A007 Socio-economic status, time preference, and body fatness

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Keywords: Body fatness, obesity, time preference

Aims
This study explores if the relationship between time preference and measures of body fatness are mediated by socio-economic status. There is some evidence that higher body mass index is associated with higher rates of time preference. The role of socio-economic status on mediating this relationship has not been previously explored. If the effect of time preference is stronger for certain socio-economic groups this may help to explain health inequalities.

Methods
We employ non-linear and linear multivariate regression methods to investigate the relationship between a number of measures of body fatness: Body Mass Index (BMI), waist circumference, and per cent body fat (PBF) and time preference which is measured using a proxy of financial planning horizon. We use sub-group analysis and interaction terms to explore if socio-economic status mediates the relationship between our measures of body fatness and time preference. The analysis controls for exercise, nutrition, and other economic and demographic variables that are likely to influence body fatness. All models are estimated separately for men and women as the determinants of body fatness are different for these groups.

Data
This research uses secondary data from the Understanding Society survey. Understanding Society is an annual longitudinal survey of approximately 40,000 households in the UK which began collecting data in 2009. All adults in each household are asked about their personal background, finances, employment, expectations and aspirations, friends and family, health and happiness, neighbourhood, time use, and leisure. In Wave 2 a sub-set of 20,000 households took part in a follow-up health assessment by a registered nurse who asked additional health questions and took a range of physical measurements, including height and weight, waist circumference, body fat percentage via bioelectrical impedance, and blood pressure. The analysis uses these objective measures of body fatness from the nurse assessment sample as well as other economic, demographic, and financial time preference variables from the main study sample.

Results
The analysis shows that higher time preference rates measured by financial planning horizon are positively associated with higher levels of body fatness. This relationship holds with the different measures of body fatness. Preliminary results show that this relationship between time preference and body fatness may be stronger in lower socio-economic groups.

Conclusion
We find evidence that socio-economic status mediates the relationship between body fatness and time preference and can help to explain health inequalities.
A016 Use pilot economic models to support grant application for clinical trials? A case study of STRATA project

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Keywords: Pilot economic model, grant application, Markov model

Background & aims
Schizophrenia is a chronic but treatable condition. However, more than half of those with schizophrenia do not receive appropriate treatment (Kane et al., 1988; Barbato, 1998), mainly because of heterogeneity in drug response and lack of guidance on drug selection. The Institute of Psychiatry of King’s College London is proposing a series of clinical trials to develop a stratified treatment pathway (ST) for schizophrenia patients, whereby a brain scan administered to patients would determine which drug was used. However, the potential economic impact of ST is unknown. Therefore a pilot model was proposed to:

1. Assess how accurate the stratified test needs to be so to make ST cost-effective, compared with the current treatment as usual strategy following NICE guidelines (TAU).
2. Assess the cost-impact of implementing ST.

Methods
A decision tree was constructed to assess the cost-effectiveness and cost impact of ST over a 1-year and 5-year time horizon. A Markov process was embedded in decision trees to model the possible prognosis of schizophrenia. To test the robustness of the results of the model, a series of one-way sensitivity analysis and probabilistic sensitivity analysis (PSA) were undertaken. The primary outcome was the incremental cost-effectiveness ratio (ICER). Analyses were conducted from both societal and NHS perspectives.

Data
A quick literature search was conducted to search for model inputs. Where published evidence was sparse, the expert opinion of clinicians was used to estimate relevant parameters.

Results
The preliminary results show that, at the NICE £20,000 willingness-to-pay (WTP) threshold:
Year 1 results: when the sensitivity and specificity of the stratified test is 60% and 65% respectively, ST becomes broad line cost-effective (ICER = £214,134 per QALY). However, the probability of ST becoming cost-effective is less than 50%. The net benefit of implementing ST is £3.5 million.
Year 5 results: when the sensitivity and specificity of the stratified test is 60% and 65% respectively, ST dominates TAU. The probability of ST becoming cost-effective is 100%. The net benefit of implementing ST is £355 million.

The above results are only sensitive to the sensitivity and specificity of the stratified test.

Conclusions
Despite potential limitations, pilot economic models can be a useful tool for both the grant applicants and assessors to consider the potential cost consequences of proposed clinical trials. It is highly recommended that pilot models should be routinely built to inform research funding allocation.
A048 Assessing efficiency in district public health expenditure in Mozambique

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Key words: efficiency analysis, stochastic frontier analysis, health system efficiency, health expenditure, Mozambique health system

Aim
Health systems efficiency has mostly been analysed at facility level, through the assessment of productivity, or at national level, through cross-country comparisons of health care inputs and health outcomes. In spite of playing an important intermediate role in determining overall public systems efficiency, local administrations efficiency remains largely unexplored, especially in low and middle income countries. This study aims to assess the efficiency of district administrations in managing financial resources in Mozambique, and to understand which characteristics are associated to performance scores.

Methods
We estimate individual district efficiency scores using stochastic frontier analysis. We measure the production output as the average share of total human resources and equipment available in district health facilities, compared to the minimum standard defined by law. We define the inputs to the production process as district average recurrent expenditure per health facility. We include district characteristics in the estimation of the efficiency frontier to understand their relative contribution to the productive performance and to account for heterogeneity. We estimate a time invariant efficiency random effect stochastic frontier panel data model. We perform the following sensitivity analysis: a) we vary the functional form assumed for the production process; b) we run a cross-section analysis on the pooled panel dataset; and c) we define alternative outputs based on human resource availability and equipment only.

Data
We use data on health facility characteristics from the National Health Information System and data on provincial and district recurrent expenditure from the Ministry of Finance and Ministry of Health budget execution reports, in both cases from 2008 to 2011.

Results
Preliminary results suggest that district efficiency scores vary considerably. Population covered, number of health facilities and workload (utilization level) are negatively associated with district performance suggesting the presence of scale efficiency. The proportions of health facilities located in urban areas, with access to running water and with access to electricity are positively associated with district performance, suggesting the . District efficiency varies across Provinces.

Conclusions
There is potential to increase efficiency in public health expenditure by improving the efficiency of local health administration. Additional capital investment appears to be required to catalyse efficiency improvement. Further research is required to understand the “intangible” determinants of efficiency.
A055 Health economics of prisons? The jury is out!

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Keywords: Prison, market failure, economic evaluations, systematic review

Background
Although there has been significant research into the relationship between health and prison in regards to health problems associated with criminal behaviours and incarcerated populations, less is known about the economics. In the mid 1990s to earlier 2000s the US and UK noted health care costs in prisons were growing at a faster rate than any other correctional cost and commissioned work to identify the cause and solutions. As a result the number of economic evaluations of health related interventions in prisons increased significantly. What was not investigated though was the economics of providing health care in prisons.

Theory
We discuss the areas of market failure that differentiate delivering health care in prisons from other health care markets including: positive and negative externalities, duty of care, equity in access and quality of care, monopoly of power, returns to scale, supply of care including access to physicians and prisoners as informed consumers. We explore the tension between the purpose of prison, the protection of society through the deterrence of criminal activity and the incarceration of those likely to commit more crimes, and the purpose of health care, to improve the health of the population. The inefficiencies that occur as a result of this tension are described.

Method
A systematic review of health related economic evaluations in prisons was undertaken to summarise how efficiency is measured and reported. A comprehensive search strategy was employed searching medical and social science databases, NHS Economic Evaluation Database, Offender Health Research Network, Google, reference lists and relevant journals. The quality of economic evaluations was assessed using Drummond’s 10 point check list.

Results
The literature search identified 2,215 papers, 72 of which were included in the review. Papers were grouped into the most common type of clinical areas (communicable disease control (CDC), addiction, mental illness, telemedicine and other) with the most common clinical area being CDC (32%) and the most common type of economic evaluation being costings (39%). The effectiveness of the intervention for the majority of studies was based on observational studies and mechanisms for reducing bias were rarely considered. The costs and consequences included in the studies meant that unless the intervention was clearly cost saving it was hard to comment on the probability it was cost-effective.

Conclusion
Guidance on conducting health related economic evaluations in prisons should be produced so as to improve the quality, comparability, theoretical basis and rigour of future analyses.
A069 Examining productivity losses associated with health related quality of life using patient data

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Keywords: productivity loss, days off work, HRQoL, economic evaluation, value based pricing

Aims
Value-based pricing (VBP) aims to assess the cost-effectiveness of medicines taking into account a broader scope of value, including wider societal benefits such as reduction of productivity losses, i.e. reducing time off work due to poor health. This paper reports on a study to develop models to estimate the productivity losses associated with the health related quality of life (HRQoL) of the patient measured using EQ-5D.

Methods
Secondary data from a large UK patient dataset, the Health Outcomes Data Repository (HODaR) was used in this study. HODaR is a dataset of survey data collected using a prospective survey of patients at a large University hospital in South Wales, UK, supplemented with routine data collected in the hospital. Inpatients are sent questionnaires 6 weeks after discharge and complete EQ-5D and report the number of days off work and days off normal activities over the previous 6 weeks. A number of regression models were used to estimate the relationship between days off work and days off normal activities and the health of the patient measured using EQ-5D and ICD chapter. Analysis took into account the distribution of the dependent variables which have spikes at 0 (zero productivity loss) and one model also allowed for a spike at 42 days (maximum productivity loss).

Data
There were 57,912 records from 43,802 inpatients that had complete responses for EQ-5D, ICD classification and days off work.

Results
Regression results indicated that days off work could be predicted using EQ-5D data. The preferred model is the zero-inflated negative binomial model with variable inflation. The relationship between EQ-5D and productivity losses was consistent and significant, where lower EQ-5D score meant higher productivity losses. The relationship between ICD chapter and productivity losses was not as clear with varying sign and significance of the dummies for ICD chapter across models. Similar results were observed for the models predicting days off normal activities.

Conclusions
The results can be used to predict days off work and days off normal activities associated with changes in HRQoL measured using EQ-5D. These allow productivity losses associated with HRQoL to be estimated using existing datasets for inclusion in economic evaluation. The use of a large patient dataset means that the models are based on HRQoL from a number of conditions but further research is recommended to match HRQoL and productivity recall periods to allow better estimates.
A073 What is the most appropriate structure to model costs and outcomes in COPD patients recently discharged from hospital? A review of existing approaches and proposed new model structure

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Keywords: Decision analysis, Markov modelling, model structure, chronic disease, economic evaluation

Background
Baseline exacerbation and hospital admission rates are important parameters in Chronic Obstructive Pulmonary Disease (COPD) models as changes to these risks will be the main cost differentiators in interventions aimed at reducing future hospital admissions.

The majority of moderate and severe COPD patients experience between 1-2 exacerbations per year of which 20% result in hospital admissions. However, a small proportion experience much higher rates and national audits repeatedly report that over 30% of COPD patients admitted to hospital will die or be readmitted within ninety days of discharge. This minority group has been largely ignored in Markov models which typically incorporate mean exacerbation and mortality risks reported in large cohort studies of stable COPD populations. The widely-used approach is unlikely to reflect costs and outcomes of interventions delivered to cohorts admitted or recently discharged from hospital, which are likely to include a much higher proportion of frequent exacerbators.

Method
This study reviews existing approaches to modelling exacerbations rates in COPD Markov models and considers alternative structures and parameters that could be applied when modelling COPD cohorts recently discharged from hospital.

Proposed new structure
A new Markov structure is proposed that incorporates tunnel states that reflect higher readmission and mortality risks subsequent to discharge. This structure also allows for differentiation between those prone to recurrent exacerbations which remain in a cycle of discharge and readmission and those that return to a stable condition and experience exacerbation rates reflecting norms within different severity group.

This study is research in progress. We would be interested in the views of HESG members on this approach and how similar issues have been addressed in other disease areas.
A075 Income, employment status and macroeconomic conditions and the supply of informal care

Authors: Jeff Round

Submitting author’s institution: University College London

Keywords: Informal care, macro-economic conditions, employment

Aims
An increasing proportion of the population is entering older age and the demand for health and social care services is increasing. The provision of informal care by family and friends is considered an important component in meeting the care needs of individuals. In this paper, we investigate the impact of income, employment status and macroeconomic conditions on the decision of an individual whether and how much informal care they provide. We extend the analysis to the sub-population of working age individuals.

Methods
We use a two part-model across each of the three populations. The first part of the model is used to explore the factors associated with the individual’s decision to provide any informal care at all. In the second part of the model we explore these relations in only those individuals who provide any informal care. At each stage we control for age, gender, ethnicity, region and month and year of interview.

Data
Our primary data set is the 18 waves (1991-2009) of the British Household Panel Survey (BHPS). The core BHPS includes data on employment status, hours per week of paid employment, hours spent caring per week, and gross income. This is combined with the BHPS Derived Current and Annual Net Household Income dataset to provide net income data. Macroeconomic conditions at the Region level are estimated using monthly Job Seekers Allowance claimant counts for the period covered by the BHPS.

Results
In the primary sample those in full-time employment were less likely to provide any informal care (OR 0.678, 95%CI 0.610 to 0.753, p<0.001) than those not in employment. Employment status and income were also significantly associated with hours of care provided. Those not in employment provide more hours of care than those in part-or full-time employment while there is a small but significant decrease in hours of care provided for every £10 increase in weekly net-income. In the working age sub-population those in full-time employment were less likely than those not in employment to provide care (OR 0.673 95%CI 0.598 to 0.758, p<0.001) and increased income was again associated with reduced hours of care provision.

Conclusions
The data suggests that individuals must trade-off between employment and income opportunities and caring. Policy makers seeking to increase informal care provision should consider that those in full-time employment are less likely to provide any informal care, and to provide fewer caring hours than those not in employment.
A080 The well-being of elderly dependent persons: the effect of formal and informal care

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Keywords: long-term care, informal care, health, multivariate probit, instrument

Most of the developed countries are facing aging populations. This demographic trend raises the question of old-age dependency and of the well-being of dependent elderly persons. For instance, in France, the number of dependent elderly individuals amounted to 1.15 billion in 2010 and is expected to double by 2060.

Our work aims at estimating the effect of informal care (provided by the family) and formal care (professional care) to dependent persons on several indicators: perceived health, depression, undernutrition and satisfaction of needs for assistance. This is important to shape public policies and to determine the type of care that ensures the highest quality of life to elderly individuals. We use French data - the Disabled Persons Healthcare Survey (household section, 2008) - that provide information on health and socioeconomic variables. Using a sample of 4166 dependent elderly over 70, the effects of informal care and professional care on each type of indicator are estimated by multivariate (3 equations) probit models that address endogeneity problems (Stata package “Cmp”, Roodman 2009). Indeed, formal care and informal care are endogenous and are instrumented through two probit equations. The instrument for informal care is the number of daughters (Van Houtven and Norton, 2008) and the instrument for informal care is the proportion of persons 60 years and older in each French department (Stabile et al., 2006). Furthermore, we estimate our models separately for men and women to allow gender-specific effects.

Descriptive statistics stress that only 11% of women and 9% of men are in good or very good health; 7.5% of women and 4.5% of men report depression and 16.5% of women and 9.5% of men suffer from moderate undernutrition. Concerning the type of care, 27.5% of the elderly receive exclusively informal care, 26.7% receive exclusively professional care, 25.5% receive both type of care and 20.3% receive no help.

Very preliminary econometric results (simple probit models, not controlling for endogeneity) show no significant impact of care on health. This is due to the fact that a poor health status increases the probability of care. Once controlling for this reverse causality, we expect significant effects of both types of care on perceived health, depression, undernutrition and satisfaction of needs for assistance. More precisely, we predict a positive effect of formal care on perceived health and satisfaction of needs and a negative effect of informal care on undernutrition and the risk of depression.
A084 Smile, but only if your parents can afford it - identifying socio-economic inequalities in access to orthodontic dental care

Authors: William Whittaker

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Keywords: Access, need, health inequality, dentistry

Aims
Orthodontics is a dental specialty that is concerned with the straightening of misaligned teeth and jaws. Approximately 30% of 12-14 year olds in the United Kingdom have NHS orthodontic care and although this figure is rising year on year, there is little evidence of an increase in clinical need for orthodontic care. Utilisation and the need for health care may not coincide. Use is determined by the need for care, but also the availability and accessibility of services, affordability of treatment and acceptability of the patient to seek and complete treatment. This paper aims to test whether the use of orthodontic services is aligned to need and whether socio-economic inequalities exist in service use.

Data and Methods
Using NHS orthodontic activity records for Greater Manchester in the North-West of England (2008-2012), three different models were developed. The first models test whether there are differences in the use of orthodontic care by age, socio-economic status (SES, as measured by quintiles of the Index of Multiple Deprivation derived from the patient’s postcode), and provider availability (measured by distance to closest provider); each conditional on need (as measured by clinical data). Socio-economic inequalities may be driven through choices of the patient or practitioner. The second set of models use information on patient refusal for treatment in the data to examine patient acceptability of care, determining whether there is any statistically significant difference in the uptake of treatment by SES.

The third set of models examines the decisions made by practitioners. Referrals from dental to orthodontic practitioners result in either: treatment, a decision not to treat, or delayed assessment. The latter is common when the patient is judged to have teeth that require alignment, but the patient has poor oral hygiene that requires improving or there is a need to wait for further tooth or jaw movement. For each type of outcome we test for socio-economic inequalities conditional on need.

Results
We find the use of orthodontic care, patient acceptance of treatment, and delayed assessment are each significantly associated with SES and this persists when the clinical need for care is controlled for.

Conclusions
Our results suggest policies aimed at reducing socio-economic inequalities in orthodontic care should tackle provider availability, encourage patient acceptance amongst patients of lower SES and develop ways to support/target oral health improvements for lower SES.