstruction. The instrument for ES provision is the hospital's tendency-to-operate (TTO). This is the propensity to use ES instead of an alternative treatment (e.g. antibiotic therapy) and is derived using data from hospital admissions in the year preceding the primary admission. The study reports hospitalisation costs and survival over a one-year time horizon.<br>**Results** We identified HES cohorts ranging from 108,856 to 272,520 admissions across the five conditions, and ES rates from 11% (diverticulitis) to 91% (appendicitis). Our identification strategy exploits the large variation in ES provision across NHS hospitals. The resultant IV was of sufficient strength (F-statistic from 18.2 (diverticulitis) to 4,050 (cholelithiasis)) and measured covariates were balanced across the distribution of the TTO. Preliminary results suggest that there is important heterogeneity in relative effectiveness and cost-effectiveness across and within the five conditions. For example, while for appendicitis, ES leads to increased costs but no reduction in mortality; for diverticulitis, ES appears to lead to higher mortality and higher costs.<br>**Discussion** We will report the relative effectiveness and cost-effectiveness of ES for subgroups of prime interest to inform clinical guidelines but also how best to target future trials. Our approach illustrates how EHRs can be combined with novel IV approaches to provide policy-makers with relevant evidence on the comparative effectiveness and cost-effectiveness of health technologies that are routinely provided. |

| **HESG ID#** | **2146** |
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| First author | Valerie Moran |
| Affiliations | Luxembourg Institute of Health and Luxembourg Institute of Socio-Economic Research, Luxembourg |
| Title | Investigating variations in the performance of primary care across European countries |
| Key words | Primary care, performance, Europe, multi-level modelling, random effects |
| Abstract | Objectives: High quality accessible primary care (PC) can contribute to strengthening health system performance. Hospital inpatient (IP) admissions for conditions amenable to treatment in PC are an indicator of PC quality. Previous studies investigated performance using country-level data on IP admissions. We investigate performance using individual-level data on IP admissions, general practitioner (GP) and specialist visits (access indicators) and measurement of blood cholesterol, pressure and sugar (continuity of care indicators). We explore the relationship between these outcomes and PC characteristics after adjusting for a rich set of individual characteristics. We compare unexplained variation in outcomes across European countries to assess performance.<br><br>Methods: We use 2015 European Health Interview Survey (EHIS) data for 23 European countries. We focus on individuals with diabetes, which can be effectively managed by PC. Individual-level risk-adjusters cover socio-demographics and health. PC characteristics covering healthcare governance, organisation, provider payment, and resources are sourced from OECD Health Statistics and Health Systems Characteristics survey. We estimate multilevel logit random effects models. We predict the country-level random effects post-estimation using Empirical Bayes (EB) methods and calculate comparative standard errors for the EB estimates in order to rank countries to make inferences about performance.<br><br>Results: Variables positively associated with all outcomes include a labour market status of permanently disabled or otherwise inactive (relative to employed) and fair or bad/very bad (relative to very good/good) self-reported health. Daily smokers were associated with a lower risk of all outcomes except GP visits. P4P, nurse checks, GP registration and gatekeeping were associated with a lower risk of IP admission. A higher rate of curative care beds was associated with an increased risk of IP admission. Out-of-hours PC by physicians' rota was associated with a higher risk of a GP visit and blood pressure measurement. P4P was associated with a higher (lower) risk of a GP (specialist) visit. Residual variation was highest for blood sugar measurement and lowest for IP admission. Moreover, countries ranking differed by outcome. Discussion: Preliminary results suggest scope for European countries to improve PC performance, particularly in continuity of care. No country was a consistently high or low performer across outcomes and additional analyses could further explore characteristics and models of care of high and low performers. We intend to undertake multiple imputation to include additional risk-adjustment variables (income, alcohol consumption) with missing data. |

| **HESG ID#** | **2142** |
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| First author | Aikaterini Papadopoulou |
| Affiliations | Yunus Centre for Social Business and Health, Glasgow Caledonian University |
| Title | Valuing public goods for use in health economic evaluation: the case of street music |
| Key words | contingent valuation, preference elicitation, public goods, music |
| Abstract | It is recognised that healthcare is not the only way to improve an individual's health. Community based interventions can have health and wellbeing impacts, however, the nature of these interventions pose challenges for the typical ways in which we value outcomes for use in economic evaluation. It is also the case that many initiatives acting on upstream social determinants may not even be perceived as health improving. Community based interventions often have the characteristics of public goods, these being their non-exclusive and non-rival nature. The approaches to valuation of these types of intervention should allow for the incorporation of option value and externalities as well as individual use value, suggesting a stated preference method such as Contingent Valuation.<br><br>This paper presents a contingent valuation study to elicit monetary values of a community based Piano programme. This programme involves the placement of pianos in public places around the city which are free to use with the aim of making arts accessible to the public. Five different scenarios were designed; three scenarios focused on the individual's interaction with the piano as a player or listener and two scenarios covered the wider community impacts. The survey was delivered online from March-May 2021 using social media to recruit participants globally. Data collection is ongoing, the online survey will close mid-May 2021, 104 responses have been received to date. The WTP results for each scenario will be presented.<br><br>The results will be discussed examining issues such as aggregation and perspective. The paper will also consider the challenges for the design of valuation studies for community based interventions with public good characteristics. |

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| **HESG ID#** | **2158** |
| First author | Diane Pelly |
| Affiliations | University College Dublin |
| Title | Worker well-being before and during the COVID-19 restrictions: A longitudinal study in the UK |
| Key words | COVID-19, well-being, mental health, welfare, homeworking, remote working, satisfaction, workers |
| Abstract | Despite the large number of studies published over the past 12 months, the impact of COVID-19 restrictions on worker well-being is largely unknown. In this study we examine 15 well-being outcomes collected from 621 full-time workers assessed before (November, 2019 - February, 2020) and during (May-June, 2020) the COVID-19 pandemic. Fixed effects analyses and 2 waves of primary survey data are used to investigate how the COVID-19 restrictions and involuntary homeworking affect general and work-related well-being, stress levels, mental health and job performance. The majority of well-being measures are not adversely affected. Homeworkers feel more engaged and autonomous, experience fewer negative emotions and feel more connected to their organisations. However, these welfare improvements come at the expense of reduced home-life satisfaction, reduced working hours and reduced self-rated job performance. Potential explanations for the relative stability of life satisfaction and affect within our sample which are explored in the paper include psychological adaptation and sample composition. Potential explanations for the deterioration in the self-rated performance of homeworkers in particular which are discussed include reduced employer demands, shirking, lack of motivation, performance mis-measurement, lack of preparation and the non self-selected nature of homeworking during COVID-19. Our study is one of very few that attempts to capture workers' lived experience of homeworking both pre- and during the period of COVID-19 restrictions. Our results reveal that homeworking, especially during a pandemic when many of the usual structural supports are unavailable and additional burdens in the form of childcare and homeschooling are imposed, is not for everyone. Our findings have important practical implications for organisations seeking to make decisions around future labour-force deployment post-COVID-19. |

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| **HESG ID#** | **2145** |
| First author | Diane Pelly |
| Affiliations | University College Dublin |
| Title | Worker well-being and quit intentions: is it time to look beyond job satisfaction? |
| Key words | worker wellbeing, quit intentions, voluntary turnover, work utility, mental health |
| Abstract | Dysfunctional voluntary turnover is particularly costly for the healthcare sector which relies heavily on human capital. Tackling voluntary turnover requires a thorough understanding of its determinants. Wages have proven to be a relatively poor predictor of quits, resulting in increased interest in the impact of non-pecuniary factors in the labour welfare function (work utility) on voluntary turnover. Economists typically rely on job satisfaction to proxy for work utility. Despite a burgeoning body of multi-disciplinary evidence which shows that work-related subjective well-being (worker well-being) is a multi-dimensional construct, of which satisfaction is just one element, the view that there is no need to look beyond job satisfaction when predicting quit intentions still dominates labour economics.<br><br>This paper investigates whether economists' use of job satisfaction as a proxy for work-utility related variation in quit intentions is justified. I use the Theory of Planned Behaviour (TPB) to frame voluntary turnover as a gradual withdrawal process. I investigate factors that may influence the penultimate stage of this process, namely quit intention formation. Using novel survey data for 994 UK workers, I employ a linear probability regression model to investigate potential determinants of quit intentions. I identify micro-econometric patterns in the personal and work-related characteristics associated with potential quitters. For the first time, I directly compare the extent to which 15 different well-being measures (including job satisfaction) explain variation in quit intentions. I also investigate links between perceived barriers to quitting and quit intention formation. Finally, I investigate heterogeneity around quit intentions, mental health status and performance.<br><br>I find that job satisfaction explain 5 times more variation in quit intentions than wages. While the multi-faceted measure of job satisfaction outperforms all measures, burnout is more strongly associated with quit intentions than the ubiquitous single-item job satisfaction measure. A composite model performs best, explaining 29% of variation. Sub-group analyses reveal that workers with mental health conditions are more likely to intend quitting, whereas high-performers are less likely. My results show that engagement and affective commitment are particularly effective in explaining quit intention variation amongst workers with poor mental health. My findings indicate that the reliance on job satisfaction as a predictor of quits is justified to the extent that a multi-faceted measure is used. However, my results also demonstrate the need to consider between-worker differences when specifying work-utility functions. My results have practical implications for organisations seeking to assess quit-risk and to design preventative interventions. |

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| **HESG ID#** | **2112** |
| First author | Sarah Price |
| Affiliations | University of Exeter, UK |
| Title | Unravelling the impacts of NICE guidelines on consultation costs and primary care tests |
| Key words | GP costs, Colorectal cancer, Two-part models, Guideline impact, Difference-in-differences |
| Abstract | Objectives: To explore the impact of revising suspected-cancer NICE guidelines on consultation costs and primary care tests. We focus initially on colorectal cancer, because guideline revision introduced primary care testing for nonvisible blood in the stool (FIT/FOBT).<br>Methods: We used Clinical Practice Research Datalink data with cancer-registry linkage. Participants (n=2,000) had incident diagnostic colorectal cancer codes, pre (01/08/2012â€"31/12/2014) or post (01/08/2015â€"31/12/2017) guidance revision. Costs were estimated assuming 2020 unit costs (Curtis) for: ( 1) GP or nurse consultations (face-to-face, telephone or home); (2) Blood and FIT/FOBT tests.<br>Two-part difference-in-differences models estimated the mean changes in GP, nurse and test costs. In Model 1, logistic regression estimated the odds of non-zero costs. In Model 2, a generalised linear model (gamma family, identity function) estimated the expected costs, using data from participants with non-zero costs. Independent variables were age, sex, Townsend score, and dummy variables for pre-post periods and the guidelines. The guideline dummy classified participants by whether their first presenting cancer symptom was listed in the original guidance (â€œOld-NICEâ€□ â€" control) or was added during revision (â€œNew-NICEâ€□). The interaction term between the guideline and pre-post variables quantified the change in mean cost attributable to guideline revision. The results are presented as average marginal effects, conditional on positive cost.<br>Results: The proportions of participants with non-zero costs were 1,971/2,000 (98.6%) for GP, 1,556/2,000 (78%) for nurse, and 495/2,000 (24.8%) for tests. GP costs were higher for New-NICE than Old-NICE patients before guideline revision (90.72, 95%CI 68.26 to 113.17, p<0.0001). There was moderate evidence of a secular increase in GP costs (32.45, 2.09 to 62.81, p=0.036). The interaction term was significant (p=0.0199), with a mean decrease in GP costs attributable to guideline revision of -41.53 (-82.04 to -1.02). For nurse and test costs, there was no evidence of any difference in over time, between Old-NICE and New-NICE groups, and the interaction terms were not significant.<br>Conclusions: Revising NICE guidelines for suspected colorectal cancer may have reduced GP costs, possibly through earlier referral to secondary care. Estimated aggregate GP cost savings arising for the 34,337 consulting patients diagnosed in a typical year are £1,426,016. The results are consistent with reductions in diagnostic interval for patients with New-NICE symptoms. Further analysis will analyse impacts on ovarian cancer, which also introduced a new primary care test, and pancreatic cancer which did not; and we will explore the effect of adjusting for multimorbidity. |

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| **HESG ID#** | **1966** |
| First author | Carlos Riumallo Herl |
| Affiliations | Erasmus School of Economics |
| Title | Stronger Together: Experimental Evidence on Group Incentives for Preventive Health Services |
| Key words | RCT, CVDs, Team incentives, Financial Incentives, Health behaviours |
| Abstract | Although team incentives are seen as powerful tools to leverage the power of social groups, they have rarely been used to encourage behaviours outside firms. In this study, we partnered with a micro-finance organisation in El Salvador to test if the power of group incentives in existing social networks to encourage the demand for preventive healthcare services in a population at risk of cardio-vascular diseases (CVD).<br><br>We enrolled 400 groups of 3-6 members jointly liable for the repayment of a micro-credit into a cluster-randomised trial. We gave them information about risk factors and benefits of routine check-ups, and a free voucher for a medical check-up including a blood test and medical consultation. Each group was randomly allocated to receiving no incentive, individual incentives or team incentives for using the voucher. In addition, we cross-randomised two incentive designs: a small reward worth US$5 per person for using the voucher (or, in the case of team incentives, if all members of a group used their voucher), or a lottery with a 5% chance of winning a prize of USD$100.<br><br>We find incentives more than double the demand for preventive services. As the screening requires two separate visits, incentives are particularly effective at keeping individuals motivated, limiting the drop out after the first visit. The results also show the power of social effects to encourage individuals: despite the fact that team incentives are more uncertain than individual ones, since fulfilling the conditionality relies on others' behaviours, group incentives are equally, if not more effective than individual ones. This is thanks to stronger social effects motivating group members to take up the preventive screening (e.g. better communication and support within groups who have team incentives). However, while individuals with high CVD risk are more likely to redeem their voucher with individual incentives, this is not the case with team incentives. Despite this lack of targeting effect, group incentives provide equal or better value for money than individual ones.<br><br>Together with the drop-out rates observed between the blood test and medical consultation, the effect of team incentives suggest that individuals do not necessarily under-value the benefits of preventive services, but require extra motivation to overcome some of convenience barriers they face, pointing to the role of present bias. Leveraging the power of existing social networks may present a new avenue for designing more cost-effective incentives in developing countries to encourage individuals to use preventive services. |

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| **HESG ID#** | **2126** |
| First author | Francesco Salustri |
| Affiliations | Institute for Global Health, University College London |
| Title | The contributions of public health policies and healthcare quality to gender gap and country differences in life expectancy in the UK |
| Key words | gender gap, life expectancy, avoidable deaths, preventable deaths, mortality |
| Abstract | Background. In many high-income countries like the UK, life expectancy (LE) has increased, with women outliving men. This gender gap in LE (GGLE) has been explained with biological features, healthy behaviours, health status, and sociodemographic characteristics, but little attention has been paid to the role of public health policies. This study analyses and compares the contributions of avoidable causes of death, as a measure of public health policies and healthcare quality, into the GGLE and its changes in the UK between 2001-2003 and 2014-2016. Additionally, we estimate the contributions of avoidable causes of death into the LE gap across countries in the UK.<br><br>Methods. We obtained UK annual data on underlying causes of death by age and sex from the World Health Organization mortality database for the periods 2001-2003 and 2014-2016. We calculated gender- and age-specific LE at birth using abridged life tables for five mutually exclusive categories of causes of death: only treatable, only preventable, treatable and preventable, ischaemic heart disease (IHD) and non-avoidable. The GGLE in each period and its changes between two periods were decomposed by age and cause of death using Arriaga's decomposition method. Additionally, we decomposed the cross-country gap in LE by age and cause of death in the 2014-2016 period.<br><br>Results. Avoidable causes had greater contributions than non-avoidable causes to the GGLE in both periods (62% in 2001-2003 and 54% in 2014-2016) in the UK. Among avoidable causes, IHD followed by injuries had the greatest contributions to the GGLE in both periods. On average, the GGLE across the UK narrowed by about 1.0 year (-20.9%) between 2001-2003 and 2014-2016 and IHD followed by lung cancer and injuries accounted for about 0.8 years (81.3%) of this reduction. England and Wales had the greatest LE for both sexes in 2014-2016. Among avoidable causes, injuries in men and lung cancer in women had the largest contributions to the LE advantage in England and Wales compared to Northern Ireland, while drug-related death had the greatest contributions compared to Scotland in both sexes.<br><br>Conclusion. With preventable deaths substantially contributing to the gender and cross-country gaps in LE, our results suggest the need for encouraging behavioural changes by implementing targeted public health programs. Moreover, our cross-country analysis highlighted that this may be particularly relevant for younger men from Scotland and Northern Ireland. |

| **HESG ID#** | **2097** |
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| First author | Paul Schneider |
| Affiliations | University of Sheffield |
| Title | A NEW ONLINE TOOL FOR VALUING HEALTH STATES USING A COMPOSITIONAL APPROACH: ELICITING PERSONAL UTILITY FUNCTIONS FOR THE EQ-5D-5L |
| Key words | Valuation of health; valuation methods; online tool; multi-attribute value theory; |
| Abstract | Background<br>There are two types of preference elicitation techniques: compositional and decompositional methods. Standard valuation methods, such as TTO and DCE, belong to the latter. Their main disadvantage is that they are inefficient: limited information is obtained from each participant. As a result, creating value sets for the EQ-5D-5L (or any other descriptive system) requires hundreds if not thousands of participants. Compositional methods, on the other hand, are much more efficient they even allow the estimation of value sets on the individual level.<br>Building on the Personal Utility Function (PUF) approach developed by Devlin et al. (2019), we present a new online tool (O-PUF) for valuing health states, using compositional preference elicitation methods. The aims of this paper are to report on the development of the tool, and to test the feasibility of using it to obtain individual-level value sets for the EQ-5D-5L in a small pilot study.<br>Methods<br>The O-PUF is based on the study by Devlin et al., which successfully pioneered the use of compositional methods in face-to-face interviews to estimate personal EQ-5D-3L value sets. We adapted their methods for the 5L version and for online use. The valuation consists of three steps: 1) level rating; 2) criteria ranking and swing weighting; and 3) a 'position of dead' task. The online tool is being tested in a small sample drawn from the UK population.<br>Results<br>Pilot work is currently underway and results will be available in time for presentation at this Summer's HESG meeting. Preliminary results suggest that it is feasible to estimate EQ-5D-5L value sets on the individual-level using the new online tool.<br>Discussion<br>A challenge in the development of the tool was adopting the valuation tasks for online use. Online participants may be less motivated to work through difficult exercises. We thus simplified the valuation tasks and tried to provide short, intuitive instructions. However, in the absence of any guidance, it remains unclear whether we stroke the right balance between rigour and ease of use.<br>Even though the development of the online tool is in an early stage, there are potential avenues for further research. The tool was coded in R/Shiny. For the implementation, we have developed generic methods and functions which could easily be adapted for other settings. In fact, with some further abstraction, the underlying code could provide a modular software platform for creating valuation tools for almost any health descriptive system. |

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| **HESG ID#** | **2094** |
| First author | Carlos SIllero-Rejon |
| Affiliations | a. NIHR Applied Research Collaboration West at University Hospitals Bristol and Weston NHS Foundation Trust. b. Health Economics Bristol, Population Health Sciences, University of Bristol. |
| Title | Can value of implementation and policy cost-effectiveness methods be reconciled? An analysis illustrated with economic evaluation of two implementation programmes to increase the uptake of magnesium sulphate in pre-term births for the prevention of neurodisabilities |
| Key words | policy cost-effectiveness, value of implementation, implementation, quality improvement, neurodisabilities |
| Abstract | Background: methods for economic evaluation of implementation initiatives to increase the uptake of cost-effective healthcare are not standardised. Value of implementation and policy cost-effectiveness are two approaches to evaluate implementation initiatives. This research aims to demonstrate that these two methods can be reconciled and developed further. To illustrate this, we evaluate an implementation programme to increase magnesium sulphate (MgSO4) uptake in preterm labour to reduce the risk of cerebral palsy. In England, the National PReCePT Programme (NPP) involved 152 maternity units with the provision of regional support and funded clinical time. Forty of those units also participated in the PReCePT Trial, a cluster RCT embedded in NPP to evaluate an enhanced support model for implementation (ESP) with additional unit-level coaching and extra funding time.<br>Methods: we applied value of implementation and policy cost-effectiveness methods and reflected on their advantages and disadvantages, proposed a reconciliation to standardise evaluation of implementation initiatives to increase the uptake of cost-effective healthcare technologies. We estimated the net monetary benefit of NPP (versus pre-existing trends) and the ESP (versus the NPP) and their probability of being cost-effective.<br>Preliminary Results: both methods, value of implementation and policy cost-effectiveness, depend on the change in uptake of the healthcare technology, cost of the implementation activity, size of the eligible population affected over time and context (including scale), and the cost-effectiveness of the healthcare technology. We demonstrate that value of implementation and policy cost-effectiveness are distinct approaches and suggested a reconciliation. With this standardised approach, the NPP generated a societal lifetime net monetary benefit of £70,442 per maternity unit over 18 months, and more than £10m nationally, at a willingness-to-pay threshold of £20,000; the probability of being cost-effective was 99%. In contrast, the ESP generated a net monetary benefit of -£10,762 per maternity unit in comparison to the NPP; the probability of being cost-effective was 27%.<br>Conclusions: it is possible to reconcile value of implementation and policy cost-effectiveness methods; our standardised approach enables evaluation of specific implementation initiatives, accounting for characteristics and determinants of implementation science (e.g., contextual factors or outcomes). With this standardised approach, we concluded that PreCePT, as implemented in NPP, was highly cost-effective, and adding enhanced support is not likely to be cost-effective. Economic evaluation is useful for implementation research; we developed the ongoing discussion about how it can be done most efficiently. |

| **HESG ID#** | **2098** |
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| First author | Nicolas Silva-Illanes |
| Affiliations | School of Health and Related Research, University of Sheffield |
| Title | Effort, reward and healthy lifestyles: A questionnaire experimental study |
| Key words | inequality, fairness, reward, lifestyles |
| Abstract | For a given distribution of achievements, equality of opportunity will be attained if two principles hold: compensation and reward. Compensation principles concern reducing inequalities among individuals with the same effort (factors which the individuals should be held accountable for) and different circumstances (factors which are beyond the individuals' responsibility), whereas reward principles concern dealing with differences in achievements that are entirely due to differences in effort, among individuals with the same circumstances. Both the theoretical and the empirical literatures largely focus on compensating for difference in circumstances, while the reward principles remain under-researched. The aim of this paper is to take two reward principles derived from two definitions of effort that have been proposed in the literature, adapt them to the health context, and to explore whether these are supported by the Chilean members of the public. In the first, higher effort (i.e. healthier lifestyles) should be rewarded with higher achievement (better health), which relies on the assumption that people agree on the ordering of different lifestyles depending on how costly each is for them in terms of subjective utility. This approach is tested by exploring whether respondents prefer healthy but costly lifestyles over unhealthy but less costly lifestyles, if their lifestyles had no effect on health. In the second, effort is defined as a matter of individual preferences and the reward principle that is derived from this definition entails that no compensation is due when individuals choosing differently from the same choice set leads to different achievements. We use hypothetical scenarios involving a health inequality that are caused by variation in preferences of individuals choosing from the same given choice set, to test if respondents are willing to reduce such health inequalities. Over 500 Chilean citizens are surveyed using an online questionnaire. Data collection of the study is currently ongoing, and we expect to report the results in the HESG paper. The findings of the study will help to understand whether there is room for an alternative notion of reward that could favour the reduction of inequalities that originate in differences in health-related lifestyles. |

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| **HESG ID#** | **2132** |
| First author | Katie Spencer |
| Affiliations | Leeds Institute of Health Sciences, University of Leeds and Leeds Teaching Hospitals NHS Trust |
| Title | Variable and fixed costs in NHS radiotherapy; how realisable are the cost savings of increasing hypofractionation? |
| Key words | disinvestment, radiotherapy, time-driven activity-based costing, reimbursement |
| Abstract | **Background**: The rise in cancer diagnoses in an increasing and aging population will require increased radiotherapy capacity. Whilst investment will undoubtedly be required, efficient use of existing facilities has the potential to reduce this. Shorter treatments, requiring fewer attendances (hypofractionation), minimise burden for patients whilst maintaining clinical outcomes. Fixed costs within providers may mean savings are not realisable. Understanding radiotherapy costs and cost-drivers, the extent to which these are fixed and consequences of reducing departmental activity, can help to inform cost-utility analyses, reimbursement and disinvestment strategies.<br>**Methods:** Time-driven activity-based costing was used to estimate the cost of delivering five alternative treatment strategies for bone metastases in a large NHS provider. Modelled provider costs are compared to NHS reimbursement tariff. The extent of fixed (buildings), semi-variable (staff), stepped (linear-accelerators) and variable (materials) costs were assessed. Cost drivers and the impact of reducing departmental activity were assessed using deterministic sensitivity analyses. Using the national radiotherapy dataset, we determine expected foregone fraction numbers (per provider) following the major change in activity seen with uptake of ultra-hypofractionated adjuvant breast cancer radiotherapy in 2020. Comparing this to expected equipment capacity thresholds allows identification of the magnitude of realisable savings.<br>**Results**: The estimated provider costs of RT for bone metastases ranges from £376 (single fraction) to £3,700 (45Gy in 25# course), aligning closely with NHS reimbursement, except for the stereotactic strategy (tariff exceeding provider costs by 15.3%). Semi-variable staff costs account for 28.0-39.5% and fixed/stepped costs 38.5-54.8% of provider costs. Departmental activity is the biggest cost driver; reduction increases remaining treatment costs. Reduced staffing can diminish this increase, however, disinvestment from equipment has a greater impact where realisable. The change to ultra-hypofractionated breast cancer radiotherapy resulted in an estimated average of 2,927 (SD:1,654). fractions forgone per provider. One department reached the threshold for possible equipment decommissioning.<br>**Conclusions**: Alignment between NHS reimbursement tariff and provider cost is good for a majority of modelled treatments with fixed/stepped a large proportion. Despite a marked fall in delivered fractions, one provider reached equipment capacity thresholds supporting decommissioning. Consequently, short to medium-term imbalances between demand and capacity will result in increased treatment costs. As savings cannot be realised at provider level reimbursement on a per-fraction basis may act as a disincentive to providers delivering efficient, hypofractionated radiotherapy. In the long-term, failure to deliver efficient services may lead to an increased requirement for investment in order to treat rising cancer diagnoses. |

| **HESG ID#** | **2157** |
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| First author | Paula Spinola |
| Affiliations | UCL |
| Title | Effect of C-section on infant health: Evidence from a rationing policy |
| Key words | Cesarean section, infant health, rationing policy, instrumental variable |
| Abstract | We take advantage of a rationing policy introduced by the Brazilian government in the late 1990's to study the health consequences of C-section in the first year of life. Because the policy introduced a fixed threshold to the monthly rate of C-sections that all public providers would be compensated for, the extent to which it was binding to each provider depended on their rate of C-section in the baseline period. In a differences-in-differences analysis, we find that, indeed, municipalities most likely to be exposed to the policy (i.e. those with higher baseline C-section rate in the public health system) experienced a higher decrease in their overall rate of C-section after the policy was implemented. Using pre-policy C-section rate at the municipality level as a measure of policy exposure to instrument likelihood of this type of childbirth procedure, we find that C-section increases both Apgar scores and hospitalization rates within the first year of life. Our results, thus, point to a positive impact of C-section in health at birth and negative impact within the first year of life. We argue that our marginal C-section are driven by ex-ante low-risk births as physicians are expected to respond to the policy by cutting C-sections that are not justified on medical grounds. To our knowledge, this is the first study to investigate the causal health effect of C-sections not only in a lower middle-income country, but in one with the highest C-section rate in the world. |

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| **HESG ID#** | **2144** |
| First author | Jonathan Stokes |
| Affiliations | University of Manchester |
| Title | Wider public expenditure, the wider determinants of health and multimorbidity |
| Key words | Public expenditure, multimorbidity, wider determinants of health, disease risk factors |
| Abstract | **Background:** It has been estimated that only 10% of population health is determined by healthcare services. The remaining 90% has been attributed to a mix of behaviours, social circumstances, environment, and genetics. New models of care, therefore, tend to try and expand the prevention aspect of healthcare services. However, other existing public spending areas might also affect these â€˜wider determinants of health. Differential austerity cuts across local authorities have created an experimental opportunity to examine associations with prevalence of known disease risk factors and multimorbidity.<br>**Methods**: We combine three data sources to build an annual dataset for the 152 upper-tier local authorities (varies by measure, min: 2015-18; max: 2010-18).<br>1. Gross expenditure per capita from the Place-based Longitudinal Data Resource: Total (by Highways and transport; Social care; Public health; Housing; Cultural; Environmental; Other). Converted to real, 2017, prices using the ONS CPI.<br>2. Multimorbidity prevalence from GPPS. Individual-level data on presence of 2/3/4 or more and average count from 16 self-reported conditions collapsed to the UTLA level incorporating survey weights.<br>3. Disease risk factors from the PHE fingertips dataset. We categorised by: Obesity (prevalence of youth; adult; active/inactive adults); Risky behaviours (smoking; alcohol admissions; violent crime admissions); Deprivation (long-term job seekers; children in low-income households; homelessness); and Community/Environment (social isolation of adult social care users; Pollution). Additionally, % under 18 and % over 65.<br>We ran nine two-way (UTLA, year) fixed-effect models for each outcome. First, including only total UTLA expenditure as the main independent variable. Second, each budget line in turn (also including total expenditure minus that budget line, seven models). Third, all seven budget lines simultaneously. All adjusted for additional time-varying confounders (age proportions), and standard errors were clustered by UTLA.<br>**Results** : Initial results indicate higher expenditure was associated with decreased (particularly complex 3/4+ conditions, and mean count) multimorbidity, social isolation, and long-term job seekers. But it was also associated with decreased physical activity (and increased physical inactivity), and increased pollution. Multimorbidity associations appeared to be driven by Public health and Environmental budget lines; social isolation by Cultural; long-term job seekers mostly by Public health. Physical activity/inactivity by increased Highways and transport and Environmental spending; pollution by a mixture of Housing and Highways and transport.<br>Discussion<br>Next steps will involve exploring addition of lags and other covariates. Results will be discussed in terms of increasing use of pooled budgets and public expenditure control by Integrated Care Systems. |

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| **HESG ID#** | **2043** |
| First author | An Ta |
| Affiliations | University of Sheffield |
| Title | Eliciting public preferences across health and wellbeing dimensions to calculate equivalent income |
| Key words | multi-dimensional well-being; equivalent income; DCE; online survey |
| Abstract | BACKGROUND: There is a call for a move from health policy to health and wellbeing in all policies, arising from the growing recognition of the importance of an intersectoral and systems-based approach to public policy. Household income would be a poor metric to evaluate such policies, and a preference-based single-index wellbeing measure is needed. This study elicits preferences of the general public to operationalise a preference-based monetary measure of wellbeing called equivalent income, which collapses peoples' preferences across multiple dimensions of wellbeing, including health.<br><br>METHODS: Data were collected using a discrete choice experiment (DCE). Individual wellbeing was described across seven dimensions: the effects of physical health (with five levels), the effects of mental health (five levels), loneliness (three levels), employment (six non-ordered categories), household income (continuous), housing quality (three levels), and neighbourhood safety (three levels). Based on priors from a pilot study (n=100), a D-efficient design with 120 choice tasks was selected. To ease participant burden, partial profiles were used where at least two out of the six categorical dimensions were always ties. The choice tasks were allocated to 12 blocks of 10 choices each. An online survey using an internet panel was conducted. DCE data were modelled using conditional logit regressions, and equivalent income for each survey respondent was calculated using the estimated preferences. Agreement across the ranking of respondents using predicted equivalent income and the ranking using equivalised household income was analysed.<br><br>RESULTS: A total of 4536 individual attempted the survey, with 3362 providing valid data for analysis. All coefficients of the conditional logit model representing ordered levels of categorical dimensions are significant and have the expected sign. The coefficient for income is positive and significant. Not all employment categories are statistically significantly different from each other. Overall, large weights are placed on the effects of physical and mental health, followed by employment and housing quality. The least important dimensions are loneliness and neighbourhood safety. Amongst those who have the lowest 20% equivalent income, 60% are also amongst the worst-off in terms of equivalised income.<br>CONCLUSION The findings provide insights into average preference weights across different wellbeing dimensions. Furthermore, the analysis quantifies the effect of incorporating preferences for non-income dimensions, the most important of which are the two health-related dimensions.<br>This work was supported by the UK Prevention Research Partnership (MR/S037578/1). |

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| **HESG ID#** | **1944** |
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| Title | The effect of informal care on the allocation of time: implications for trade-offs, opportunity costs and measurement |
| Key words | Informal care; time allocation; time use data |
| Abstract | Background: Informal care requires a considerable time investment from providers. This inherently involves trade-offs against alternative uses of time such as leisure or market work, which may result in a decreased attachment to the labour market. Given that time is a constrained resource, understanding how caregiving affects various uses of time can help identify its value, provide insights into its measurement and highlight potential mechanisms through which health and wellbeing are affected.<br><br>Aim: To understand the effect of informal care on time allocation.<br>Methods: We use the 2000/01 and 2014/15 UK Time Use Surveys of how 14,704 respondents allocate all ten-minute blocks of their time across two days. Our analysis focuses on the amount, fragmentation and timing of six activity types. By comparison to non-carers, we demonstrate the opportunity costs and identify the incremental time of caregiving for household non-market work. We supplement objective time-use measures with a subjective measure of time stress. For identification, we employ a doubly robust approach using entropy balancing supplemented with regression adjustment.<br><br>Results: There are large non-market work and market work trade-offs at 2.9% more (by 41.8 minutes) and 2.8% less of the day (by 40.3 minutes), respectively, for informal carers relative to non-carers on weekdays. There is a smaller trade-off with leisure at 0.08% less of the day (by 11.52 minutes) on weekends which is similar in size to sleep coefficients on all days. Opportunity cost analysis values caregiving at £73.53 per week using the UK median hourly wage. Incremental time calculation shows that 2.6%-29.7% of reported caregiving time on seven household non-market activities can be judged as attributable to caring. Carers spend more time on leisure as a secondary activity, their time is more fragmented than non-carers and they are more likely to experience time stress.<br><br>Implications: Carers forgone leisure and sleep may be mechanisms through which health and wellbeing outcomes are affected. Analysis of secondary uses of time and the fragmentation of activities shows the time profile of carers can be considered as â€˜time stressful. Opportunity cost calculations produce a monetary valuation that is greater than the State allowance for carers, suggesting carers are under-compensated. The incremental time calculations we produce can be applied to reports of household non-market time for use in economic evaluations. |

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| **HESG ID#** | **2062** |
| First author | Felipe Vera |
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| Title | Cost-effectiveness of Physical Activity Interventions in the Prevention of Alzheimer's Disease |
| Key words | Physical exercise, Alzheimer disease, Prevention, cost-effectiveness |
| Abstract | Introduction:<br>Alzheimer's disease has extensive economic and health implications in an increasing number of countries. This study presents a simulation-based cost-effectiveness analysis that examines precision targeting people with Mild Cognitive Impairment (MCI) using physical activity in the prevention of Alzheimer disease.<br>Methods<br>A Micro-simulation was developed, using physical activity in individuals with MCI. Effectiveness was estimated using meta-analysis on the Mini-Mental State Examination (MMSE). Costs and Quality-Adjusted Life Years (QALYs) were estimated to calculate the incremental cost-effectiveness ratio (ICER). Uncertainty analysis was performed. Expected Value of Perfect Information (EVPI) was used to examine the value of research.<br><br>Results<br>Over a lifetime horizon targeted physical activity produce an incremental 0.55 QALYs and £6,438 costs. It is cost effective (ICER=£11,614 per QALY) at a threshold of £20,000 per QALY, the probability of being cost-effective is 89%. The monetary value of removing current uncertainty is estimated to £300 million.<br>Discussion<br>Physical activity interventions targeting MCI as a strategy to prevent Alzheimer's disease suggested effectiveness and a high likelihood of being cost-effective. Estimates of the value of further information suggest physical activity as a priority for future research |

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| **HESG ID#** | **2015** |
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| Title | The impact of community care services on the risk of care home admission. A competing risks survival analysis using administrative records |
| Key words | social care, survival analysis, competing risks, inverse probability weighting, administrative |
| Abstract | Background: Reducing care home admissions is a key objective for social care due to their high cost and the strong preference by most people to remain in their own homes for as long as possible. This study analyses, using administrative data, the impact of community care services on the risk of care home admissions of older people with social care needs.<br><br>Methods: We test the effect of community care services on time until admission to a care home, using data from administrative records from a large English local authority (LA). We develop two sets of models with alternative indicators of community care support, controlling for key need characteristics of the service recipients: (1) the intensity of the care package (proxied through the weekly care packlage cost) and (2) the weekly cost of individual care services. To reduce potential biases from observational data, the care package intensity models are performed in two stages. We first use the Covariate Balance Propensity Score method to estimate weights that balance relevant covariates against community care intensity. We then use the weighted dataset to fit a survival model estimating the relationship between community care intensity and the probability of failure. We consider two failure types, admission to care home and death, using a competing risks model. In addition, we select a model based on the subdistribution hazard function because this method is preferable when the focus is on estimating actual risks and prognosis. A separate set of models is produced examining the impact of individual services, controlling for need-related risk factors.<br><br>Results (preliminary): Controlling for other factors, the probability of admission to institutional care is halved for an individual receiving high-intensity home care (90th percentile) compared to an individual receiving low-intensity support (10th percentile). Home care, direct payments and day care services are found to reduce the risk of care home admission. Higher intensity of respite care, in contrast, is associated with a higher risk of permanent care home admission.<br><br>Conclusions: Providing more intensive care package in the community reduces the risk of care home admission. Whereas more analyses are needed to understand the implications for the optimum balance between community and based-based care services, the results are important for the ongoing debate about the potential for preventative interventions. Our results also suggest that it is possible to use observational data from administrative records to evaluate health and social care services. |

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| **HESG ID#** | **2131** |
| First author | Ben Walker |
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| Title | Sleep duration and economic productivity |
| Key words | sleep, productivity, panel data regression |
| Abstract | Background:<br>Sleep is essential for health. Optimal sleep duration has been linked to higher economic productivity but prior studies were usually cross-sectional.<br>Aim:<br>To determine the extent to which associations between sleep duration and economic productivity can be attributed to cross-sectional differences between individuals and the extent to which it can be attributed to longitudinal changes in individuals' sleep duration.<br>Methods:<br>We use up to 4 waves of data from 23,979 participants in the UK Household Longitudinal Survey. Respondents were asked to report their usual sleep duration per night over the past month. We relate this to three measures of economic productivity: whether in paid employment; hourly wages; and whether they had worked less carefully due to emotional problems. We use Mundlak correlated random-effects regression models to separate the cross-sectional from the longitudinal associations between sleep duration and outcomes.<br>Results:<br>The baseline mean (SD) age of respondents was 42 (13) years; 53% were female and 80% white. 51% reported sleeping 7-8 hours/night, 4% slept 9 hours. Compared to the optimal sleep duration of 7-9 hours per night; Men reporting 5 hours sleep were 18.8% (95% CI: 14.3%-23.3%) less likely to be employed, had £3.13 (1.25-5.01) lower hourly wages and were 10.2% (6.5%-13.8%) more likely to report working less carefully. Conditional on their average sleep duration; changes in sleep duration in single years were not associated with significant changes in wages for men or women; for example, a single year change to less than 5 hours sleep was associated with a non-significant £0.48 (-1.56 - 2.54) reduction in wages for men. Associations between sleep duration and wages were not found for women, however an association between changes in single year sleep duration and working less carefully was found for women. There is some evidence of a non-linear relationship between sleep duration and economic productivity with sleep duration >9 hours/night in men being associated with a 2.6% (0.1 - 4.5) increase in the probability of working less carefully.<br><br>Discussion:<br>These preliminary data suggest that associations between sleep duration and economic outcomes primarily reflect cross-sectional differences between individuals rather than the effects of longitudinal changes in sleep over time. This suggests the potential to improve economic outcomes through changing individuals' sleep may be limited. Next steps in this work will involve estimating the relationship between other sleep characteristics (such as sleep quality) and productivity. |

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| **HESG ID#** | **3000** |
| First author | Jiunn Wang |
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| Title | Valuing frailty: a compensating variation approach |
| Key words | Frailty, subjective well-being, compensating variation |
| Abstract | Background<br>Many studies have focused on the financial distress caused by frailty, but the psychological burden is somewhat neglected in the literature. We address this issue by exploring the association between subjective well-being and frailty with different levels of severity.<br><br>Methods<br>We used a sample from the English Longitudinal Study of Aging (ELSA) with participants aged 50 or over. The compensating variation approach was employed, whereby we regressed individuals' subjective well-being on their weekly income and frailty states and then examined the ratios between the coefficient of frailty and that of income. The measure of subjective well-being was based on an ordinal estimation of life satisfaction, and the measure of income was based on an equivalised household income variable covering income sources including employment, self-employment, state pension and private pension. Frailty index scores were calculating using 58 ageing-related health deficits and then categorised them into 4 states: very fit, well, vulnerable and frail. To capture the potential endogeneity and the ordinal property of the dependent variable, we used the blow-up and cluster estimator to conduct fixed-effect logistic estimations. A further analysis was conducted by separating the sample into those under the age of 65 and those aged 65 or above to see if the trade-offs differ across different age groups.<br><br>Results<br>The associations between subjective well-being and frailty are negative. These negative associations are stronger for more severe states of frailty. The compensating variation for the progression in frailty are £647.32, £4,091.13 and £108,200.70 depending on the level of severity. Our subgroup analysis shows the association between frailty and subjective well-being is less strong for older individuals, but its impact increases at a faster speed as states of frailty progress for older individuals.<br><br>Conclusions<br>We confirm the negative association between subjective well-being and frailty and find that this association becomes stronger as the states of frailty aggravate. Individuals value frailty differently by age in that the negative association is less strong for older people. The monetary amount for the progression in frailty is substantial in that the compensating variations are at least twice the average weekly income in the sample. As a complement to exiting studies analysing costs of frailty from the supply side, this study provides new evidence on how individuals value frailty from the demand side. |

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| **HESG ID#** | **2100** |
| First author | Hei Hang Edmund Yiu |
| Affiliations | Warwick Clinical Trials Unit, Warwick Medical School, University of Warwick |
| Title | The use of composite time trade-off and discrete choice experiment methods for the valuation of the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS): A think-aloud study |
| Key words | SWEMWBS, composite time trade-off, discrete choice experiment, cognitive interview |
| Abstract | Background<br>Concerns have been raised regarding the sensitivity of standard health-related quality of life tools for valuing mental health. The Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS) is a widely validated measure of mental well-being and recommended by UK policy makers. Eliciting a preference-based valuation set for the SWEMWBS could allow it to be used for economic evaluations of a wide range of interventions.<br>Objective<br>The aim of this study was to investigate the cognitive process of completing composite time trade-off (C-TTO) and discrete choice experiment (DCE) exercises for the valuation of the SWEMWBS to inform the optimisation of a valuation protocol.<br>Methods<br>Fourteen face-to-face cognitive interviews were conducted with a convenience sample in the UK using concurrent and retrospective think-aloud and probing techniques. Each participant completed 8 C-TTO tasks and 8 DCE tasks generated from experimental designs within a computer assisted personal interview setting. Verbal information was subsequently transcribed verbatim. Axial coding and thematic analysis were used to organise the qualitative data and identify patterns and problems with the completion of the task.<br>Results<br>Whilst participants found the valuation tasks generally manageable, six broad themes emerged to explain and optimise the response to the tasks. 1) Format and structure: attention needs to be paid to the design of practice examples, instructions, and lay-out, to suit people from different backgrounds. 2) Items and levels: interactions are likely across different combinations of levels of SWEMWBS items, which have modelling and valuation implications. 3) Decision strategies: participants engage in mental shortcuts to assist trade-off decisions. 4) Valuation feasibility: certain mental well-being states were difficult to imagine, compare and quantify. 5) Valuation outcome: The quality of the data was affected by participants' discriminatory ability across mental well-being states, their time trade-off decisions, and their ability to choose between forced DCE choices. 6) Reflections on mental well-being: The usefulness of these valuation tasks on reflecting personal preferences enhanced the practicality of using techniques widely used for health state valuation for valuing mental well-being.<br>Conclusions<br>The interviews suggested valuation of SWEMWBS states was feasible and contributed insights regarding the robustness of the proposed methods. A modified protocol informed by the results is being tested in a larger sample across the UK. |