The University Of Sheffield.

Abstracts

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Title

"Leaving General Practice in Norway: a Registry-based Study"

Abstract

Objectives

In most OECD countries, recruitment and retention of General Practitioners (GPs) is proving difficult. A shortage of GPs could affect the quality of care and prevent health systems from meeting the growing demand for primary care services. Despite this, little is known about observed GP quitting behaviour and decisions. The purpose of this study is (1) to track changes in GP practice style in the years prior to quitting, and (2) to identify key characteristics of quitters.

Methods

We leverage unique Norwegian registry data from 2010 to 2019 including about 100 million observations, covering consultation-level information of 5 million patients and 10,000 GPs. We identify quitting GPs as those that exit our dataset at some point during our study period. Firstly, we estimate differences between quitters and comparable non-quitters across a series of measures of healthcare provision in the years prior to quitting using regression adjustment. Secondly, we explore the characteristics associated with being a quitter, including GP characteristics, practice characteristics, and broader factors captured by fixed effects for years of activity and municipality. To overcome the endogeneity in the relationship between the quitting decision and income per consultation, we use an instrumental variable approach based on exogenous patient complexity.

Results

We find an overall trend of increased quitting over our study period. We also find evidence that GPs change their practice style in the years prior to quitting, reducing the number of fees and increasing overtime work and use of locums. Finally, GPs who decide to quit generate less income per consultation.

Discussion

The late onset of change in practice style towards the end of tenure may suggest that GPs are unable or unwilling to reduce their workload to improve working conditions prior the quitting decision. Our findings also suggest that GPs who successfully align their practice style with the attributes of the remuneration system, rewarding GP output in terms of patients list and consultations, are more likely to stay in the profession. This may reflect a certain self-selection in the GP profession, suggesting that different contractual arrangements could be offered to attract GPs with other preferences.

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Title

"Should minimally important differences be applied to EQ5D?"

Abstract

Background

The EQ-5D is one of the most frequently used generic, preference-based health-related quality of life instruments (HRQoL). Several studies have investigated whether observed differences in EQ-5D index scores are meaningful to patients using the concept of minimally important difference (MID). There is currently no consensus on whether MID is a useful concept to apply to cardinal utility measures such as the EQ5D that are used in economic evaluation.

Objective

To critically evaluate the use of MID for EQ-5D and for QALY-based health economic evaluation.

Methods

A scoping review was conducted using Arksey and O'Malley's six-step methodological framework and followed PRISMA recommendations for scoping reviews. We searched PubMed and Google scholar using selected keywords. We only included studies that used generic preference based HRQoL instruments and excluded non-English language studies.

Results

The MID for EQ-5D scores have been estimated across many disease areas, using several different methodologies. These reported MIDs vary widely and lack consistency. Very few studies report on how MID for EQ-5D can be used for economic evaluation though it has been used in cost minimisation analysis for some non-inferiority trials and in sample size calculations for economic evaluations done alongside clinical trials. Some of the issues identified as to why this is the case include: the way in which EQ-5D index scores are derived; the influence of country-specific weights on the estimates, the methods used for estimation; the impact of individual MID on population MID; and the usefulness of calculating MID for a generic cardinal utility measure like the EQ-5D. We explore these issues and offer critical comment on the role of MIDs in economic evaluation, particularly the methods for calculating MID.

Conclusions

The concept of the MID has become well accepted in clinical research, particularly in the area of disease-specific patient reported outcomes. Although methods used in this area can also be used to calculate the MID for generic HRQoL instruments such as the EQ5D, it is less clear that the MID concept should be used with cardinal utility measures and for cost-effectiveness studies. As a result, we consider the concept is currently over-used and over-reported.

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Title

"How are maternal and fetal outcomes incorporated when measuring benefits of pregnancy-related interventions in cost-utility analyses? Findings from a systematic review"

Abstract

Introduction: Medical interventions used in pregnancy can affect the length and quality of life of both the pregnant person and fetus. How these outcomes are included in a cost-utility analysis has a substantial bearing on whether an intervention appears cost-effective. Despite this, methods for valuing these outcomes remain inconsistent due to the complex ethical challenges involved. The aim of this systematic review was to evaluate how QALYs and DALYs have been constructed and analysed in cost-utility analyses of pregnancy interventions.

Methods: The review was registered with PROSPERO (CRD42020157325). Searches were conducted in the Paediatric Economic Database Evaluation (PEDE) database (up to 2017), as well as Medline, Embase and EconLit (2017 - 2019). Articles were screened in duplicate. Inclusion criteria were cost-utility analyses of interventions during pregnancy published in English. We conducted a narrative synthesis of study design; QALY/DALY construction (life expectancy, quality adjustment, discount rate); and whether the ICER was constructed using maternal or fetal outcomes. Where both outcomes were included, methods for combining them were analysed.

Results: Searches identified 2026 unique studies; 127 were eligible for inclusion, of which 89 reported QALYS and 38 DALYs. The majority of studies limited their analysis to a single individual, either the fetus (59 studies (47%)) or the pregnant person (13 studies (10%)). Where both were included (49 studies (39%)), methods for combining these outcomes varied. Twenty-nine studies summed QALYs/DALYs for maternal and fetal outcomes, with no adjustment. The remaining 20 took a number of varying approaches, each of which made differing assumptions about health outcomes and preferences. Examples include taking two separate time horizons: duration of pregnancy for maternal outcomes, and duration of childhood for fetal outcomes; or valuing fetal outcomes as a disutility applied to maternal quality of life, rather than as a separate individual.

Conclusion: Methods for capturing QALY/DALY outcomes in cost-utility analysis in pregnancy vary widely, with only a minority considering both fetal and maternal outcomes. This review indicates the need for a consistent approach to constructing lifetime outcome measures for maternal and fetal outcomes, as well as for analysing these outcomes jointly.

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Title

"Emergency readmissions: is 30-day the optimal time interval to capture hospital quality of care?"

Abstract

Quality of hospital care is key for assessing hospital performance and designing reimbursement/ incentive schemes, with emergency readmissions widely used as a quality metric.

In England, the 2011/12 National Tariff Payment System introduced the 30-day readmission rule to incentivise Trusts to reduce avoidable readmissions. The 30-day cut-off is also used in other healthcare systems such as the US, Germany, Denmark. However, some evidence suggests that it may not be the optimal threshold to capture hospital care quality. Indeed it may penalise hospitals for low quality of care which is, in fact, due to factors outside of hospitals' control. In this study, we aim to answer two research questions: (1) Which is the optimal time to readmission threshold to capture quality of care in the English NHS? (2) Does this threshold change if we consider sites within Trusts rather than Trusts?

We focus on patients diagnosed with a disease of the circulatory system and construct the pool of index admissions, using the 2018/19 Hospital Episodes Statistics Admitted Patient Care dataset. We estimate a multilevel logistic regression model for each of the binary outcome variables, indicating whether an index admission was followed by a readmission at day 0 to 90, controlling for patient-level characteristics (age, sex, Elixhauser index). For each model, we calculate the proportion of total variance explained by the hospital-level random effects, by means of the intracluster correlation coefficient (ICC). A higher ICC means that hospital factors have more weight in explaining the variation, so the readmission indicator is more reliable as a quality signal.

Preliminary results show that the ICCs exhibit a decreasing trend as the readmission window widens. In particular, the proportion of hospital-level variance is highest at the 0-days readmission cut-off, declines rapidly until levelling off around 7-10 days, and gradually decreases hereafter. This indicates that for the patient group considered a 30-day readmission window may not be the most appropriate one. Similar results were found when considering sites as the organisational unit of interest. However, site-specific effects explain a larger proportion of outcome variation, suggesting that policy interventions would be more effective at this level.

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Title

"Can public health insurance mitigate adverse impact of health shock on children's educational outcome?"

Abstract

Can public health insurances mitigate the adverse impact of health shock on children's educational outcome? We explore this question in the context of a publicly financed health insurance scheme in the Indian states of Andhra Pradesh and Telengana. Exploiting two sources of variation: (1) staggered rollout of the health insurance scheme and (2) exposure to adverse health shock during childhood, we employ a difference-in-difference framework to study the interaction between adverse health shock and health insurance availability. We make a distinction between health shock to a child and parental health shock and find that the impact of health shock and the mitigating role of health insurance depends crucially on the type of the adverse health shock and the age of exposure to health shock and health insurance. Combining a household level panel from Young Lives India with administrative records, we find that exposure to parental health shock in childhood has no effect on grade attainment at age 15. On the other hand, exposure to child health shock during the age 5-8, has negative impact on grade attainment at age 15, which is partially mitigated by health insurance availability. Child health shock in later childhood, however, is not found to have any impact on child's grade attainment at age 15. We also find that exposure to parental health shock adversely affects a child's cognitive outcomes, which is partially mitigated by health insurance availability. In contrast, exposure to child health shock improves the child's cognitive outcome. In this context, we provide suggestive evidence that the positive impact of child health shock on cognition is driven by compensating parental investment on education and health of the shock affected child.

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Title

"Comparing the Health Utilities Index Mark 3 (HUI3) with the Short Form-6D (SF-6D): Evidence from an Individual Participant Data (IPD) Meta-analysis of Very Preterm or Very Low Birth Weight (VP/VLBW) Individuals"

Abstract

Objective: To examine the discordance between the HUI3 and SF-6D measures in describing and valuing the HRQoL using IPD obtained from five prospective cohorts of individuals born VP/VLBW.

Methods: IPD were obtained from five prospective cohorts of individuals born VP/VLBW and controls contributing to the 'Research on European Children and Adults Born Preterm (RECAP)' consortium. The combined dataset comprised over 2100 individuals, and the ages of assessment in adulthood ranged between 18 and 29 years. A one-stage IPD meta-analysis was implemented using linear mixed models.

Results: The HUI3 detected a clinically significant utility decrement in adulthood of 0.06 (95% CI: -0.08, -0.04) associated with VP/VLBW status, while SF-6D did not detect a clinically significant utility decrement. The intraclass correlation coefficient between the measures was below 0.40 and the relationship was nonlinear. Both measures were found to detect differences in physical health outcomes. However, the measures differed in their impacts on subjective constructs of health such as emotional, pain or social functioning.

Conclusion: The HUI3 and SF-6D instruments might not be interchangeable for use in clinical and population research and cost-effectiveness based decision making that considers the long-term consequences of VP/VLBW status. The HUI3 multi-attribute utility measure is more sensitive at detecting the long-term sequelae of preterm birth than the SF-6D. The results show that differences in the HUI3 and SF-6D descriptive systems likely drive differences in utility scores between VP/VLBW individuals and controls in adulthood. Results presented in this study imply a high degree of complementarity between the two measures.

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Title

"The effects of devolution in Greater Manchester on health, social care, and the wider determinants of health: A whole system evaluation"

Abstract

Greater Manchester (GM) and NHS England signed an agreement in July 2015 to devolve health and social care in the region. This agreement followed and preceded other devolution agreements that granted GM powers over areas of regional policy likely to impact wider determinants of health, including housing, transport, and education. There is virtually no evidence on the combined impact of these changes. We evaluated the causal effect of devolution in GM on multiple outcomes using a whole system evaluation approach.

We used a conceptual framework of health system performance to select 110 outcome measures, available for general practices or small geographical areas between April 2008 to March 2020. The measures included population health, performance of primary, hospital, and social care services, and wider determinants of health. We identified targeted outcomes from a detailed documentary analysis of the interventions implemented. We estimated impacts using the generalised synthetic control method and adjusted for multiple hypothesis testing.

Life expectancy in GM increased by 0.196 years (S.E. 0.007) more than the counterfactual group. Improvements in performance were observed in primary care, including a -6.25 reduction in the volume of potentially preventable admissions per 100,000 population (S.E. 1.92) and a 2.41 percentage points increase in patients recommending their GP (S.E. 0.24). Effects on other services were mixed, including inpatient and social care. For example, there was an increase of 137.4 delayed transfers of care per 100,000 population (S.E. 45.0); a measure commonly used to assess integration. Wider determinants of health also improved in some instances, including a -53.7 reduction in alcohol-specific emergency admissions per 100,000 population (S.E. 6.71); an explicitly targeted outcome.

Devolution was associated with increases in population health, probably driven by improvements in primary care and other wider determinants of health. These changes may have occurred as a result of health and social care devolution but also from the devolution of other public services in the region or a combination of the two. Similar improvements may not be replicated within Integrated Care Systems, without the greater alignment of decision-making across health, social care, and wider public services.

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Title

"What matters the most? Socio-economic inequalities in excess weight in England"

Abstract

Background: The prevalence of excess weight has been increasing globally in the last decades, affecting disproportionally adults from low socio-economic backgrounds. The associated increased risk of chronic disease and loss of productivity puts undue pressure on health systems and societal resources. In England, tackling unfair and unjust health inequalities is at the heart of national public health policy and a prerequisite for enabling these decision makers to set policy priorities is an understanding of the prevalence of excess weight inequalities in their local population. Just as important is to understand how individual and socio-economic factors contribute to inequality across the excess weight spectrum to enable tailored inequity-curbing policy design.

Methods: We conducted both pooled (England) and regional-level (nine regions: North-East, North-West, Yorkshire and Humber, East Midlands, West Midlands, East of England, London, South East and South West) analyses of individual level data from a nationally representative sample of adults (over 20 years old). We used concentration indices to measure relative inequalities in excess weight across three dimensions of socio-economic deprivation: neighbourhood-level deprivation, occupational status and educational qualification. We used a Shapley decomposition method to evaluate their relative contribution to inequality.

Results: At a national level, all three dimensions of socio-economic deprivation were found to be positively associated with excess weight across the adult population, with educational qualification ranking first [CCI: 0.066 (0.009)], closely followed by neighbourhood-level deprivation [CCI: 0.054 (0.008)]. Large variation was found between regions and genders, with inequality being either considerably higher or exclusively patterned among women. The strongest independent factor contributing to excess weight inequalities was having a long-lasting limiting illness, especially among women and towards the right tail of the excess weight spectrum. Heterogeneous patterns of contribution across the excess weight spectrum were found, however age played a dominant role toward the left tail of the BMI distribution.

Conclusions: While socio-economic inequalities in excess weight exist in the English adult population, careful consideration as to which dimensions of deprivation and contributing factors to target in policy making is needed to avoid a widening of inequalities in excess weight, and therefore resulting population health and well-being.

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Title

"Re-Estimating the Social Gradient in the Health Effects of Marginal Health Care Expenditure"

Abstract

Background

Health inequality concerns are increasingly prominent following the COVID-19 crisis. However, little is known about the health inequality impacts of changes in healthcare expenditure. This information is needed for setting general health budgets and distributional cost-effectiveness analysis of the health inequality impacts of specific decisions. Researchers have produced indirect estimates by combining data on social patterns of healthcare utilisation with regression-based estimates of the overall health effects of marginal healthcare for broad disease categories. However, this does not account for social differences in healthcare outcomes.

Objective

Our objectives are two-fold. First, directly to estimate the social gradient in the mortality effects of marginal healthcare expenditure, using standard instrumental variable methods based on core NHS resource allocations data. Second, to convert mortality effects into quality adjusted life expectancy (QALE) and thereby re-estimate the social gradient in the health effects of marginal healthcare expenditure.

Data and Methods

Our analysis employs planning area level ('Clinical Commissioning Group') population and mortality data for 2018, Index of Multiple Deprivation scores for 2019, per-head core NHS allocations (including general and acute, maternity, mental health and prescribing services). We use an instrumental variable approach with mortality as the dependent variable. We use components of the formula (market forces factor, distance to target and age) to instrument hospital expenditure and stratify within-planning-area mortality by five neighbourhood deprivation quintile groups. We assume morbidity effects are proportional to mortality effects and use the Sullivan method to calculate effects on quality adjusted life expectancy using 2018 Health Survey for England EQ-5D-5L data. We conduct extensive sensitivity analysis using different health outcome metrics and regression specifications.

Preliminary Results

In our preliminary analysis, we estimate that an increase in hospital expenditure of 1% decreases the age-sex adjusted mortality rate by -947 in 100,000 (95% CI: -1,714 to -179) for the most deprived group and -369 (95% CI: -680 to -58) for the least deprived group. This suggests the social gradient in health effects is shallower than previously thought. Simply increasing health expenditure may not reduce health inequality much, targeting funding towards specific activities expected to reduce health inequality may be necessary.

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Title

"Does caring for others benefit our own mental health? Evidence from the COVID-19 pandemic in the UK"

Abstract

While there is a growing literature focused on mental effects of COVID-19 on the general population, less is known about the potential psychological consequences of providing informal care during the ongoing pandemic. The COVID-19 outbreak caused the sudden disruption of most formal care services due to national lockdowns and stay-at-home orders. As a result, many started providing care during the pandemic, for instance in the UK alone an estimated 4.5 million individuals started providing informal care.

Mental health challenges related to COVID-19 and the psychological burden associated with informal care are widely documented. However, until now these two issues have been considered separately. Moreover, there is currently no evidence on the causal impact of providing informal care with different caregiving durations on the mental well-being of informal caregivers during the COVID-19 pandemic. Since governments rely on unpaid carers as an alternative to formal care, investigating this research question is policy-relevant.

Exploiting the longitudinal nature of the UK Household Longitudinal Study (Understanding Society), we employ the last three mainstage questionnaire waves before COVID-19 (2016-2019) together with eight COVID-19 survey questionnaire waves (April2020-March2021). We implement a difference-in-differences approach with multiple time periods, defining treatment groups according to caregiving duration, i.e. when respondents become informal carers for the first time. Specifically, we observe three groups of experienced informal caregivers starting their provision in 2017, 2018 or 2019, respectively; new caregivers starting their provision with the pandemic outbreak; and a never-caregivers group. This allows exploring the role of adaptation, investigating mental outcomes of informal carers with different caregiving durations also including a wide range of control variables. As people can self-select into caregiving, we employ propensity score matching to pre-process the data before estimating our difference-in-differences models accounting for attrition and non-response bias.

Our estimates suggest that mental health fluctuated according to social restrictions, but informal carers had consistently worse outcomes during the pandemic. It also seems that adaptation plays a role, with experienced informal caregivers coping better than new caregivers. Hence, this paper suggests that policies mitigating psychological burden of unpaid carers might be helpful, especially at the start of their care provision.

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Title

"The Psychological Gains from COVID-19 Vaccination: Who Benefits the Most?"

Abstract

In this paper we exploit evidence from the vaccination roll-out in the UK to estimate the short-term direct impact of vaccination on psychological well-being, with a particular focus on its effect on individuals who were mentally distressed prior to vaccination. This group, which accounted for around 27% of the UK population, was not explicitly prioritized in the roll-out, despite the dramatic impact that the pandemic had on psychological well-being. We use data from the UK Household Longitudinal Study Understanding Society, a large-scale panel survey representative of the UK population with detailed information on the vaccination status of participants as well as their psychological well-being, assessed through the 12-item General Health

Questionnaire (GHQ-12).Taking advantage of the panel structure of the data, we compare the evolution over time in the psychological well-being of individuals who were vaccinated a few weeks before the survey with individuals of the same age and priority group who had not been vaccinated yet. To limit endogeneity concerns, we use invitations for vaccination as an instrument for vaccination. We focus mainly on individuals aged 40 to 80 who are not health or social workers, as for this group we can exploit plausibly exogenous variation in the timing of invitations.

The first jab improves the mean symptom score in the GHQ-12 by 12% of a standard deviation (standard error=4%) and it decreases the number of mentally distressed individuals by 4.3 percentage points (s.e.=2.1) The improvement in psychological well-being caused by vaccination compensates for around one-half of the overall decrease in well-being produced by the pandemic and is similar in size to the psychological gain of moving from unemployment to employment. The impact is 2.5 times as large for individuals with clinically significant levels of mental distress before vaccination. Vaccination increases their average psychological well-being by 29% st. dev. (s.e.=9%) and the probability of being mentally distressed decreases by 13 p.p. (s.e.=4.4), compared to individuals with similar levels of distress who had not been vaccinated yet.

We quantify the impact of COVID-19 vaccination on psychological well-being using information from a large-scale panel survey representative of the UK population. Exploiting exogenous variation in the timing of vaccinations, we find that vaccination increases psychological well-being (GHQ-12) by 0.12 standard deviation, compensating for around one-half of the overall decrease caused by the pandemic. This improvement is mainly driven by individuals who became mentally distressed during the pandemic, supporting the prioritization of this group in vaccination roll-outs. The effect persists for at least two months, and it is associated with a decrease in the perceived likelihood of contracting COVID-19 and higher engagement in social activities.

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Title

"What contributes to variations in self-reported health for the general population and for ten condition-specific patient groups in England? - An empirical analysis using repeated cross-sectional general practice data with 2.9 million patient records"

Abstract

Background

Significant variations in the UK's population health have been widely observed. Little is known about (1) what individual and health service factors associated with these variations or (2) how much of the unexplained variation is at patient and health service levels. This paper aims to address both questions.

Methods

We linked data from the NHS's General Practitioner (GP) Patient Survey, Quality and Outcomes Framework, and GP workforce databases, between 2012/13 and 2016/17. The resulting dataset covers almost all GP practices in England, with a nationally representative sample for the general population. Additionally, we generated ten subsamples one for each chronic condition. We use mixed-effects models to identify factors associated with EQ-5D-5L index variation for the general population and for the ten patient groups. We also calculate ICCs using variances estimated from mixed-effects models to decompose the unexplained variation in the EQ-5D-5L index to patient, GP, and CCG levels. We explored the impact of missing values on mixed-effects models using multiple imputation.

Results

Some explanatories (such as multi-morbidity, gender, deprivation) had similar and plausibly signed effects for all 11 sets of individuals. But there were differences for those with different conditions. For example, those reporting their ethnicity as Black had lower EQ-5D-5L index if they had angina/heart problems but higher EQ-5D-5L index if they have diabetes or mental health problems. Better clinical quality for specific conditions was associated with better patient reported health only for three conditions (asthma, diabetes, epilepsy).

For the general population and ten condition-specific patient groups, the unexplained variation in the EQ-5D-5L index was almost entirely at patient level, with very small general practice and CCG contributions.

Conclusion

The findings from our study identifies factors that explain the variation in health for the general population and patient groups with chronic conditions in England. Policymakers could develop interventions to reduce or eliminate the effects for some of those factors to improve health and reduce variation in health for the general population and patients with chronic conditions in England.

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Title

"Can locating welfare services in health care settings improve health? A difference-in-differences analysis using the Understanding Society longitudinal cohort"

Abstract

Background

There is some evidence that co-locating welfare services, services that provide advice and support on matters related to finance and welfare benefits, in health care settings may improve mental health outcomes. The service is primarily provided by a voluntary charity, Citizens Advice, with some financial contribution from the local government.

Aim

The aim is to evaluate the impact of co-located welfare services provided by Citizens Advice across England and Wales on mental, physical and financial outcomes using a longitudinal data set.

Methods

We developed an economic logic model based on stakeholder and lived experience input to describe the anticipated causal pathways and inter-relationships of resource use and outcomes. Data was obtained from Understanding Society, a UK Household Longitudinal Survey for 10 waves of the survey (2009 to 2019), with approximately 45,000 respondents. Lower Super Output Area was used to derive deprivation and if an individual fell in the catchment area for a GP with a co-located service. We use the differential timing of the roll-out of Universal Credit, as the roll-out of Universal Credit has been found to result in poorer mental health and financial outcomes, to conduct a difference-in-differences analysis. We test the differential impact that co-located welfare services have on pre-post Universal Credit for Short-Form 12 (SF-12) mental health and physical health scores, and on potential earnings. .

Results

Earnings, physical and mental health showed decreases over time. Universal Credit rollout was associated with an average decrease of £35.00 (95% CI -63.27 to -6.96) in net monthly household income. We found no significant differences in mental and physical health. The difference-in-differences analysis found co-located welfare services were associated with 0.265 points (95% CI 0.066 to 0.463) increase in SF-12 mental health scores. No significant differences were found for co-located services and the impact on earnings or physical health.

Discussion

The evaluation of co-located services has required a systems thinking approach to assist with interrogating the causal relationship between co-located services and intended (and unintended) outcomes. Co-located services have the potential to improve mental health outcomes for individuals negatively impacted by austerity government initiatives such as Universal Credit.

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Title

"Heterogeneous spillover effects of emergency department crowding on patient outcomes"

Abstract

Background: Unexpected spikes in emergency department (ED) attendance volumes have been found to affect waiting times, quantity and quality of care. However, the literature fails to recognise the heterogeneity in attendance flows, specifically the difference between predictable and unpredictable conditions. Moreover, little is known about how EDs provide healthcare during unexpectedly quiet periods.

Goals: Focusing on conditions with stable flows of patients throughout the year, we explore two dimensions of demand heterogeneity in the effect of ED crowding on patient care. Our main research questions are: (1) How is ED care affected by unexpected surges and drops in demand from patients exhibiting volatile demand patterns? (2) Do EDs respond differently to surges compared to drops in attendances for conditions characterized by volatile demand?

Data and Methods: We use Hospital Episodes Statistics data covering 140 Type 1 EDs in England for the financial year 2016/2017. We estimate daily volatility in attendance volumes across all EDs for different primary diagnoses and categorise conditions as stable when their coefficient of variation is below the 67th percentile. We then measure deviations from expected daily volumes of patients using a high-dimensional fixed effects capturing hospital-specific variation in attendances by week of the year and day of the week. We study the impact of demand for high-volatility conditions on various indicators of performance across the entire ED care pathway of patients attending for low-volatility conditions. Additionally, we explore whether the effect of deviations from expected demand are symmetric between surges and drops.

Results: We find that a 1-SD rise in unexpected volatile demand increases the likelihood of leaving without being seen by 5.4 p.p. and decreases likelihood of referral to GP by 2.2 p.p for patients attending for low-volatility conditions. We also find evidence of a lower number of investigations, increased waiting times, and increased rates of reattendances within 7 and 30 days. Finally, we find asymmetric results between days with higher and lower than expected attendances. Compared to days with unexpectedly high volatile demand, EDs respond to quiet days with better quality and quantity of care but lower efficiency (i.e. longer waiting times).

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Title

"A general modelling framework to estimate the impact of waiting times on health for patients undergoing elective procedures."

Abstract

Waiting times for elective procedures have increased in England over recent years. This has been exacerbated by the reduction in elective activity during the COVID-19 pandemic. The NHS currently uses a universal waiting time target of 18 weeks. If there are differences in the health benefits obtained from different elective procedures and for different patient groups there may be scope to improve population health benefits by varying the target across procedures or patient groups. However, this requires an understanding of the health consequences of waiting times.

We outline a general modelling framework to estimate the impact of waiting times on health, measured in quality-adjusted life-years (QALYS), for patients undergoing different elective procedures conditional on their clinical and socioeconomic characteristics.

Waiting times, clinical and socioeconomic characteristics may influence the probability of being on a waiting list for a specific procedure, including both the probability of entering and exiting from the list. Clinical and socioeconomic characteristics influence the health related quality of life (HRQoL) and mortality risk while waiting. The duration of the waiting time may alter the expected health benefits (HRQoL and mortality) of the procedure if during this time patient clinical characteristics evolve. Patients are at risk of exiting a waiting list without receiving the specified procedure (e.g. procedure no longer expected to provide benefit, substitution for another procedure, admission for a non-elective procedure, transfer to private care, or death).

We outline the evidence and steps required to apply the framework to a given procedure. These include, for example, assessing whether those in need of the procedure experience excess mortality risk while waiting, whether their health condition is progressive or stable over time, and the likelihood of substitution of the procedure. We then demonstrate the framework by applying it to one specific procedure.

The framework can be used to consider the impacts of waiting times targets for elective procedures on population health. Further, our framework, in combination with estimates of the current backlog resulting from the COVID-19 pandemic, can quantify the health consequences of the impact of the pandemic on waiting times and lists.

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Title

"Learning-by-doing in health care: lessons from the COVID-19 pandemic"

Abstract

A positive relationship between hospital volumes and outcomes for certain types of medical care is well documented. Hospitals that treat more patients tend to have lower complication and mortality rates and higher patient-reported health gains. Much of the economic literature has focused on econometric challenges around identification of causal effects in the presence of endogenous selection ('selective referral'). In contrast, few studies have explored the causal mechanisms by which volume affects outcomes. Understanding these mechanisms is important to inform policy decisions about aggregation of services.

Learning-by-doing (LBD) describes the accumulation of knowledge through experience and is a potential mechanism by which hospitals improve their provision of care over time. The aim of this study is to test the theory of LBD using as a case study hospital treatment for Covid-19 complications during the first nine months of the pandemic. This early stage of the pandemic is an excellent setting to study LBD because hospitals had no prior experience with this disease, there were no standardised treatment pathways and no approved vaccines, patients required urgent hospital admission with limited scope for selection, and regional variation in infections led to different speeds of knowledge accumulation (here, the cumulative volume of Covid-19 patients treated).

We analyse HES data for all patients treated with a primary diagnosis of Covid-19 between 01 February and 30 September 2020. We estimate patient-level regression models of 30-day mortality controlling for patient characteristics, hospital fixed effects (to capture differences in e.g. capital endowment and staff quality), month fixed effects (to capture common shocks due to e.g. emergence of new drug treatments) and cumulative volume of COVID-19 patients treated in the hospital up to the day of admission.

We find evidence of LBD in COVID-19 care: for every 100 additional COVID-19 patients that a hospital treats, the probability of death decreases by 0.4 percentage points ($p<0.001$). Effects are stronger when experience is lower. Further sensitivity analyses and robustness checks will be conducted in time for the HESG meeting.

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Title

"Body Mass Index and Healthcare Expenditure: Where to Draw the Line?"

Abstract

This paper examines whether there are specific ranges of body mass index (BMI) values that lead to variation in child healthcare costs. To find a relationship between BMI and child healthcare cost, most previous literature apply pre-determined BMI thresholds based on generic growth charts. This paper hypothesises that these charts could be more precisely defined, in relation to assessing healthcare costs for overweight children. This is especially so in the relationship between BMI levels and resulting child healthcare costs. Ideally assessing health risks, such as overweight and obesity, should be based on evidence of increased morbidity and therefore, increased healthcare cost.

Additionally, the relationship between BMI and cost might not be a simple linear one, that determines expenditure by the level of severity of overweight measured using BMI.

To investigate this, grid-search techniques are applied to estimate threshold effects in nonlinear models. Given the truncated nature of healthcare costs, a non-linear model is appropriate. Furthermore, the inverse hyperbolic sine (IHS) transformation is applied to the healthcare cost variable. Overall, the results show a positive relationship between BMI and child healthcare cost. Importantly, this relationship varies at different BMI thresholds for different age groups. For children above the BMI threshold, annual healthcare cost and probability of incurring a positive pharmaceutical cost is, on average, significantly higher in the long run (6 to 8 years later). The modelled thresholds lie within the range of BMI-for-age defined by the CDC growth charts, however, the estimated number of thresholds are generally lower compared to those indicated in the growth charts. Therefore, use of generic growth charts may lead to very different estimates of disease prevalence and therefore, healthcare cost.

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Title

"Incorporating prior beliefs into meta-analyses of health state utility values using the Bayesian power prior"

Abstract

Background

Health state utility values (HSUVs) are pivotal inputs to health-state defined economic models informing most Health Technology Assessments (HTAs), and thus adoption decisions for novel interventions. Where there are multiple potential candidate HSUVs, methods for synthesis are limited. At present typically a single value is used, implicitly weighting other candidate HSUVs at 0. Rarely, candidate HSUVs are meta-analysed, with each HSUV weighted by the inverse of its variance.

Methods

Using two case studies in lung cancer and liver cirrhosis, a Bayesian 'Power Prior' (BPP) approach was implemented to demonstrate the potential importance of incorporating prior beliefs. The BPP is a technique used in clinical research to allow historical data to supplement contemporary control data in clinical studies. In this implementation the weights used reflect the authors' perceived applicability of relevance to a hypothetical UK HTA, downweighting (but not entirely discounting) older studies, non-UK value sets, and vignette studies. Power prior HSUV estimates were compared with using a single preferred value, random effects meta-analysis (REMA), and Bayesian meta-analysis (BMA).

Results

In the lung cancer case study with 1 contemporary estimate and 5 historical HSUVs, the estimated BPP HSUV was 0.72 (95% Credible Interval, CrI: 0.57-0.87), compared to the single contemporary HSUV of 0.75 (95% Confidence Interval, CI: 0.24-1.27), REMA of 0.69 (CI: 0.64-0.74) and BMA of 0.71 (CrI: 0.59-0.86). In compensated liver cirrhosis (9 candidate HSUVs) the corresponding estimates were BPP HSUV of 0.70 (CrI: 0.47-0.93) versus single value of 0.73 (CI:0.29-1.17), REMA of 0.72 (CI:0.55-0.89), and BMA of 0.70 (CrI: 0.55-0.88).

Discussion

The concept of the BPP can be adapted for meta-analysing HSUVs, leading to differences compared to other methods - with corresponding implications for economic model results. In particular, the downweighting of studies shows wider CI/CrIs relative to other meta-analysis methods but more precise estimates than using a single value. The implementation of BPP provides a practical mechanism to explicitly incorporate perceived relevance to the decision problem. Further developments of the method could include the use of hierarchical models to incorporate examples where multiple HSUVs are taken from the same clinical study (i.e., study level effects).

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Title

"Mental Health Diagnosis and Healthcare Usage: Evidence from Ireland"

Abstract

Background:

Mental health places burdens on individuals and can drive usage of a broad range of healthcare. Across OECD countries, Ireland has the third highest rate of mental illness, yet little is known about the impact mental health diagnoses have on healthcare usage. This paper examines healthcare use by people with a mental health diagnosis and examines whether the Irish two-tier system across public (Medical Cards) and private health insurance coverage affects how people with a mental health diagnosis interact with the system.

Methods:

We used data from the Healthy Ireland Survey (HIS, 2015-2019), a large nationally representative survey of adults which captures information on respondents' demographics, health, and healthcare use. Our mental health measure captures a diagnosis of any emotional, nervous or psychiatric problems, such as depression or anxiety, confirmed by a medical diagnosis. We used logistic and linear regression analyses to examine the relationship between having a mental health diagnosis and healthcare usage.

Results:

Overall, 6.1% of adults had a mental health diagnosis, with females (Odds Ratio (OR)=1.3***), lower educated (OR=1.3***) and Medical Card holders (OR=2.7***) having higher rates of mental health diagnoses. People with a mental health diagnosis had 4 additional GP visits, 0.8 additional hospital inpatient stays, and 0.2 additional emergency department attendances per annum. Across healthcare services examined, Medical Cards had larger effects on healthcare use amongst people with a mental health diagnosis compared to people without a diagnosis. No such interaction effect was observed for private health insurance. For those with a mental health diagnosis, usage of mental health services were higher for Medical Cardholders, and private health insurance was associated with private mental health services.

Conclusion:

Having a mental health diagnosis is associated with very high healthcare use, and holding public or private health insurance affects how people with a mental health diagnosis interact with the healthcare system. These results have implications for the development of Ireland's universal healthcare plans (SlÃ¡intecare) as they highlight the need to account for mental health illness when designing resource allocation.

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Title

"The impact of natural history evidence on the cost-effectiveness of treatments for depression: a modelling case-study of cognitive behavioural therapy"

Abstract

Background

Depression is a common long-term, debilitating condition. Psychological treatments are clinically effective at improving the symptoms of depression and are recommended as the first line treatment for moderate to severe depression in the UK. The most delivered type of psychological treatment is cognitive behavioural therapy (CBT). As CBT can be a lengthy process, some people's depression symptoms may naturally resolve before they experience a treatment benefit. There are several existing cost-effectiveness analyses of CBT, but to-date no study has explored the impact of different natural history estimates on subsequent estimates of cost-effectiveness. This study sought to address this evidence gap.

Methods

We adapted an existing UK-based cost-effectiveness analyses comparing face-to-face CBT with hybrid CBT with a five-year time horizon. Clinical outcomes and the duration of treatment (including waiting times) were based on national UK data. Evidence on depression natural history was identified by a systematic search of model-based evaluations. Cost-effectiveness was summarised as the incremental cost effectiveness ratio (ICER) per quality-adjusted life year (QALY; the measure of patient benefit used), which was compared with a willingness to pay of £30,000 per QALY.

Results

Three natural history sources were identified, with mean times to natural resolution of 30, 46, and 81 weeks. Face-to-face CBT was always more effective than hybrid CBT and always more costly. Estimates of cost-effectiveness were sensitive to the natural history source used; for the longest and shortest times to natural resolution, face-to-face CBT generated 0.033 and 0.005 additional QALYs, respectively with ICERs of £16,943 and £151,983, respectively.

Conclusions

Different sources for the natural history of depression can strongly influence estimates of cost-effectiveness, which in turn influences decisions about if a treatment should be made available. No UK-specific estimates were identified and so are an important area for future research.

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Title

"Costs and Benefits of Incentivising Physicians to Enhance Care of Patients with Complex Conditions: Econometric Evidence from Patient Migration"

Abstract

BACKGROUND. Many health systems internationally offer incentive schemes to encourage specific behaviours from physicians. Evaluation of such schemes has been limited to date, due to challenges with data, diverse impacts, and universal implementation. Our aim is to evaluate the cost-effectiveness of physician incentives to provide enhanced services for patients with complex medical conditions, using data from Alberta, Canada.

METHODS. We apply econometric methods to estimate the incremental net benefit (iNB) for each of the incentives used in Alberta. The use of the incentives is likely to be endogenous at the patient level due to unmeasured severity, physician level due to unmeasured practice style, and geographically due to unmeasured system variables. We therefore use a 'mover' design, exploiting patient migration to isolate the effects of the incentives from unobserved characteristics. We construct a panel dataset covering the complete 4.5 million Alberta population from fiscal years 2015-16 to 2019-20, with annual direct health system cost, patient outcomes (mortality, number of inpatient admissions, and emergency department visits), age, health status, location of residence, uptake of the incentive by current location of residence and by health status, and time-to-move indicators. Generalized linear models with two-way fixed effects estimate the impact of exposure to incentive utilization on outcomes. iNB is estimated for each incentive and outcome as the difference in the monetary value of the marginal effect on the outcome from the marginal effect on health system costs, including incentive payments.

RESULTS. Increasing uptake of incentives for general practitioners to spend additional time with complex patients over the age of 80 by 10% has an iNB of $1285.65 (SD 765.09) for avoided inpatient visits over three years, and an iNB of $574.53 (825.90) in the first year for emergency department outcomes. Null effects are found for mortality. Negative iNB values are estimated for increased utilization of medical specialist incentives, for both inpatient and emergency department outcomes.

CONCLUSION. Increasing uptake of the general practitioner incentives is expected to be cost-effective. The study demonstrates how a mover design can be used to calculate the cost-effectiveness of interventions when implementation is universal.

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Title

"The impact of organisational models in general practice on cancer referrals: Evidence from northwest London"

Abstract

Background: New types of collaborative organisational models in General Practice (GP) have emerged over the last two decades in England, including super-partnerships, federations and primary care networks. With as many as three quarters of practices currently working in a collaborative model, it is important to study the extent to which these models contribute to patient safety.

Objective: To estimate the association between GP organisational models and the appropriateness of suspected lung cancer referrals from primary care.

Methods: We used primary care records from nearly 3.5 million patients in the northwest London Whole Systems Integrated Care dataset to examine referrals between April 2013 and March 2019. A coded missed referral was defined as a consultation by a patient presenting with possible lung cancer symptoms based on the National Institute for Health and Care Excellence guidelines, who was not subsequently referred for further investigation. A linear regression model with correlated random effects was estimated to identify the association of organisational models with the rate of coded missed referrals. The number of collaborative groups within the clinical commissioning group was included as an instrumental variable in the model, to account for the possibility that a membership in a collaborative group may be more likely where these are locally available.

Results: The study identified 12,981 cases of patients presenting with symptoms that could indicate lung cancer during the time period studied. Of these, 40.9% were appropriately referred by the GP to specialist care, radiological or other investigations within two weeks of consultation. This number is 48.6% and 62.5% when the referral interval was extended to 1 and 3 months, respectively. The analysis showed that engaging in a collaborative model was associated with a lower rate of coded missed referrals after accounting for the potential self-selection of the model.

Conclusions: Failing to refer patients with symptoms indicative of lung cancer for further investigation could be a threat to patient safety, potentially delaying diagnosis and treatment initiation. The move towards collaborative models in General Practice presents an opportunity to improve appropriateness of care and patient safety in primary care, through increased collaboration and economies of scale.

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Title

"The association between ICU specialisation and mortality in the UK"

Abstract

Importance: Proponents argue that increasing specialisation of critical care services would improve quality, but these theoretical benefits remain unproven.

Objective: To empirically determine whether increasing Intensive Care Unit (ICU) specialisation reduces mortality for critically ill patients.

Design: Retrospective cohort analysis of patients (ï‚³ 16 years) admitted to 231 ICUs in the United Kingdom from 2010 to 2016.

Setting: All 231 ICUs in the United Kingdom

Participants: Adult patients (ï‚³ 16 years) patients with critical illness admitted to ICUs in the UK

Exposure: ICU specialisation, which as defined as the share of patients within different categories of disease.

Main Outcome(s) and Measure(s): We used a multivariate hierarchical logistic regression model to evaluate the association between ICU specialisation and acute hospital mortality

Results: Of a total of 933284 patients admitted to 231 ICUs, 513750(55%) were male and the median age was 65(interquartile range [IQR] 50-75) years. Hospital mortality was 21.2%. The median sepsis specialisation was 0.30 [IQR 0.23-0.37], cardiac specialisation 0.05 [IQR 0.01-0.09], neurosurgery 0.02 [IQR 0-0.06], trauma 0.12 [0.08-0.12], medical specialisation was 0.27 [IQR 0.20-0.34, elective surgery 0.13 [IQR 0.06-0.22, and emergency surgery 0.06 [IQR 0.04-0.10]. Overall, there was no reduction in the odds for mortality when patients were treated in a specialist ICUs, OR 1.06 (95%CI 1.0-1.08, p<0.001) for sepsis, OR 1.01(95%CI 0.99-1.04, p=0.292), neurosurgery OR 1.01 (95%CI 0.98-1.04), trauma OR 1.03(95% CI1.01-1.05, p=0.010), medical OR 1.03(95% CI 1.01-1.06, p=0.007), elective surgery OR 0.96(95%CI 0.94-0.99, p=0.002) and emergency surgery 1.00(95%CI 0.97-1.03, p=0.867). These findings were consistent across alternate definitions of specialisation and within subgroups of the most severely ill patients.

Conclusions and Relevance: Speciality ICUs do not have significantly lower hospital mortality for critically ill patients in the UK after adjusting for patient characteristics and caseload volume. This has relevance for policymakers, payers and clinicians interested in the future organisation of critical care services in that while there may be benefits from high volume ICUs, there is no compelling evidence demonstrating added value from specialist ICUs.

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Title

"Socioeconomic inequalities in waiting times, access and health for breast cancer"

Abstract

Background: In many publicly funded health systems, access to care is based on need, and not ability to pay. Yet, socioeconomic inequalities in access persist. Access is a multifaceted concept encompassing several dimensions along the patient pathway, including utilisation, patient experience and responsiveness. Access for cancer care is a policy priority in several OECD countries, because lack of or delayed access to care can lead to deleterious health outcomes, including higher mortality. In this paper we test for the presence of inequalities in waiting times, resource use and health outcomes by socioeconomic status for patients with breast cancer.

Data: We use patient-level data from Hospital Episode Statistics to identify all elective inpatient admissions of female patients with breast cancer as primary diagnosis who underwent breast surgery (mastectomy or breast conserving surgery) between 2015/16 and 2018/19. From the Office for National Statistics we link death records and income deprivation measured by the index of multiple deprivation.

Methods: We employ linear regression models to study the association between income deprivation (in quintiles) and inpatient waiting times, length of stay, volume of activity and all-cause one-year mortality. We control for age, ethnicity, primary and secondary diagnosis, type of procedure, type and number of comorbidities, past emergency admissions and Healthcare Resource Groups. We control for supply-level factors through hospital fixed effects.

Results: Our preliminary results show no evidence that least income-deprived patients experience shorter waiting times or shorter length of stay. However, we find that patients in the most deprived quintile have only about 15% of surgeries. We also find that the most deprived patients have a higher probability of dying within a year by about 0.6 percentage points compared to the least deprived patients.

Conclusion: We find no socioeconomic inequalities in access for patients with breast cancer in the specific domains of waiting times and length of stay, but inequalities in health outcomes remain that may be related to differences in lifestyle and availability of a network to support patients during illness.

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Title

"How does a Local Instrumental Variable approach perform across settings with instruments of differing strengths? A simulation study and an evaluation of emergency surgery"

Abstract

Background:

Health Technology Assessment (HTA) agencies, including NICE, emphasise the potential of real-world evidence (RWE) for estimating treatment effectiveness in settings where RCT data are unavailable. Local Instrumental Variable (LIV) methods can minimise the risk of bias due to unmeasured confounding in EHR studies provided a valid, continuous instrument is available. In particular, the PeT-IV method yields consistent estimates of person-centered treatment (PeT) effects, which can be aggregated to report different parameters of relevance for HTA processes, such as the Average Treatment Effect (ATE) and conditional ATE (CATE). However, there is a lack of guidance on the IV strength required for these methods to perform well.

Methods:

The NIHR-funded ESORT study used PeT-IV to evaluate the effectiveness of emergency surgery and found that the IV strength differed across the conditions considered. Motivated by the concerns this could raise for the performance of the IV approaches, we designed a simulation study to assess how PeT-IV performs with IVs of differing strengths and sample sizes. We considered four scenarios: effect homogeneity, overt heterogeneity (i.e., over measured covariates), essential heterogeneity (over unmeasured covariates), and a combination of overt and essential heterogeneity. We compared PeT-IV to the two-stage least squares (2SLS) estimator, according to bias and statistical efficiency (RMSE), in estimating ATE and CATEs.

Results:

The study found that RMSE and bias in ATE and CATE estimates for both methods reduced as IV strength increased for all scenarios and sample sizes, with lower RMSEs for PeT-IV estimates than for 2SLS estimates. Under effect heterogeneity, both methods performed well provided the IV was sufficiently strong. In the presence of overt heterogeneity, RMSE increased for 2SLS but was largely unchanged from the case without heterogeneity for PeT-IV. Under essential heterogeneity, 2SLS performed poorly (high RMSE and bias) while PeT-IV continued to estimate the ATE with low bias and RMSE.

Conclusions:

Our findings suggest that PeT-IV constitutes an attractive alternative to conventional IV methods, notably in settings with essential heterogeneity. The paper discusses the implications of these findings for guidelines on the use of IV methods, and for health economists attempting to assess treatment effectiveness from RWE.

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Title

"Addressing the 'QALY Trap' in the context of economic modelling of carer burden"

Abstract

Caring for patients, especially those with severe physical or neurological conditions, can impose significant physical, mental, and emotional burdens, or 'spillover effects', on informal carers. Arguably, these burdens and the impact of new treatments on carers as well as patients, should be considered in economic evaluations alongside benefits to the patient. A recent review of National Institute for Health and Care Excellence (NICE) technology appraisals, however, found that carer burden is rarely included in evaluations, and when it is, modelling has been inconsistent. Furthermore, the predominant approach arguably leads to a variant of the 'QALY trapâ', whereby it is not possible to simultaneously value life extension for the patient and a reduction in burden for the carer.

NICE's recent methods review concluded that further guidance on when and how to include carer QOL in economic models would be useful. However, their review also concluded that this will require further stakeholder engagement before more specific guidance could be developed.

We seek to contribute to this development by identifying and discussing the relative merits of different methodological approaches to including carer burden in economic evaluations and issues for future research.

We conducted a review covering the peer-reviewed literature, methodological guides from HTA agencies and health economics organisations, and recent NICE technology appraisals. Our interpretation of this review suggests four broad approaches:

1. Modelling carer health-related quality-of-life (HRQOL) without bereavement effects
2. Modelling carer HRQOL with bereavement effects
3. Modelling broader carer wellbeing
4. Applying an exogenous 'value multiplier' to model outputs

In this context, 'bereavement effects' refer to the short or long-term HRQOL impacts of the death of the person for whom the carer was caring.

To understand the relative strengths and limitations of each approach, we will be conducting a survey and a qualitative roundtable with invited experts. These activities have been organised and will be completed ahead of the full paper deadline. We will summarise the results of these engagements and will be keen to discuss their implications for best practice in modelling carer burden. Contributing experts will be included as authors on the full paper subject to their approval.

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Title

"Measuring and valuing health and quality of life using the EQ Health and Wellbeing Short: perspectives from members of the NICE Public Involvement Programme Expert Panel"

Abstract

The EQ Health and Wellbeing Short (EQ-HWB-S Experimental version) which has nine dimensions (mobility, activities, exhaustion, loneliness, cognition, anxiety, sadness/depression, control, pain) has been developed to support decision-making in health and social care. Utility weights were generated in a feasibility study using a modified EuroQol Valuation Technology protocol. The aim of this stage was to gain views from informed members of the public regarding the EQ-HWB-S, including the pilot weights, for decision-making.

Method: Members of the NICE Public Involvement Programme Expert Panel were invited to participate, with volunteers selected to represent varying age, gender, health and caring responsibilities. To familiarise the group with the measure and the source of the weights, each person completed a valuation interview (time trade-off (TTO) and discrete choice experiment (DCE)). This was followed by a cognitive debrief and information giving group session, where the weights from the feasibility valuation study were presented. Two separate focus groups obtained views regarding the measure, the utility weights, the sample and the methods used. All sessions took place online. Focus groups were recorded, transcribed, and analysed using a framework approach.

Results: Twelve people (50% female, aged 28-74) completed the interviews and nine attended the focus group. EQ-HWB-S was viewed positively due to the inclusion of dimensions such as exhaustion and loneliness. Some missing dimensions were identified (e.g. coping, sleep) but existing dimensions were considered to cover some of these (e.g. sleep covered by exhaustion). There was surprise at the small utility decrements for anxiety, control and exhaustion relative to other dimensions. Weights were seen as reflecting societal norms, respondent experience or knowledge, the composition of the sample and the interpretation of items. There were concerns that the valuation survey sample was not diverse or large enough to adequately represent the values of those who would be impacted by decisions based on EQ-HWB-S. DCE was preferred to TTO but participants suggested TTO could be improved by providing more background information, different practice states and offering post-survey debriefs.

Conclusion: The EQ-HWB-S was viewed positively by informed members of the public but there were concerns regarding the utilities and their source.

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Title

"Testing the reliability, validity and acceptability of an adapted EQ-5D-3L for adults who have a mild to moderate learning disability"

Abstract

Background:

Around 1.2 million people in the UK have a mild or moderate learning disability, living on average 20 years less than the general population. Whilst there are clear health inequalities, research with this population is constrained. Evidence suggests that people who have learning disabilities often have difficulty completing research materials such as the EQ-5D. An adapted EQ-5D-3L for adults who have a mild to moderate learning disability was developed, incorporating the results of a systematic review of quality of life measures, qualitative interviews and focus groups with adults who have learning disabilities and their supporters.

Objective:

A test-retest survey using face-to-face interviews was undertaken to determine the reliability, acceptability and validity of the EQ-5D-3L adapted for adults who have a mild to moderate learning disability.

Methods:

Staff working with third-sector advocacy groups identified clients who have a learning disability as potential participants for referral. Participants completed the EQ-5D-3L and the adapted EQ-5D-3L. Participants were interviewed twice within a four week period. As participants were following Covid-19 guidance, online interviews were completed. Where available, a family member, support worker or advocate also completed the proxy EQ-5D-3L. Statistical analyses evaluated correlations between the different measures. Test-retest reliability was estimated using Cohen's kappa. An ordered logit model was used to test the construct validity of the adapted measure by assessing its ability to differentiate between known-groups (e.g. self-reported health). Acceptability was assessed by examining levels of missing data and participant's own version preference. An interviewer-completed overall ease of completion form captured face validity of the adapted version.

Results:

Between September 2020 and June 2021, 64 participants from across England consented to participate. We found that the adapted EQ-5D-3L is acceptable, reliable and valid. Four of five domains and three of five domains show stronger test-retest reliability than the standard EQ-5D-3L and proxy-completed versions, respectively. Over 85% of participants preferred answering the adapted EQ-5D-3L than the standard EQ-5D-3L; it was well-accepted by most participants, easier to administer and understand. Full statistical results will be reported.

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Title

"An age-period cohort (APC) approach to studying long term trends in obesity and overweight in England (1992-2019)"

Abstract

Introduction:

Obesity and overweight have been increasing over time in England. They have also been repeatedly shown to increase with age, until a peak at around 65 years old, as well as among successive birth cohorts. There are several APC studies on obesity worldwide, but this study aims to extend the range of periods and birth cohorts observed to study long-term trends in age, period and cohort effects for obesity, overweight and healthy BMI.

Methods:

We use data on individuals between the ages of 5 and 85 from the Health Survey for England covering the period 1992-2019 and allowing us to investigate cohorts from 1909-2013. We use the established BMI thresholds from the World Health Organisation to define obesity, overweight and healthy BMI. For children, we use the International Obesity Taskforce age-sex specific thresholds. We compare trends through time and birth cohort's age trajectories for healthy BMI, overweight and obesity prevalence. Next, we estimate an age-period-cohort (APC) model to disentangle the effects of aging, from historical or contextual factors and from generational effects.

Preliminary Results:

We observe an increase in obesity and a decrease in healthy BMI during the period 1992-2019. There is significant variation in age trajectories by birth cohorts for healthy BMI and obesity prevalence. Our APC estimation finds that the odds of being obese compared to having a healthy BMI increase steeply with age before peaking around 69 years old, increase throughout the study period but faster between 1992-2001, and are higher for birth cohorts born between 1989-2008 compared to their predecessors.

Provisional Conclusions:

Overweight has remained relatively stable, suggesting any transitions from overweight to obesity are mirrored by transitions from healthy BMI to overweight. Younger generations with higher obesity prevalence coupled with increasing prevalence with age, suggests that obesity should remain a high priority for public health policy makers, particularly during middle-age. Targeting adolescents may help to prevent this problem from worsening in the future. Interventions during adulthood will be increasingly important if these trends continue.

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Title

"What is the optimal level of engagement with behaviour change interventions?"

Abstract

Background: There is an increasing focus on behaviour change interventions as a mechanism to improve public health. The complexity and length of such interventions require significant time investments from individuals, which can have a negative impact on participation. We aim to examine whether effectiveness varies by the level of attendance, using the NHS Diabetes Prevention Programme (DPP) as a case study.

Methods: We linked DPP attendance records with primary care records of type 2 diabetes diagnosis from the National Diabetes Audit for 2016 to 2020. We used logistic regressions to estimate the association between attendance and the risk of developing diabetes by 31st March 2020 among those referred by 31st March 2018. We then examined the marginal returns to attendance in terms of the change in risk by the number of sessions attended, to determine the optimal level of attendance.

Results: We analysed 182,371 referrals, of which 54% attended an initial assessment ('uptake'), and just 19% attended at least 60% of sessions (defined by the DPP as 'completion'). Attending fewer than five sessions was not associated with a change in the risk of developing type 2 diabetes compared to those who did not attend at all. However, risk decreased at a steady rate following attending six sessions, up to session 12. Attending the full 13 sessions was associated with a 5.7 (95% CI: -6.51 to -4.91) percentage point reduction in risk, relative to the 12.2% rate amongst individuals who did not attend the initial assessment.

Conclusions: Participation in the DPP was associated with a significantly reduced risk of developing type 2 diabetes amongst individuals with non-diabetic hyperglycaemia. A minimum engagement level of 40% of intervention content was required before any changes in the risk of developing type 2 diabetes were realised. Whilst health benefits did increase with continued engagement beyond the 60% completion, our results suggest that shorter interventions could still be beneficial and at lower cost.

As attendance may be endogenous we plan to use arbitrary predictors of attendance (specific dates, days and times of the week, and provider retention incentives) as instrumental variables in future work.

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Title

"Public health insurance and risky sex: The role of PrEP"

Abstract

We investigate the effects of the Affordable Care Act (ACA) facilitated Medicaid expansions on the use of pre-exposure prophylaxis (PrEP) for HIV. In administrative data from 2011 to 2019, we identify medications prescribed for PrEP and exploit state-level variations in Medicaid expansion to evaluate their effect on PrEP utilization. Using an event study specification in a two-way fixed effects (TWFE) setting, we estimate the impact of these expansions on PrEP prescriptions, HIV diagnoses, and common sexually transmitted infections. Following recent work, we employ methods which attempt to address the potential for bias arising due to the staggered timing of Medicaid expansions. We find a 70% increase in the utilization of PrEP within the Medicaid population for states which expanded Medicaid compared to those which did not. Additionally, we find a 5% reduction in HIV diagnoses among men and a 9% reduction in HIV diagnoses in ages 25-34. Our results offer evidence that suggests increased access to healthcare increases utilization of drugs which greatly reduce the risk of HIV and has the potential to reduce the spread of HIV.

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Title

"Estimating Health Inequality Aversion and Equity Weights"

Abstract

Objectives: To separately identify aversion to health inequality and equity weights that capture aversion to health differences that are correlated with, and possibly caused by, non-health characteristics.

Methods: We introduce a novel experiment that disentangles aversion to health inequality from aversion to health correlation, and that allows the latter aversion to be more intense when the correlation is causally determined. The experiment is a modified dictator game in which participants allocate resources that differentially impact recipients' health. In separate treatments, recipients are 1) anonymous, 2) identified by income, and 3) identified by income that causes health. These within-subject treatments allow the identification of parameters that determine aversion to 1) health inequality, 2) income-related health inequality, and 3) income-caused health inequality, respectively. We conduct an online experiment with a representative sample of the UK adult population (n=337). Participants make choices in multiple rounds within each treatment, producing a rich dataset (26,286 observations). We use a random behavioural model that accounts for noise in decision making to estimate preference parameters at both the aggregate and participant levels. We compare the data fit across a number of social welfare functions.

Results: We find aversion to health inequality that is lower than most previous estimates. On average, there is aversion to positive health-income correlation. We find extensive heterogeneity across participants, both for inequality aversion and income-related weights. For some participants, the income is weighted differently when it causes health inequality. An income-rank-dependent social welfare function that respects relative invariance fits the data slightly better than one that respects absolute invariance, and both fit much better than a model in which health consequences of resource allocations are ignored.

Discussion: We highlight the importance of separating aversion to univariate health inequality from aversion to bivariate (income-related) health inequality. Both parameters are required to design policy that is sensitive to differences in health across disease groups and income groups.

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Title

"The Morals Of Models: Improving Public Understanding Of Decision Models Through The Application Of Decision Analytic Models With Omitted Objects Displayed (DAMWOOD)."

Abstract

The COVID-19 pandemic has increased public awareness of the influence of epidemiological and economic decision models on public policy decisions. Alongside this is an increased scrutiny on the development, analysis, and reporting of decision models, and how they inform public policy decision makers. Important technical and ethical questions are raised, bearing on the legitimate role of modeling in public policy decision making.

Decision models for public policy do not exist in a social vacuum. The scope of a model commissioned to inform public decision making is determined by the needs of the socially legitimate decision maker. Model developers may advise, but decision makers are accountable for setting the decision problem, outcomes considered, and policy decisions made.

We consider two challenges in modeling for pandemic policy response. First, the scope of the decision problem is not always made explicit by decision makers, with modellers left to guess which policy options should be considered, and which outcomes should be used to evaluate them. Second, there is rarely sufficient transparency to ensure the public can see what is included in models, and so have limited opportunity to advocate to decision makers for the prioritization of specific outcomes. The effect of these challenges in public policy development is to weaken the evidence on which decisions are based and the accountability of decision makers to the public.

To address these challenges, we extend the recently described directed acyclic graphs with omitted objects displayed approach to decision analytic models. We apply this approach to a previously published COVID-19 vaccine optimisation model. The enhanced diagrams illustrate the ways in which it is possible to improve communication of model assumptions. The diagrams make explicit which outcomes are omitted from model outputs and provide information on the expected impact of the omissions on aggregated model results.

We report initial feedback from a sample of decision makers on the utility of the extended diagram approach. We investigate the usefulness of the approach to communicate results, to frame the decision problem, and the willingness of decision makers to use DAMWOOD to communicate about models and as the basis of decision making.

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Title

"Static regulation and technological change "prescribing cost-effective treatments under financial constraints in the English NHS"

Abstract

Despite the long-term benefits of new health technologies, their optimal adoption may be impeded by the financial constraints of a public health system. This paper assesses whether financially constrained hospital trusts ration expensive but cost-effective innovative treatments which have been recommended by the National Institute for Care Excellence (NICE) for use in the English National Health Service (NHS). NICE requires hospital trusts to make funding available for treatments it recommends for use, but hospital trusts are also penalised for running significant deficits. In such circumstances, financially constrained hospital trusts may choose to ration the use of these treatments in the short-term, even though their prescribing may be a more efficient use of funds in the long-term.

We study the specific case of an expensive but extremely cost-effective Hepatitis C treatment, using data from a panel of 80 hospital trusts providing acute care in the United Kingdom over five years. We collate trust level data on prescribing, disease prevalence and patient demographics alongside trust-level financial data to find evidence of rationing new cost-effective treatments under financial constraints.

Our identification strategy is based on plausibly exogenous variations in the availability of funding for new medicines that impact allocation and treatment decisions for patient groups benefiting from new medical innovations. Hepatitis C is a relatively small patient group and is unlikely to be a major driver of financial constraints for trusts, and thus variations between trusts are likely to be exogenous, conditional on patient demographics and disease prevalence. Additionally, over this period, financially constrained trusts merged with other trusts to improve their financial circumstances. These mergers provide an opportunity to estimate the impact of financial constraints on prescribing new medicines.

Our initial results suggest that historic levels of deficit and surplus result in a variation of shift-share affordability across English hospitals. Following health technology shocks, hospitals display differential levels of prescribing conditional on demographic factors and disease prevalence, consistent with their different levels of indebtedness.

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Title

"Not just another EQ-5D-5L value set for the UK: using the 'OPUF' approach to study health preferences on the societal-, group-, subgroup-, and individual person-level"

Abstract

BACKGROUND

We recently reported on the development of a new method for valuing health states, called 'Online elicitation of Personal Utility Functions' (OPUF). In contrast to established methods, such as time trade-off or discrete choice experiments, the OPUF approach does not require hundreds or thousands of respondents, but allows estimating utility functions for small groups and even on the individual level.

The objective of this study was to generate and compare EQ5-5D-5L value sets on the societal-, group-, subgroup-, and individual person-level.

METHODS

The OPUF tool is a new type of online survey, a demo is available at: https://eq5d5l.me. It broadly consists of three valuation steps: dimension weighting, level rating, and anchoring. Responses were combined on the individual level to construct personal utility functions, using an additive linear model. Every respondent also completed three conventional discrete choice experiments. We assessed the heterogeneity of preferences between observed and latent groups using PERMANOVA and k-means cluster analysis.

RESULTS

A representative sample (N = 1,000) of the UK population was recruited through the prolific online platform. On average, it took participants about nine minutes to complete the survey. Data of 874 respondents were included in the analysis. For each respondent, we constructed a personal EQ-5D-5L value set. The derived utility functions predicted respondents' choices in discrete choice experiments with an accuracy of 78%. On the societal level, the predicted values for the EQ-5D-5L health states ranged from -0.376 to 1.

Health state preference varied greatly between individuals. This was largely due to differences in the anchoring (i.e. the range of the utility scale respondents used), while there was near consensus on the relative importance of the five EQ-5D dimensions between groups. Demographic characteristics explained only a minor proportion of the variability.

CONCLUSION

Using the OPUF approach, we were not only able to estimate a new EQ-5D-5L value set for the UK, but also to examine the underlying individual preferences in an unprecedented level of detail. Even though the method is still in an early stage of development, we see several potential future applications.

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Title

"Mental health and productivity: evidence from UKHLS Covid-19 modules"

Abstract

Health is an important component of human capital, but the relationship between individual health and productivity is a complex one; this is especially true in the case of mental health. Empirically validation of the relationship between mental health and productivity is hampered by limited availability of direct measures of productivity in large secondary data sets. This is an important evidence gap because the prevalence of mental health problems is increasing and there is a large gap in employment rates between those with and without these problems. Further, for those in work, workers with mental health problems earn lower wages on average than those without. Increasing mental health problems are therefore likely to exacerbate economic inequality, and may be contributing to the persistently low productivity levels that characterise the UK economy.

We explore whether changes in mental health contribute to changes in productivity by exploiting the COVID-19 modules of the UK Household Longitudinal Study. Importantly, the modules include a direct (self-reported) measure of productivity change relative to pre-COVID levels. Mental health is measured via the General Health Questionnaire (GHQ) both before and during the pandemic. To overcome the obvious endogeneity problems we use an instrument based on 'feelings of loneliness', which we argue operates on productivity only via its impact on mental health. This instrumental variable approach is implemented in ordered probit models using two-stage residual inclusion.

Our results show a strong positive relationship between mental health and productivity and reveal interesting gender differences. During the COVID-19 pandemic women reported feeling more lonely, experienced larger reductions in mental health and larger falls in productivity than men. However, the relationship between mental health and productivity is stronger for men than women, with estimates approximately two and a half times larger for men than women. This result is robust to various specifications and across COVID-19 module waves. We explore whether this is a result of gender differences in labour market attachment.

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Title

"NHS staff turnover and hospital efficiency"

Abstract

Staff retention in the NHS has become a challenge and recent trends show staff shortages are worsening. The economics literature has largely focused on understanding the responsiveness of nurses and doctors' labour supply to wages, with the evidence pointing to labour supply being largely inelastic. Despite the evidence on the factors that could improve nurses and doctors retention, the very little quantitative evidence in health and social care suggests staff turnover worsens productivity and patient health (Huckman and Barro, 2005; Antwi and Boblis, 2018). The aim of this paper is to quantify the impact of turnover rates in the NHS on productivity and health outcomes. We use administrative data drawn from the Hospital Episodes Statistics (HES) and turnover data drawn from the NHS Staff payroll system for all acute hospitals in England from 2012 to 2019. Our outcome measures include length of stay, waiting times, in-hospital mortality and mortality rates within 30 days post-discharge. We focus on the impact of turnover for medical staff and nurses. As turnover variables we use joiners rate, leavers rate and stability index. The latter captures the percentage of staff at the start of a period that do not leave a hospital provider. Joiners and leavers rate are defined as the percentage of joiners/leavers over the average staff count in a given year. Simultaneity between turnover data and performance indicator may be a potential threat to our base case estimates, hence we use an instrumental variable approach to establish whether there exists a causal relationship. Our results suggest modest effects of turnover on hospital efficiency, mainly through mortality indicators. The paper also explores the determinants of turnover. In particular, we explore whether paid/unpaid overtime, work related stress and job satisfaction explain turnover rates across hospital providers.

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Title

"What types of economics research do evidence users need? Recommendations from a NIHR round-table"

Abstract

Health and care economics has diversified considerably in recent years, in response to increasingly complex interventions and associated evaluations, increased availability of data and techniques, changes in organisational context, and greater acknowledgement of different stakeholder communities.

These new requirements are exemplified by the higher profile of social care within government. Similarly, transfer of public health responsibilities to Local Authorities meant economists have new context and new stakeholders to consider. Cost-consequences analysis, which highlights where and when costs and benefits occur, has become more popular.

Economists have also had to develop methods to take account of new policy imperatives, such as addressing health and wellbeing inequalities. In global health, economists have developed methods for evaluating systems strengthening and measuring progress towards sustainable development goals. Whereas cost-benefit analysis is common in many areas of economics and in government, it is much less so in health and care economics.

Some differences across topic areas arise from historical differences in methods and approaches in different parts of the discipline. Health and care economics has sometimes developed out of economics, but also from operational research, biostatistics, health services research, psychology and less commonly, sociology and anthropology.

This diversity is important for making progress, but risks applicants not being clear what economics research is most appropriate to propose and peer-reviewers and funders not being clear what economics research they should expect. This may lead to a mismatch between what is commissioned and what evidence-users need.

We are bringing together voices from across NIHR for a round-table discussion in March 2022, including government-based economists, funding committee members, and social care and public health researchers. Preparatory material has queried, for example (why) are economists failing to address the most important policy decisions?, or why have economists failed to suggest novel solutions to the social care funding crisis?

Following the round-table, we will publish a report providing signposting for grant applicants, peer-reviewers and funding committees on what economics research can be useful and relevant depending on topic, organisational setting and the primary evidence-users. By discussing a draft document at HESG, we hope avoid overlooking or misrepresenting important issues.

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Title

"The carer experience during the COVID-19 pandemic: Mental health, loneliness and financial (in)-security"

Abstract

Background: Informal caring is associated with a range of negative outcomes for carers. COVID-19 has caused immense societal disruption, which may have had a disproportionate impact on informal carers. Reducing inequalities requires knowing whether, and how, carers were impacted by the COVID-19 pandemic.

Aim: To measure differences on a range of outcomes between carers and non-carers using Understanding Society COVID-19 survey data collected between April 2020 and September 2021.

Methods: Data from the main and COVID-19 Understanding Society surveys was used to identify informal carers for (i) someone in their household (HCs) and (ii) someone outside their household (NHCs). Propensity score matching found non-carer controls for each carer group in a 4:1 ratio. Differences between carers and matched controls were assessed for: mental health (measured by the General Health Questionnaire, GHQ-12); loneliness (three-point scale); subjective financial security (five-point scale); whether behind with mortgage/rent payments; how behind they were with bills (three-point scale); household wealth changes during COVID-19; whether they ever received universal credit (UC) after March 2020 (only working age respondents not on UC pre-pandemic). UC and household wealth change were assessed using logit models, other outcomes were analysed using random effects panel models.

Results: A total 1,463 HCs were matched with 5,972 controls, with 802 NHCs matched with 3,208 controls. HCs reported 1.33 worse GHQ-12 scores than controls in April 2020 ($p<.001$), with the difference growing by 0.022 each month ($p=.007$). NHC's scores were 0.808 worse ($p<.001$) with no significant time trend. Both HCs (odds ratio, OR=1.889, $p<.001$) and NHCs (OR=1.816, $p=.002$) were lonelier. Worse subjective financial security was reported by both HCs (OR=2.848, $p<.001$) and NHCs (OR=1.868, $p<.001$). HCs were more likely to receive UC (OR=1.653, $p=.001$). Both groups were more likely to be behind with bills (HC OR=2.286, $p<.001$; NHC OR=2.390, $p=.005$), with no effect for housing payments. Household wealth was more likely to decrease for HCs (OR=1.259, $p=.003$) and NHCs (OR=1.280, $p=.019$).

Conclusion: COVID-19 was associated with worse mental health, increased loneliness, and greater financial insecurity for carers, highlighting the need to address a growing imbalance and the need for a carer focused COVID-19 recovery strategy.

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Title

"Using discrete choice experiments (DCEs) to compare personal and social preferences for health and wellbeing outcomes"

Abstract

Background: Outcomes can be valued using personal or social preferences. A personal preference valuation asks respondents if they would choose to live a longer time in poorer health or the other way round, whereas a social preference valuation asks respondents whether they would choose for fellow citizens to live longer lives in poorer health or the other way round. Economic evaluation of health technologies typically assumes a non-welfarist framework, which would be better served by social preferences than personal preferences. Yet, the typical health state valuation study elicits personal preferences, resulting in a methodological inconsistency. However, few studies have contrasted the personal and social preferences for health and wellbeing outcomes using otherwise (near) identical valuation scenarios, and as a result, little is known about their relationship.

Aim: To measure how people would trade-off different dimensions of wellbeing from a personal and social preference.

Methods: An existing DCE used to elicit personal preferences across a set of wellbeing attributes including health was adapted to a social preference DCE, using qualitative methods. The social preference DCE was pre-piloted with six general public participants. They were interviewed online using the think aloud method. Participants explained how they went about answering the choice tasks, whether they were able to think in terms of social preferences, how they understood the language used, and made suggestions for improvement. Subsequently, this social version of the DCE was re-adapted to create the personal version, to ensure that the two versions aligned with each other as much as possible.

We are currently collecting online data using the two DCEs from two separate samples of the UK public. The personal and social preference choice data will be analysed separately using regression models. Marginal rates of substitution given by the willingness to pay for the wellbeing attributes will be calculated and compared to identify any differences in personal and social preferences.

Results and Conclusion: Data collection is currently ongoing.

This work was supported by the UK Prevention Research Partnership (MR/S037578/2).

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Title

"The Effect of Social Participation on Health and Well-Being: Evidence using Spatial Marginal Treatment Effects Model"

Abstract

Background: Social participation is the involvement of individuals in activities that provide connections with others. Past research has shown associations between social participation and improved health outcomes. However, causality has not been established due to endogeneity arising from reverse causality and unobservable heterogeneity. Availability and proximity of community assets are plausibly valid instruments but have not been related to health and well-being outcomes. We map community assets in a large, heterogeneous urban area and use a marginal treatment effects framework to estimate health returns to social participation.

Objectives: (i) To estimate the health and well-being returns to social participation (ii) to examine if these effects vary by propensity to participate.

Methods: We geo-coded fourteen different types of community assets within Greater Manchester and linked this information to the UK Household Longitudinal Study. We use distance to assets as spatial instruments in a marginal treatment effects regression model. This model estimates how treatment effects vary by propensity to participate and produces marginal policy relevant treatment effects (MPRTE). They estimate the average effect of marginal shifts in either increases in proximity of assets or propensity scores, and the treatment effects report expected returns for those who subsequently would participate due to the incremental change.

Results: Spatial proximity of assets predicts social participation. The effects of participation on health and well-being are not homogenous, with greater returns for those more likely to engage. The average treatment effect on the treated is 1.91 (95%CI 0.30-3.52) points on a five-point measure of self-assessed health and 21.8 (95%CI 3.13-40.3) points on the 100-point Short-Form 12 of Mental Health Component Summary score. MPRTEs indicate that marginal shifts in either proximity of assets or propensity scores would have insignificant treatment effects across both outcomes. This indicates that larger shifts in both are required for returns to health and well-being.

Discussion: Social participation has significant gains to health and well-being yet disproportionally benefits those more likely to engage. Future policies will require large shifts in community asset infrastructure and encouragement of social participation for equitable gains across individuals to ensure it does not contribute to existing inequalities.

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Title

"Beauty, Underage Drinking, and Adolescent Risky Behaviours"

Abstract

Physically attractive individuals experience a range of advantages in adulthood; yet, how attractiveness influences earlier consequential decisions is not well understood. This paper estimates the effect of attractiveness on engagement in risky behaviours in adolescence. We find marked effects across a range of risky behaviours with notable contrasts. More attractive adolescents are more likely to engage in underage drinking; while they are less likely to smoke, use drugs, or practice unprotected sex. Investigation into the underlying channels reveals that popularity, self-esteem, and personality attractiveness have roles as mechanisms. Our findings suggest physical attractiveness in adolescence carries long-lasting consequences.

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Title

"Methods for Estimating Individual Treatment Effect from Real World Data for Use in Health Technology Assessment: A Review"

Abstract

There has been a surge of interest in the role (and use) of machine learning (ML) methods in healthcare decision making. When embedded within a causal inference (CI) framework, ML can be employed to analyse complex datasets, with the promise to yield more accurate estimates of parameters of interest for CEA such as treatment effects and predicted treatment-specific outcomes. ML and CI can help derive treatment effect estimates to support more nuanced recommendations and funding considerations.

The paper begins with a brief overview of the potential to use CI for personalised medicine and its application in CEA for HTA. This is followed by a review and taxonomy of existing ML methods to estimate subgroup-specific and individualised treatment effects (ITE) from real-world data under specific combinations of outcome variables, treatment exposure and data structure. The purpose is to help practitioners identify the most appropriate method to use, depending on: the available data (cross-sectional or longitudinal); the outcome of interest (continuous, binary or time-to-event); whether the method can handle observed or unobserved confounders; if the method produces a parametric function to predict ITE and explicitly quantifies measure(s) of uncertainty; the software (R, Python or Stata) used to implement it. By contrasting the taxonomy against the information required to conduct CEA for HTA, the paper highlights the gaps that ML methods developers need to address for ML to become integral part of the next-generation toolbox used in HTA.

There is extensive literature on ML methods for ITE estimation, although not all produce estimates consistent with a CI framework. Most of the methods can handle confounding at baseline, but cannot accommodate time-varying and hidden confounding. Those ML methods that estimate ITE in longitudinal settings and account for time-varying confounding have been developed for use with continuous outcomes. Only one ML method can estimate ITE for time-to-event outcomes while accounting for time-varying confounders. Most methods produce point estimates using non-parametric estimation and do not formally quantify uncertainty around their predictions. More work is required to further develop and integrate CI and ML methods for the analysis of real-world data to inform treatment and funding decisions.

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Title

"The effect of Prospective Payment System reform on patient payments and health outcomes in Chengdu"

Abstract

Background: In May 2011, Chengdu, the capital city of Sichuan province in China introduced a Prospective Payment System (PPS). The policy targeted enrollees of the Urban Resident Basic Medical Insurance (URBMI) and the Urban Employee Basic Medical Insurance (UEBMI) and was implemented across ten diseases and among all 130 tier 2 (under 500 beds) and 74 tier 3 (over 500 beds) hospitals.

Objectives: In this study, we first developed a theoretical framework to predict changes associated with the payment reform, including on expenditure and quality of care. We then evaluated the PPS policy effect on patient out-of-pocket (OOP) payments, length of stay (LoS) and 30-day emergency readmission rates.

Data: We used patient-level data collected from Chengdu Healthcare Security Administration from quarter 1 in 2010 to quarter 4 of 2013. The dataset comprised 19489 observations in 167 hospitals.

Methods: Following the allocation of patients into PPS targeted (treatment) group and control group based on diagnoses codes, we performed a difference-in-differences (DiD) estimation. As a robustness check groups were formed using Propensity Score Matching (PSM) methods.

Results: We found that the adoption of PPS resulted in a 9.9% reduction in total health payments, a 10.7% reduction in OOPs, a 5.7% reduction in LoS, and a 2.6% rise in the probability of 30-day emergency readmission compared to the counterfactual. Our analysis of heterogenous effects revealed that the decrease in 30-day readmissions was concentrated among tier 2 hospitals, with no change observed in tier 3 hospitals.

Conclusion: In Chengdu, after PPS adoption, total health payments, OOPs and LoS for PPS targeted patients decreased, while 30-day readmissions increased. The increase in re-admissions was observed in tier 2 but not in tier 3 hospitals.