Abstract number: 1

Exposure to job insecurity and depression

Author: Marie Kruse
Co-author: Mickael Bech

Abstract:
Job loss impacts negatively on both physical and mental health. During economic crises, the risk of unemployment usually increases. Exposure to potential job loss and job insecurity due to economic crisis may also impacts on individual health. We investigate the impact of overall job insecurity on mental health in the Danish population. During the period 1996-2014, consumption of antidepressants soared and eventually stagnated. Meanwhile the mid 00-s provided an economic boom followed by a crisis, causing unemployment rates to drop and then increase. This study aims to identify a possible interaction between the two developments taking into account other explanatory variables in a model of antidepressant consumption. In a panel data regression covering all individuals aged 30-65 and living in Denmark during 1996-2014, we analyse the impact of exposure to job insecurity on consumption of antidepressants. We find that increased job insecurity is positively associated with antidepressant consumption. Other, individual, factors do however play a more prominent role.

Abstract number: 2

Is obesity epidemic?

Author: Jørgen T. Lauridsen

Abstract:
Summary: Background: Alike most countries, Denmark experiences an increasing percentage of obese citizens of all ages. Although obesity is not in a clinical sense infectious, this development has commonly been termed “the obesity epidemic”, based on an assumption of a spread of lifestyle behaviour underlying obesity. However, most studies focuses on the epidemic pattern over time as measured by changes in obesity rates. A few studies focus on space, but merely in terms of geographical patterns of exogenous factors underlying obesity. Objective: The present study shows that the previous non-spatial approaches are insufficient and demonstrates advantages of explicitly implementing the spatial dynamics of obesity rates. Data and methods: Obesity rates and explanatory variables for a spatial panel of 98 Danish municipalities, observed 2010 and 2013, is exerted to spatially adjusted regression models. Results: A spatial behavioural spillover of an endogenous learning nature is demonstrated, thus indicating a spatial epidemic dynamic behind obesity rates.

Abstract number: 3

Optimal Level of Public Hospital Beds in Korea

Author: Youngho Oh

Abstract:

Objective Serious problems such as supplier-induced demand or limited access to health care may be caused by an imbalance in medical resources such as hospital beds. To help guide hospital bed policy, we estimate the optimal level of supply of hospital beds in Korea compared with OECD countries.Date & Methods Using OECD and WHO data from 1980 to 2012 for 33 OECD member countries, we employ a panel analysis including fixed effects models and random effects models for estimating the optimal level of hospital beds such as all hospital beds acute care beds, long-term care beds and public hospital beds. The optimal levels of hospital bed resources in Korea are estimated from perspectives of medical resources, national health expenditure, and health level on the basis of the averages on the variables observed as determinants of hospital bed supply, using OECD country data. Findings Overall, the current supply levels of hospital beds in Korea, such as all beds, acute care beds, and long-term care beds, were estimated to be very high. However, the proportion of public hospital beds in Korea was very low as compared with other OECD countries. Regarding the number of all beds, the optimal level of hospital bed supply on the basis of the patterns observed among OECD countries is 4.02 to 7.48 beds per 1000 people; however, in the case of public hospital beds, estimates for the optimal proportion of public hospital beds on the basis of the patterns observed in OECD countries was 57.11% to 71.81% when the model did not include the type of health care delivery system. The estimates changed greatly when the model included the type of the health care delivery system. On the basis of the data on countries with a private-based health care delivery system, the optimal proportion of public hospital beds was estimated to be 53.61% to 55.15%. However, the actual proportion of public hospital beds in Korea was 12%, which was only 17% to 22% of the optimal level. Conclusion The problem of hospital bed supply in Korea is that acute and long-term care beds show an oversupply, whereas the public hospital bed capacity is too low. This problem is considered the result of policy failure and absence; i.e., failing to have an effective policy on hospital beds in place. Therefore, policies in the future should be directed toward reducing the supply of acute and long-term care beds on the basis of regional distributions and expanding the supply of public hospital beds on the basis of the public health care demands Key Words. Hospital beds, optimal supply of public hospital beds, oversupply of hospital beds

Abstract number: 4

Disease and fertility: Evidence from the 1918 Spanish flu epidemic in Sweden.

Author: Maryna Ivets
Co-author: Nina Boberg-Fazlic, Maryna Ivets, Martin Karlsson, Therese Nilsson

Abstract:
Objectives: The 1918 Spanish flu epidemic constitutes one of the largest unanticipated mortality shocks in Sweden's history. Within the course of a few months, 10% of the Swedish population was infected and almost 1% died. Our paper studies the epidemic's effects on population dynamics, specifically the fertility response to this event. Data: Our unique panel dataset is constructed from several high-quality administrative sources: the Medical Board, Swedish Demographic Statistics, Midwife Journals and Statistics Sweden.Methods: We investigate whether the prevalence of the flu in certain districts has an impact on fertility post-flu. In order to do so, we define three periods: pre-flu, the flu, and post-flu. We specify the model in terms of conception rates, as it is the conditions at the time of conception that should matter for the decision of whether or not to have a child. We use a difference-in-differences estimation model with district fixed effects as well as month-year fixed effects. In some specifications a county trend is included as a robustness check. The additional control variables include the mortality environment at the time of conception, per capita earnings and per capita capital income, the poverty share and the number of female/children factory workers. We also control for the number of midwives; this acts as a proxy for the medical infrastructure available in the district. Flu intensity is defined as the sum of deaths or influenza and pneumonia cases during the period August 1918 to March 1919, normalized by district population as of 1917.Results: We find evidence for behavioral effects from mortality but not from morbidity. In the years following the epidemic, fertility was significantly lower in districts with high influenza prevalence than in districts with low prevalence. This is despite the fact that we control for a range of factors theoretically associated with a drop in fertility following a mortality shock. We do not find evidence for replacement effects; rather the opposite. Notably, births to married women that already have children are reduced in districts highly affected by the flu. These findings contribute to the understanding of the link between mortality and fertility, which is one of the central relations in demography.Conclusions: We illustrate that a mortality shock such as the Spanish flu influences fertility rates not only in the short-term but even a decade later. We have shown that in Sweden, fertility rates were lower in the most flu-affected districts. This is consistent with economic theory and a dominating substitution effect. However, fertility effects seem to go beyond what can be explained by economic theory, as we still find negative effects, even when controlling for economic circumstances in the district.

We have also shown that the pattern of who had children changed after the flu, with a selection into married mothers who already had children

Abstract number: 5

Macroeconomic conditions and cardiovascular health in Iceland

Author: Kristín Helga Birgisdóttir

Abstract:

When studying the impact of economic conditions, and economic cycles specifically, on heart disease researchers have found mixed results. Results appear to be sensitive to time, place, data sources and/or outcomes. In this analysis we test this relationship in a context not examined before. We focus on the long-term relationship between economic cycles and cardiovascular diseases on a population level in Iceland. In contrast to many other economically volatile countries, Iceland is a developed country with a strong data collecting infrastructure, which makes for reliable data. Here, we want to take advantage of this opportunity, to examine good quality data from a western country that, due to its size, happens to provide substantial volatility. The data used is aggregate annual data spanning the period 1960-2009. The time series used here are not all available for the whole study period and therefore we perform analyses for the period 1981-2009 as well. Since it is not obvious how best to measure the economic cycle we use three different aggregate indicators of economic activity, as well as yearly changes of those indicators, to proxy the economic cycle; the unemployment rate, real GDP per capita, and real GDP. Total mortality due to diseases of the circulatory system was used as an outcome measure. Additionally, diseases-specific analyses were also performed for ischemic heart disease and cerebrovascular diseases, as well as acute myocardial infarction, a sub-category of ischemic heart disease. Three different specifications were used in our sensitivity analysis. First, lead values for up to two years of the economic variables are added to the regression as the health impact of economic changes could reasonably be assumed to take time to emerge. Second, an additional economic indicator is used to capture people's living standards. Third, the study period is split up into decade long time series to see whether the relationship between economic conditions and heart health is found in individual periods.Due to the multitude of determinants of heart health and in accordance with previous research, a priori we expected to find a relationship that could be of either sign, but likely to be small if existing. Indeed, our results for both study periods point to a very small, but fairly consistent, pro-cyclical relationship (i.e. better economic times are associated with less cardiovascular mortality), although not consistent across all economic indicators or cause-specific

mortalities, and not statistically significant. Furthermore, results varied between males and females, especially when circulatory diseases as a whole were studied. Such patterns were not as apparent for particular disease sub categories. When studying shorter periods in the sensitivity analysis a picture of a changing relationship emerged between the economy and heart health, with it changing between a pro-cyclical one to a counter-cyclical one during the study period. As in the longer time periods, statistical significance was low for males, but higher for females. These shifts over time are in accordance with recent findings from the US and point to the importance of further research aiming to explain this development.

Abstract number: 6

Health brings wealth: evaluating the treatment effect of kidney transplantation on employment in Sweden

Author: Johan Jarl
Co-author: Ulf-G. Gerdtham, Peter Desatnik, KG Prütz

Abstract:
Background. Kidney transplantation is considered a superior treatment for end stage renal disease compared to dialysis although little is known about the wider effects, especially on labour market outcomes. Objective. The objective is to estimate the treatment effect of kidney transplantation compared to dialysis in terms of employment, labour force participation, labour income, early retirement, and educational activities, controlling for the non-random selection into treatment. Method. The average treatment effect is estimated using an inverse-probability weighting regression adjustment approach. The inverse probability weights are calculated after estimation of a treatment model and then applied to treatment-specific outcome models. This allows prediction of the potential outcome for each treatment and thus the treatment effect. Results. Kidney transplantation has a substantial treatment advantage over dialysis in all labour market outcomes except educational activities. For example is the probability of being employed (participating in the labour force) one year after treatment 21 (25) percentage points higher for transplantation, after controlling for non-random treatment selection. The positive effect increases with additional time after transplantation, mainly due to worsening outcomes in dialysis. The treatment effect on labour income is mainly channelled through employment probability, but a significant labour income effect is still evident after controlling for employment. The productivity gains of transplantation (reduced labour income losses) compared to dialysis over 5 years amounts to €33’400. The results are stable to separating dialysis into haemo- and peritoneal dialysis. Conclusion. Even though

there is a substantial treatment selection effect that is essential to control for, the probability to return to work and other favourable labour market outcomes are substantially higher with transplantation compared to dialysis. In terms of the studied outcomes, transplantation should preferably be offered to all of working age individuals with renal failure.

Abstract number: 7

The intrinsic and instrumental effects of health on subjective well-being in patients with chronic conditions

Author: Lamu Admassu Nadew
Co-author: Jan Abel Olsen

Abstract:
Background: There is increasing evidence that health related quality of life (HRQoL), wealth and social relationships are important for people's subjective well-being (SWB). However, little is known about the specific indirect pathways that link health to SWB via social relationships and income in patients with chronic conditions. Beyond the direct effects of HRQoL on SWB, this study shows that health is associated with social relationships and household income, and that both social relationships and income would link the association between health and well-being. Method: Data was obtained from the Multi-Instrument Comparison (MIC) study, which is based on an online survey of 2012 administered in six OECD-countries - Australia, Canada, Germany, Norway, UK and the US. This study employs the data on seven disease groups (N=6173) - arthritis, asthma, cancer, diabetes, depression, hearing and heart problems. Structural equation modeling was conducted to explore the direct and indirect link between HRQoL and SWB. SWB is a latent construct estimated from the first three items of satisfaction with life scale. Three different measures of HRQoL were applied in different models (EQ-5D-5L; SF-6D; VAS). A composite score based on four questions from the Assessment of Quality of Life instrument measures social relationships. Results: Social relationships is most important to SWB, followed by health and income. When generic measures of health were used (EQ-5D-5L; SF-6D), the total indirect effect of health on SWB is stronger (0.246; 0.267) than its direct effect (0.167; 0.219). However, when a visual analogue scale (VAS) is applied, the direct effect (0.325) is stronger than its total indirect effects (0.196). The indirect effect of health through income was very small in all models (highest 0.02), because household income is weakly correlated with SWB. (All figures are standardized results). Conclusions: An

important insight from this analysis is to show the importance of health through social relationships. Improving health enhance social networks, thereby promoting trust and mitigating transaction costs, and eventually enriching overall well-being.

Abstract number: 8

Socioeconomic factors affecting the demand for multiple sclerosis drugs

Author: Seyede Sedighe Hosseinijebeli

Abstract:

Background:

Considering to the high cost of multiple sclerosis treatment and implementation of a new financial protection programme for specialty disease in Iran, the aim of this study was to examine factors affecting the demand for multiple sclerosis drugs in Iran.

Methods:

This study was carried out in Ahvaz, Iran. The study population included households that at least one of their members suffer from MS and were inhibited in Ahvaz, for more than 3 years. They were asked to fill a questionnaire including socioeconomic factors and medical costs. Furthermore, Poisson regression was employed to econometrically estimate the demand of multiple sclerosis drugs, using the default software STATA12.

Results;

All out of pocket payment groups were significantly (P-value<0.001) correlated with drug demand. Partial effect of each 3 out of pocket groups calculated -26.95,-14.59, and 8.69 respectively.

Conclusions:

Given the increasing cost of drugs, as well as their safety in the treatment of disease, review of policies concerning patients Cost sharing strategies, Out of pocket payment and financial safety programmes is essential. Finding of demand elasticity could be used for evidence based policy making to subsidy these specialty drugs.

Abstract number: 9

Does risk-adjusted payment influence primary care providers' decision on where to set up practices?

Author: Margareta Dackehag
Co-author: Anders Anell, Jens Dietrichson

Abstract:

Background: Providing equal access to health care is an important objective in most health care systems. It is especially pertinent in systems like the Swedish primary care market, where providers are free to establish themselves in any part of the country. To improve equity in access to care, 15 out 21 county councils in Sweden have implemented risk-adjusted capitation based on the Care Need Index, which increases capitation to primary care centers with a large share of patients with unfavorable socioeconomic and demographic characteristics. Our aim is to estimate the effects of using care-need adjusted capitation on the supply of private primary care centers.

Method: We use a dataset that combines information on all primary care centers in Sweden during 2005-2013, the payment system and other conditions for establishing new primary care centers used in the county councils, and demographic, geographic, and socioeconomic variables for low level geographic areas. To estimate the effects of care-need adjusted capitation, we use difference-in-differences models, contrasting the development over time between areas with and without risk-adjusted capitation, and with high and low Care Need Index values.

Results: Risk-adjusted capitation significantly increase the number of private primary care centers in areas with relatively high Care Need Index values. The adjustment results in a changed distribution of private centers within county councils; the total number of private centers does not increase in county councils using care-need adjusted capitation. The effects are furthermore increasing over the first three years after the implementation of such capitation, and concentrated to the lower and middle range of the group of areas with high index values.

Conclusions: Risk-adjusted capitation based on the Care Need Index increases the supply of private primary care centers in areas with unfavorable socioeconomic and demographic

Abstract number: 10

Choice of physiotherapist: Empirical analysis on patient choice in rehabilitation

Author: Visa Pitkänen
Co-author: Piia Pekola

Abstract:

Objectives

In addition to public health care provided by municipalities, the Social Insurance Institution of Finland (Kela) finances and organizes physiotherapy for disabled individuals aged 0–65 years. The budget for physiotherapy in this study's focus was 73,5 million euros in 2015, and about 1250 firms produce these services for around 14,000 individuals annually. Since 2011, the individuals have been able to choose the producer from a pool of firms, which have been selected after public procurement procedures organised by Kela. The disabled individuals base their choice on their own preferences such as quality and distance, because there are no out-of-pocket payments. This study examines their views on freedom of choice, how easily they find information regarding the producers and the key elements their choices are based on.

Data and methods

The data for this study was collected as a postal survey in autumn 2015. The study population consisted of disabled individuals aged 20–63 to whom Kela organises physiotherapy. The respondents were selected by a simple random sample of 3400 individuals. A total of 1724 questionnaires were returned with a response rate of 51%. Open answers were analysed thematically and descriptive statistics and non-parametric chi-square tests were used to find differences across different groups. Ordered logistic regression was used to analyse the relation between dependent variables (the importance of patient choice and easiness of finding information and selecting producer) and background variables.

Results

The data shows that 45% of the disabled individuals are able to make the choice by themselves. More than 80% find it important to be able to choose their physiotherapist. Choice is most important for women, younger individuals, highly educated persons and for those who are able to make the choice by themselves. We find that self-rated health has no effect on how important disabled individuals view patient choice.

Most of the individuals (62%) think finding information and selecting among the different producers is easy, even though comparable data does not exist. Individuals making choice by themselves find it easier

to find information and selecting a producer. Individuals seek for information from many sources such as health care professionals or visiting different producers. Finally, we find that key elements behind choices are producers' specialisation, individuals' own beliefs about the quality and effectiveness of the physiotherapy and their previous experiences of different producers.

Conclusions

We have analysed patient choice in a rehabilitation service where individuals' choices should be based on their own preferences. Our study shows that most individuals value patient choice in rehabilitation, though those who are able to make the choice by themselves value choice more and can find information regarding the producers easier than others. We also find that the individuals are willing to change the producer for better quality. These findings are a major argument in favour of choice based model in rehabilitation within the social insurance market, as choice is intended to extend competition and improve quality among producers. In the future choice should be enhanced by offering easily achievable comparative data of different producers.

Abstract number: 11

The effect of human capital on health behaviour after screening for colorectal cancer

Author: Eline Aas
Co-author: Tor Iversen

Abstract:

Objectives

We study the changes in demand for health that occur after cancer screening, and more specifically, whether these changes in demand vary with human capital. We expect that misinterpretation of test results occurs more frequently among individuals with a low level of human capital compared with individuals with a high level of human capital, i.e. human capital makes the information updating based on the screening result more accurate. If this is the true, the implications for health policy are profound.

Data

The analyses are based on unique data from a randomized controlled screening trial in Norway, NORCCAP (NORwegian Colorectal Cancer Prevention) running from 1999 to 2001. The dataset consists

of approximately 100 000 individuals born between 1935 and 1950, of whom 21 000 were invited to participate in a once only screening with sigmoidoscopy. Information on screening participation status and screening outcome (positive and negative test and cancer diagnosis) was provided by the Cancer Registry of Norway. For all individuals we also have information on outpatient consultations and inpatient stays, human capital, measured by education, income, wealth, marital status and working status. Since we are working with data from a randomized trial, we can approximate the result of health behaviour by health care utilization both ex ante and ex post of screening. The result of health behaviour is mainly measured by lifestyle related diseases, such as COPD, hypertension and diabetes type 2, identified by ICD10 codes either as main or secondary diagnosis. To control for the time trend of change in health care utilization, we also include health care utilization in the same period for non-lifestyle related diseases, such as hip fractures and hearing aid.

Methods

Relevant regression models are used to estimate whether the interaction between screening outcome and human capital changes the utilization of health care for lifestyle related diseases. We start by dividing the sample in invited and control groups, to see if there are changes in lifestyle related utilization in an intention-to-treat setting. Further, we divide the invited into participants and non-participants, and next the participants according to screening outcome. In these models we take account of the non-random selection of the participants among the invited.

Results

Results indicate that the prevalence of lifestyle related diseases is lower among individuals with a high level of human capital and among participants. In the further analysis, we expect that health care utilization will change according to screening output, and that a high level of human capital will reduce the absolute value of these changes due to a more accurate Bayesian updating.

Abstract number: 12

Optimal screening participation

Author: Mathyn Vervaart
Co-author: Eline Aas, Emily Burger

Abstract:

Objective

Analyses to inform decision makers about the cost-effectiveness of screening programs rarely consider heterogeneity except for age. Introducing heterogeneity may reveal that screening is not cost-effective in subgroups where for instance life expectancy is lower than average. The objective of this paper is to analyze the impact of morbidity on the cost-effectiveness of screening for colorectal cancer. Two types of morbidity are considered; i) unrelated morbidities that reduce overall life expectancy, and ii) related morbidities that in addition are correlated with cancer incidence, adverse events and cancer mortality. We hypothesize that unrelated morbidity will negatively affect cost-effectiveness of screening through lower life expectancy, while the impact of related morbidity may be ambiguous due to the negative effect of lower life expectancy in conjunction with a positive effect through increased cancer incidence.

Method

A Markov model of screening for colorectal cancer by once only sigmoidoscopy compared to no screening is developed to estimate the cost-effectiveness. Sigmoidoscopy is expected to reduce the future incidence of cancer as polyps and adenomas are removed from the colon. Cohorts of Norwegian men and women aged 60 years old are analyzed until death or 80 years. Unrelated morbidity is represented by chronic obstructive pulmonary disease (COPD), dementia and chronic renal failure, while related morbidities include diabetes mellitus, obesity and smoking. The main outcome is incremental cost per quality-adjusted life year (QALY) gained (ICER) from a health care perspective.

Data

Norwegian life tables are adjusted for overall colorectal cancer mortality and used together with national epidemiologic data to determine transition probabilities. The effect of screening is based on a randomized controlled trial in Norway. In addition we review the literature to derive morbidity-specific risks of colorectal cancer incidence, adverse events, overall- and cancer specific mortality and utility values. Cost estimates are taken from Norwegian studies.

Results

Preliminary results indicate that unrelated morbidity increases the ICER, while related morbidity reduces

the ICER, where the latter result indicates that the effect of reduced future incidence dominates the effect through adverse events and life expectancy. Based on our findings, decision makers need to address heterogeneity when evaluating screening programs, as some subgroups may not be cost-effective to screen. This is also of great importance when decision makers are considering interventions aimed at increasing participation, since morbidity is more prevalent among the non-participants than the participants.

Abstract number: 13

Comparing seven new EQ-5D-5L value sets: What difference do they make?

Author: Jan Abel Olsen
Co-author: Admassu N. Lamu, John Cairns

Abstract:

Objectives

Following the development of the EQ-5D-5L generic descriptive instrument, much work has been done in various countries to develop new preference based value sets. The objectives of this paper are: i) to show the extent, and types, of differences across seven recently published value sets, and; ii) on the basis of a comprehensive international study of several patient groups, show the effect that the different value sets have for the valuation of their health related quality of life.

Data and methods

The value sets are obtained from published studies based on general population samples of 1,000 respondents in each of seven countries: Canada, England, Japan, Korea, Netherland, Spain, Uruguay. The elicitation methods used were time-trade-off (TTO) and discrete choice experiments (DCE).

By normalising the value sets to a [0 – 1] scale, we make scale length adjustments to indentify how much of the observed variations in health state values are due to different scale lengths. The worst health state (’pit state’ 55555) ranges from the lowest -.446 in Netherland to -.025 in Japan. The ’scale length adjusted’ value sets are then compared to an ’unweighted misery scale’, ranging from 0 for the combination 55555, to 1 for the combination 11111.

Patient level data from six countries were obtained from the Multi-Instrument-Comparison project, covering a total of 8,000 paricipants in seven disease groups. Simple descriptive statistics are used to show differences in the mean and median utilities from different value sets, for each disease group.

Results

For each dimension, we consider the mid level 3 while keeping the other four dimensions at level 1. Comparing the values corresponding to these single-dimension mid levels, the dimension Depression has the lowest of the five values in the three European countries. Interestingly, the dimension Mobility has the highest value in England and Netherland, but the lowest of the five values in Japan and Korea. Dimension specific variations at level 3 reveal that the differences across countries are largest for the first dimension (Mobility) and lowest for Pain. Generally, the differences are larger at the bottom half of the scale. Comparing the impact of differences across patient groups showed largest variations for depressed patients. Their mean utility was 0.66 when the Spanish value set was applied, but 0.83 with the Uruguayan. In other words, the prospect of 'curing depression' would appear to involve twice as much health gains if the Spanish value set were used (1-0.66=0.34) as compared to the Uruguayan value set (1-0.83=0.17).

Conclusions

For their purpose of measuring improvements in health states, the different value sets provide quite different numbers, reflecting their different scale lengths and differences in their relative valuations of the diminsions included. Further research is needed to try to disentangle differences due to scale length diffferences, from those due to difference in preferences over the relative importance of the five dimensions.

Abstract number: 14

What is the value of quality indicators for informed decision making in healthcare? A Bayesian decision theoretical and value of information analysis perspective

Author: Anne Sig Vestergaard
Co-author: Lars Holger Ehlers

Abstract:

Background Health research is continuously directed at finding new ways to increase health gain. However, the existence of budgetary restraints within healthcare systems is increasingly recognized, which prompts additional considerations of the cost-effectiveness of interventions before their

introduction. A challenge that has arisen within the last decade is the use of quality indicators as outcome measure in interventions that increase quality and safety in healthcare. Quality indicators aim at quantifying the effect of quality improvements but, sadly, they are often not measures that allow for establishment of cost-effectiveness with generally acknowledged threshold values, as they do not reflect health gains, per se. They are, however, hypothesized to ultimately affect patients' health. Opportunities to identify cost-effective quality improvements may by missed if their value for money cannot be established by use of conventional health economic methods. This hampers informed decision making and may potentially cause substantial net opportunity costs to the society.

Objective To apply Bayesian decision theory and value of information analysis to the area of quality improvement and patient safety to 1) investigate the requirements for quality indicators to be usable for economic evaluation and 2) investigate under which circumstances quality indicators may be used in decision making.

Data and methods Bayesian decision theory and value of information analysis were used to establish a framework for identification of requirements for acceptable quality indicators and for evaluation of uncertainty when applying quality indicators for estimation of cost-effectiveness of interventions. Use of quality indicators in health economic evaluation introduces an extra intermediate link in the relationship between interventions and expected net benefit, which increases the total uncertainty pertaining to study results. This uncertainty carries a potential cost, interpreted as expected value of perfect parameter information, which should be compared to the expected cost of resolving that uncertainty.

Results and conclusions Bayesian decision theory and value of information analysis may comprise a viable framework for evaluation of the cost-effectiveness of quality improvements, which may allow for more informed decision making. Requirements for an acceptable quality indicator include a correlation between the intervention and the quality indicator and a correlation between the quality indicator and patient-relevant outcomes. If these correlations are misspecified, the validity of cost-effectiveness results may be compromised.

The cost of uncertainty that is introduced when applying quality indicators as intermediate links should be compared to expected resources required to decrease or diminish the uncertainty. However, if the parameter

uncertainty of using the quality indicator does not affect decision uncertainty, the inherent uncertainty regarding the expected net benefit should be accepted in the decision process.

Use of quality indicators in economic evaluations remains a secondary option if acquiring patient-related outcomes is a viable alternative as its use may increase the uncertainty pertaining to the expected cost-

effectiveness substantially. Requirements exist for a quality indicator to be applicable in a health economic evaluation and it should be used only in certain decision contexts.

Abstract number: 15

The causal effect of an unconditional cash transfer on mental health in the poor population of South Africa

Author: Julius Ohrnberger
Co-author: Eleonora Fichera, Matthew Sutton

Abstract:

Objectives

Mental health is the single major cause of disability in the world (World Health Organization). Mental health problems are especially dominant among the poor living in low and middle income countries (LMICs). Evidence on the effects of cash transfers on mental health outcomes of the poor living in LMICs is scarce. Previous studies have dominantly examined the effects of cash transfers on physical health outcomes. Less than a handful of studies looked into associations of mental health outcomes with cash transfers. However, nothing is known about the causal effect.

The aim of this paper is to fill a gap in the literature by explaining the causal effect of the South African Child Support Grant (CSG), an unconditional cash transfer programme (UCT) to the poor, on mental health outcomes. This has important policy implications as firstly improvements in mental health would call to include the mental health dimension into the targeting and evaluation of anti-poverty programmes in LMICs, and secondly as improvements in mental health outcomes translate into long run poverty alleviation by increasing individual productivity (following Grossman).

Data

We use data on 10,936 individuals living in poor households from three waves (2008-2012) of the South African National Income Dynamics Study (NIDS). The NIDS is a longitudinal biannual survey of a representative sample of the South African population, containing information on health outcomes, health behaviours, household and socio-economic circumstances. As a measure of mental health, we use a 10-item version of the Center for Epidemiological Studies Depression Scale (CES-D). Our identification variable of CSG receipt is a self-reported binary by the caretaker of the child.

Methods

We use household fixed effects to estimate the effect of CSG-participation on the CES-D scale of the adult household members. To account for intra-household allocation effects, we condition CSG receipt on

the main economic decision maker in the household. We use household fixed effects instrument variable estimation to address potential selection bias into the CSG programme. We control for socio-economic, demographic, household, and behavioural individual characteristics and condition CES-D on negative events in the past. We also test whether attrition is a potential source of bias in our estimates, and estimate treatment intensity and treatment duration effects.

Results

We find a statistically significant effect of CSG participation on CES-D when conditioning the transfer on the economic decision maker of the household. CSG receipt has on average a -0.852 point effect on the CES-D score of the economic decision maker in comparison with the other adults and decision makers living in non-receiving households. This translates into strong improvement in mental health outcomes.

Conclusion

This is the first paper to show the causal impact of a UCT on mental health outcomes of a poor population. Increasing the household budget constraint significantly reduces depressive symptoms of the main economic decision maker. Financial policies on poverty alleviation in LMICs should therefore include and target on mental health outcomes of this sub-group. This is important as improved mental health can translate into higher individual productivity affecting poverty levels.

Abstract number: 16

Information and consumer choice: Evidence from two randomized field experiments in Swedish primary health care

Author: Gustav Kjellsson
Co-author: A Anell, LM Ellegård, J Dietrichson

Abstract:

Increasing patient choice has been a popular measure in both Swedish primary care and international healthcare policy during the last decade. By giving patients opportunity to choose provider, these policies aim to strengthen incentives for providers to increase quality and to better match patients with providers that better suit their needs. This requires that patients have access to adequate comparative information about providers, and that they act on this information when choosing provider. However, across countries and health care markets, patients rarely search for information, and publicly reported information has had little impact on patients' choices of providers. The transaction costs related to information retrieval and to

switching provider are possible obstacles to well-functioning patient choice systems and health care markets. The gathering of information and comparison of providers is costly in terms of time, and there are also (small) process costs related to switching provider.

We use two large-scale randomized field experiments to examine whether increased information availability and decreased process costs can affect patients' choices of provider. We have, in cooperation with the regional health authority in Skåne, provided randomly drawn samples from two population groups with information on the quality of their current primary care provider (i.e. where the patient was enrolled) and its three geographically closest competitors. The information was sent per mail and contained information about, among other things, opening hours, objective and subjective quality ratings, and the provision of non-compulsory services. In the first experiment, 1 percent of the general population in Skåne over 18 years received information (10,259 individuals). Within this group, there are two treatments: One group received only the information leaflet (T1, n = 2,559), the other group received the leaflet and a pre-paid switching form (T2, n = 7,700 individuals). The second experiment targeted individuals that recently moved to the region, using a similar treatment as T2 (information leaflet + switching form, n = 3,454 individuals). The two experiments have control groups consisting of 102,600 and 3,456 individuals respectively.

Preliminary results show that the propensity to switch provider increased in both experiments. The group receiving both an information leaflet and a switching form (T2) have significantly higher switching rates than the control groups, amounting to increases of 14.5 percent and 22.9 percent in Experiment 1 and 2, respectively. The group that only received an information leaflet also switch more often, but the increase is smaller and the switching rate is not significantly different from the control group's rate. Comparing the two treatments in Experiment 1, the difference is not significant. Further analyses will exploit the rich background data available from Swedish registers to examine whether the effect varies with socioeconomic characteristics or health status (indicated by previous diagnoses in medical care registers).

Abstract number: 17

Financial incentives to redistribute general practitioners (GPs) into low socioeconomic areas: are they effective?

Author: Michelle McIsaac

Abstract:

Objective:

Despite attempts by governments to use pecuniary incentives to redistribute GPs and provide more equal access to care, geographical maldistribution and inequality in access to primary health care services persists. Existing policy simulations suggest that financial incentives are an effective mode of distributing newly trained doctors into underserved areas. However, these evaluations use cross-sectional data pertaining to a cohort of newly entering doctors and are therefore more likely to be assessing the effectiveness of recruitment programs rather than relocation programs. In addition recent discrete choice experiments (DCEs) suggest that practice attributes such as workload, patient volume, and afterhours care play an important role in practice choice. This paper builds on the previous literature in this area to examine the effectiveness of financial incentives in relocating established GPs into neighbourhoods with low socioeconomic status. The analysis is the first to use observed location choice data and include practice-level attributes.

Data:

Data from the Medicine in Australia: Balancing Employment and Life (MABEL) survey which tracks the locational choices of over 3,000 GPs in metropolitan Australia over a four-year time-period from 2008-2011 is used. We examine the relocation choices of GPs and present a dynamic location choice model. Location choice, personal characteristics, location and job attributes are observed thereby allowing for an assessment of the role of non-pecuniary factors in actual location choice.

Methods:

This paper uses a discrete choice model that incorporates GPs' actual changes in location from one year to the next, based on a panel survey. The analysis incorporates several non-pecuniary practice attributes. We also examine heterogeneity in preferences between practice-owning GPs, and salaried GPs. The results from the relocation model are used to

analyse the potential for policy to redistribute GPs into neighbourhoods with low socioeconomic status. The relocation choice model uses a nested structure to capture both the decision for established GPs' to move or stay, and if they move the choice of the new practice location. Including a broader range of characteristics of each alternative and incorporating the dynamic aspects of location choice leads to a more accurate assessment of the effectiveness of financial incentives than is currently available

Results:

The results demonstrate that mobile GPs are more likely to be younger and in employee roles and that practice owners and older GPs were less likely to relocate. Expected earnings have a positive effect on the probability of choosing a new location. However policy simulation suggests that financial incentives targeting the earnings of GPs practicing in areas with low SES would only lead to a modest redistribution of GPs across metropolitan areas.

Conclusion

The results of this paper suggest that in the metropolitan context, once personal characteristics and non-pecuniary practice attributes are taken into account established GPs are not particularly sensitive to financial incentives aiming at inducing them to relocate. We therefore conclude that financial incentives are not an effective policy lever.

Abstract number: 18

Cost effectiveness analysis of heparin- versus standard polytetrafluoroethylene graft alongside a randomised controlled trial with five years follow-up

Author: Marie Konge Villemoes
Co-author: Lindholt, Jes S., Houlind, Kim C., Gottschalksen, Bo, Pedersen, Christian N., Rasmussen, Martin, Wedel, Charlotte, Bramsen, Morten B. and Søgaard, Rikke.

Abstract:

Objective: To assess the cost effectiveness of heparin- versus standard polytetrafluoroethylene graft as treatment for peripheral arterial disease from a health care sector perspective.

Data and methods: Danish participants (n=426) of the Scandinavian Propaten trial, which was a randomised controlled trial conducted in Denmark, Norway and Sweden during the years 2005-2014,

were included. Inclusion was restricted to patients who were scheduled for a bypass surgery in either femoro-femoral or femoro-popliteal. Analysis is based on the intention-to-treat principle and five years of register-based follow-up on health care service use (general practice, prescription medication and hospital use related to cardiovascular disease) and survival. Mean costs and outcomes (95% bootstrapped confidence intervals) are reported. Discounting of 3% per year are applied for costs and life years all monetary estimates are in 2015-DKK. Subgroup analyses are planned for +/- critical ischemia. Sensitivity analyses are conducted to assess the robustness of results to graft prices and societal consequences to production, among others.

Results: Preliminary results indicate that there is no significant overall difference between the groups with respect to the use of general practice, prescription medication, and hospital admission for cardiovascular disease; the difference in total health care costs is DKK 3271 (95%CI -22530; 29073). With respect to survival, the heparin graft lead to a small and insignificant improvement of 14 days (95% CI -64; 92). For the subgroup with critical ischemia, the heparin graft tended to lead to lower costs and longer survival. For the subgroup with none-critical ischemia, the opposite was found as the heparin graft lead to higher costs and shorter survival. The production loss due to sick leave was investigated for patients who were part of the labour force at baseline (16%) and this was no different between randomization groups.

Conclusions: These preliminary results point at a weak probability for heparin being cost effective for the total population of patients with peripheral arterial disease. The result however seems to mask bidirectional results for the subgroups of critical and non-critical ischemia, as the heparin graft seems to be cost effective for the group with critical ischemia and not cost effective for the group with none-critical ischemia. A main limitation in this study is that there is no measure for quality of life.

Abstract number: 19

Competition and low value health care. Evidence from primary care

Author: Anthony Scott
Co-author: Hugh Gravelle, Jinhu Li, Matthew McGrail

Abstract:

Aims. The aim of this paper is to examine the effect of competition between physicians on the intensity and quality of care they provide. The impact of competition in health care has been studied for hospitals with mixed results on quality, and the more limited evidence for physicians is plagued by endogeneity and has not yet examined the effects of competition on quality of care.

Data. We use a unique data set to study the effect of competition, measured by distance between general practitioners (GPs), on intensity and quality of care provided. Detailed pooled data on the content of over 320,000 GP consultations provided by almost 3,300 GPs over a 4 year period are used.

Methods. Since the measure of competition varies for each individual GP, we can use geographic area fixed effects to control for unobservables (e.g. demand/need) that may influence both intensity/quality and the location choices of each GP. Changes in service intensity in a consultation (the sum of the number prescriptions, referrals, tests, imaging, and treatments in each consultation) tell us something about costs but little about the impact on quality of care provided. To examine effects on quality, the richness of the data enables us to separately estimate a number of diagnosis-specific models aligned with recent recommendations from the Choosing Wisely campaign. In particular we examine: i) intensity of care for consultations for chronic disease, where under-treatment is widely recognised and so increased intensity increases quality, ii) low back pain where referral for imaging is not recommended, iii) upper respiratory tract infection (URTI) (coughs and colds) where prescription of antibiotics is not recommended, iv) mild anxiety/depression where prescription of antidepressants is of low value. Given GPs in Australia can choose to change prices in response to competition, rather than change intensity and quality, we also analyse a subset of GPs who choose to fix their prices where we expect the effect of competition on quality to be stronger.

Results. Initial results suggest that total intensity of care increases with more competition, suggesting GPs recommend care which encourages the patient to return thus increasing revenue. We find evidence that more competition increases quality (reduces low value care) for chronic disease, low back pain and URTI. These effects are statistically significant but very small in magnitude. As expected, competition has stronger effects on intensity and quality of care when prices are fixed.

Abstract number: 20

Evaluation of health care reform: the introduction of municipal copayment

Author: Oddvar Kaarbøe
Co-author: Jan Erik Askildsen, Tor Helge Holmås, Karin Monstad

Abstract:
Background and objective: As part of the Norwegian Coordination Reform of 2012, municipal co-payment of general hospital admissions was introduced. The objective was to incentivize municipalities so that more patients were treated in primary health care and long-term care instead of being referred to

hospital treatment. The co-payment was attached to medical specialist services only (with some exemptions), whereas surgical treatment was exempted. This paper evaluates whether municipal co-payment had the intended effect.

Data: The analysis benefits from individual-level data at the population level, i.e., of all Norwegian citizens in the period 2010–2013 (19,808,930 observations). The data set comprises, in addition to use of somatic specialist services, data on visits at general practitioners, physiotherapists, and visits with private specialists on contract with local health authorities, as well as information on a number of individual characteristics from Statistics Norway.

Methods: The analysis has two outcome variables: i) the probability of hospital visits in somatic treatment (hospital admissions, day treatment, and policlinic consultations) and ii) the number of hospital visits, given at least one visit. The analysis is based on descriptive statistics and regression analysis (linear regression models with municipality-fixed effects) in a before/after set-up as well as difference-in-difference approach where the comparison group is diagnoses that were exempted from municipal co-payment (surgical diagnoses). When regressing outcome ii), we include length of stay as control variable since the implementation of a fee to reduce bed-blocking in hospitals may have improved hospital capacity.

Results: The main analysis – as well as a number of sensitivity checks - gives no indication that municipal co-payment has reduced the quantity of specialist health care services. On the contrary, in some subsamples we actually find an increase in specialist health care services after the reform (although the magnitude is negligible). There is no reason to believe that municipal co-payment in itself would lead to more specialist services, therefore, these results indicate an omitted variable problem.

Interpretation: The introduction of municipal co-payment is not easily evaluated, since in the Care Coordination reform, several incentives were introduced at the same time, on a national basis. Thus, finding valid control groups is problematic. Besides, other changes may have coincided with the reform. Still, we find it reasonable to conclude that it is very unlikely that municipal co-payment has had any effect on the consumption of specialist services.

Abstract number: 21

Productivity of Norwegian hospitals 1999-2014

Author: Anthun, Kjartan Sarheim
Co-author: Kittelsen, Sverre A C, Magnussen, Jon

Abstract:

Background and objectives: The purpose of this paper is to analyse the productivity of Norwegian hospitals over a series of years, from 1999 to 2014. A productivity front is estimated trough Data Enveloping Analysis (DEA), decomposed via Malmquist indices, and scale properties of hospitals examined through a period of ownership reforms, hospital reorganizations and mergers.

Material: To calculate productivity we use data on hospital production (output), and the resources that created that production (input). Output data is information about inpatient and outpatient treatments in all Norwegian specialized hospitals (N=80 688 010). Input data is operating cost for producing hospital outputs.

Methods: Output data is regrouped by one fixed DRG-grouper for comparison across years and then measured in four dimensions: emergency inpatients, elective inpatients, day-care and outpatients. All data is aggregated to hospital level for analysis, N=506. Hospital productivity is calculated using bootstrapped Data Enveloping Analysis on the pooled dataset. All hospitals are compared to the best practice of input to output conversion. The measures are decomposed into front shift and catch up effects by way of calculating bootstrapped Malmquist indices.

Expected findings and conclusion: We estimate an increase in the average productivity of 22.5 percentage points from 1999 to 2014. The period has seen a major reform of ownership and many minor changes in the organization and financing of hospitals. The optimal scale is small, and the mergers and reorganizations result in decision making units of increasing size. The decompositions indicate that there was a period of positive development in the year 1999-2003, then followed by a period of less growth. This is an important study as it is the first Norwegian hospital productivity study performed over a 16 year time span.

Abstract number: 22

The cost-effectiveness of abatacept, rituximab and tocilizumab compared with tnfα-inhibitor as a second-line therapy for the treatment of rheumatoid arthritis using the discrete event simulation model

Author: Saara Huoponen
Co-author: Aaltonen KJ; Joensuu JT; Nordström D; Blom M

Abstract:

OBJECTIVES: The aim of this study was to evaluate the cost-effectiveness of abatacept, rituximab and tocilizumab compared with tumor necrosis factor alfa (TNFα) inhibitor in rheumatoid arthritis patients not responding adequately to the first TNFα-inhibitor using the Finnish registry data.

DATA AND METHODS: Using the discrete event simulation model implemented by programming language R, four treatment sequences were compared among 1000 Finnish rheumatoid arthritis patients in a lifetime scenario. The analysis starts after the failure of the first TNFα-inhibitor. The patients were treated with another TNFα-inhibitor, abatacept, rituximab or tocilizumab in combination with methotrexate. The baseline characteristics of the population and the transition probabilities over the Health Assessment Questionnaire (HAQ) categories were based on the National Register for Biologics in Finland (ROB-FIN). The cycle length was set to six months. At the completion of each cycle, patients could continue or discontinue treatment or die. The initial response to therapy was measured as the American College of Rheumatology (ACR) responses obtained from the ROB-FIN. ACR responses were assumed to have impact on HAQ values. Disease progression was modelled using an average annual HAQ progression rate of 0.03 based on the registry data. EQ-5D utilities were mapped from the HAQ scores. Analysis was conducted from the societal perspective, and all costs were presented in 2014 euro. Both the costs and quality-adjusted life years (QALY) were discounted at 3 % per year. As for utilities, the costs were determined by the HAQ categories. Direct costs comprised drug expenditures and use of health services, while indirect costs included early retirement due to rheumatoid arthritis and sick leave. Published estimates for the risk of adverse events were applied as registry data on adverse events was incomplete. Deterministic and probabilistic sensitivity analyses were conducted to explore the effect of different model values and assumptions on the result.

TENTATIVE RESULTS: Incremental direct costs in the abatacept and tocilizumab compared with TNFα-inhibitor as a second line therapy were 1,600 € and 2,400 €, respectively, while incremental costs including both direct and indirect costs were 1400 € and 2300 €, respectively. Rituximab reduced direct

costs by 4,700 € in comparison with second line TNFα-inhibitor and total costs by 4,800 €. Incremental QALYs were 0.0001 for tocilizumab in comparison to TNFα-inhibitor, while abatacept and rituximab were associated with a decrease in QALYs by 0.006 QALYs and 0.018 QALYs, respectively. The final results will be presented in the full paper.

CONCLUSIONS: Our study showed that effectiveness of abatacept, rituximab and tocilizumab was similar compared with TNFα-inhibitor as a second line therapy for rheumatoid arthritis. Abatacept and tocilizumab were slightly more costly than TNFα-inhibitors, while rituximab is cost-saving treatment option.

Abstract number: 23

Does changing neighborhood affect mental health?

Author: Jane Greve
Co-author: Bence Boje-Kovacs, Cecilie D. Weatherall

Abstract:

Abstract: Studies examining the causes of mental health problems mainly focus on individual factors measured during the individual's life (McLaughlin et al., 2011). However, a preliminary conclusion from a literature review on neighborhood characteristics and mental health problems points to limited effects of individual-level interventions in improving mental health (Thuong and Ma, 2006). As an alternative, Thuong and Ma (2006) suggest that future research investigates the effect of neighborhood-level interventions.

While previous studies mainly measure mental health utilizing small samples of the population, the administrative register data are particularly useful for studying the relationship between mental health and neighborhood characteristics. As all Danish psychiatric hospitals are public, all admissions and discharges are recorded in the administrative registers. Furthermore, all treatment at the psychiatric hospitals is free, so that no attrition rate in data exists and even characteristics of the most severe mental health problems are registered. Besides information on use of mental health services and prescription of medicine from 1995 through 2014 the Danish administrative data contains information about socioeconomic characteristics, demographics, housing, and moving patterns, which makes it possible to follow individuals over time. Using information on individual residential addresses, we construct neighborhoods based on both geographically defined quadrants and the characteristics of the nearest 200 neighbors. All the characteristics of the neighbors are known on individual level.

In order to overcome the limitations of selection bias and to determine the causal impact of moving to

certain residential areas on mental health care use we exploit the randomization of municipal social housing offer in the two largest cities of Denmark.
Preliminary results show that people moving to a deprived area suffer from more mental problems after the move compared with people moving to other areas (private rental areas and other public housing areas). Thus neighborhood-based interventions might have a significant positive impact on mental health for some of the most disadvantages groups of the population.

Abstract number: 24

Variation in the impact of birthweight on health by household income

Author: Jonas Minet Kinge

Abstract:
This paper examines the effects of low (LBW) and high (HBW) birthweight on health status, illness and obesity using data from the Health Survey for England from 1997-2014. The dataset is cross-sectional and we subsample children aged 2-16, with information on birthweight, current health status and a household income. We pay particular attention to possible interactions between LBW/HBW and household income, asking to what extent the harmful effects of LBW/HBW are mitigated by higher household income. To explore this we apply sibling fixed effects design and stratify by household income tertiles. We find that LBW has significant effects on self-reported health status and illness. Furthermore, HBW is significantly and positively associated with obesity. Importantly, these effects were only present in the children from families with low household income. Hence, there is evidence of variation in the effects of LBW/HBW by household income.

Abstract number: 25

Who benefits from competition between physicians?

Author: Burkhard Hehenkamp
Co-author: Jeanette Brosig-Koch, Lisa Einhaus, Johanna Kokot

Abstract:
Objective:We examine how physician competition affects the quality of medical care given that patientsdiffer in their ability to freely choose physicians.Literature:Earlier theoretical and experimental studies have shown that, in the absence of competition,provider behavior is distorted away from the

patient optimum when physicians' monetaryincentives conflict with patient optimal treatment (for an overview see e.g., Iversen and Lurås,2006, and the experimental evidence by Hennig Schmidt et al., 2011, Brosig Koch et al., 2015a).When competition is feasible and patients can freely choose their physician, these distortionsmay be reduced, however (Huck et al., 2014, Brosig Koch et al., 2015b). The empirical literaturesuggests that patients are often passive rather than active when it comes to choosing physicians(Harris, 2003). It therefore represents an important question whether the positive effects ofcompetition prevail when patients differ in their ability to freely choose physicians.Method:This study intends to answer this question by means of a controlled laboratory experiment. Weexamine medical treatment of patients who are heterogeneous with respect to both, theirmobility and their health characteristics. We particularly compare medical treatment decisionsmade in a competitive environment to those made under no competition. A repeated designrunning over 20 rounds is used, to capture that physicians usually interact with each otherrepeatedly over time. This feature, too, allows us to reach conclusions with respect to thedynamics of provision behavior.Data:The experiment was conducted in the Essen Laboratory for Experimental Economics (elfe) at theUniversity of Duisburg Essen (Germany) in May and June 2015. As Brosig Koch et al. (2013) didnot find any qualitative differences between treatment decisions of medical students and ofstudents from other fields, subjects from different fields of study were invited. Of the 127participants, 51 were male and 76 were female.2 Results:We find that, on average, the quality of medical care provided under competition significantlydiffers both for mobile and immobile patients from the patient optimum as well as from thetreatment provided in the absence of competition. While the quality of medical care forimmobile patients deteriorates over the 20 rounds compared to the case of no competition, itimproves for mobile patients. Thus, in line with the theoretical prediction, competition canreduce the distortive impact of fee for service payment of physicians, but only for those whoare able to freely choose physicians. The observed deviations from the patient optimum aresensible to patient health characteristics: they are more pronounced for immobile patients inneed of a low number of medical services. Conclusion: Our study provides support for the view that competition may have positive effects on thequality of medical care. In case that some patients are unwilling or unable to freely choosephysicians, competition evokes inequalities regarding the medical treatment of the differentpatient groups, however. The effects of competition are also sensible to patient healthcharacteristics, at least in some patient groups. Consequently, the answer to the question □Whobenefits from physician competition?□ is not straightforward and requires cautiousinvestigation

Abstract number: 26
Withdrawn

Abstract number: 27

Effect of duration of symptoms on gains from elective surgery

Author: Yiu-Shing Lau
Co-author: Matt Sutton, Mark Harrison

Abstract:
Background: A recent paper (Nikolova, Harrison and Sutton, HEC, forthcoming) shows that length of waiting time between when specialist decides a patient needs surgery and when they receive surgery reduces the long-term health gain. The median waiting time for elective surgery in the NHS in England is 65 days. A much longer waiting period is between when the patients start to experience symptoms and the specialist decides that surgery is needed. Symptom duration is likely determined by patient decisions but also clinical decisions in primary and secondary care about what severity of symptoms warrants surgery.
Objectives: To understand what determines the length of symptom period and how symptom period affects long term health.
Data: We use data from the Patient Reported Outcome Measures (PROMs) programme for two financial years, 2009/2010 and 2010/2011. Patients complete questionnaires prior to and after surgery. Prior to surgery, patients report how long they have experienced symptoms. This is linked at an individual level to Hospital Episode Statistics (HES) to extract patient and hospital characteristics. Our dataset consists of 180,679 observations.
Methods: We use a variety of econometric methods such as interval regression and linear probability models. Health is measured using pre and post-surgery EQ5D health utility values and emergency readmissions after 30 days of surgery. Symptom period is measured in four bands.
Results: Preliminary findings show that males and patients under the age of 70 experience longer symptom periods. Patients at large, specialist and teaching hospitals have longer symptom periods. Longer symptom periods are associated with worse pre-operative health states with an average decrement of 0.013 EQ5D utility points. Preliminary findings also show that the longer the symptom period, the lower the long-term health by, on average, 0.042 EQ5D utility points when not controlling for pre-

operative health. When controlling for pre-operative health, there is an average reduction of 0.0370 EQ5D utility points when we compare patients with symptoms less than one year, with patients with symptoms waiting over 10 years. We also find that longer symptom periods are associated with a higher probability of emergency readmissions after 30 days of surgery by 1.37 percentage points.
Conclusion: Our findings suggest that longer symptom periods are associated with worse pre-operative health. Clinical decisions about when to treat patients do not lead to consistent severity of symptoms prior to surgery. Furthermore, we find that longer symptom periods, leading to worse pre-operative health states, are associated with a reduction in long term health and a higher probability of adverse health outcomes. More attention should be paid to ensuring shorter and more consistent periods over which patients experience symptoms prior to surgery.

Abstract number: 28

Point-of-care testing of HbA1c in diabetes care and preventable hospital admissions

Author: Christian Skovsgaard

Abstract:
Objectives: Point-of-care testing (POCT) of HbA1c may result in improved diabetic control, better patient outcomes, and enhanced clinical efficiency with fewer patient visits and subsequent reductions in hospitalizations and costs. In 2008, the Danish regulators agreed to create a new national tariff for the remuneration of POCT of HbA1c in primary care. Nevertheless, this framework agreement has only been implemented in the Central Region of Denmark. The objective of this study is to assess whether there is an impact of the use of POCT of HbA1c on preventable hospital admissions among diabetes patients in general practice.
Data: We use panel data from the years 2004-2013 for the Capitol Region of Denmark and an algorithm based on The Danish Drug Register, The Danish Health Service Register and the National Patient Register to define a cohort of diabetes patients. Patients are required to be above 18 years and comply with at least one out of three criteria: 1) Redeemed at least one prescription for anti-diabetic drugs with

ATC code A10A* or/and A10B*. ATC-code A10BA02*(metformin) was excluded for women between age 20-40. 2) Received at least three blood sugar or HbA1c tests from their GP or a specialist in the primary sector 3) Registered with one of the following ICD10 codes in the hospital sector: DE10, DE11, DE12, DE13, DE14, DO24, DH360. In addition to the above mentioned registers we also used data from

statistics Denmark.

Method: We apply difference in differences and propensity score models to analyse whether there was a casual effect of POCT of HbA1c in general practice on preventable hospital admissions. The POCT fee is used to measure the amount of POCT of HbA1c among diabetes patients. Preventable hospital admissions were assessed through the ambulatory care sensitive conditions (ACSCs) classification of hospital admissions. As use of POCT in the Central Region was voluntary we expect selection bias. To deal with this we further include control variables such as gender, age, ethnicity, socioeconomic covariates, municipality classifications, and case mix measure in terms of the Charlson index and costs of care in primary and secondary care.

Results: There was a significant impact of POCT of HbA1c among diabetes patients in general practice on preventable hospital admission in the Capital Region of Denmark. However, the casual effect was sensitive to the way preventable hospital admissions were defined in terms of hospital activity (ICD10).

Conclusions: It appears relevant to reassess the system for testing of HbA1c to remedy unwarranted variation in POCT of HbA1c in Danish general practice. Further studies are warranted in order to assess the impact of POCT on health care outcomes such as mortality as well as on economic outcomes.

Abstract number: 29

Different domains – different time preferences?

Author: Morten Raun Mørkbak
Co-authors: Eskild Klausen Fredslund, Dorte Gyrd-Hansen

Abstract:

The vast majority of studies examining the relation between time - and risk preference and health behaviour have applied a measure of preferences in the financial rather than in the health domain (see e.g. Story et al. 2014 and Anderson & Mellor 2008 for an overview). Most studies find a small but significant correlation. The question arises whether time and risk preferences for health outcomes are better predictors of health than time and risk preferences for monetary outcomes. In principle, health behaviour may be linked towards both domains – through the effort (costs) in the financial domain and through the consequences (benefits) in the health domain. In the present paper, we set out to investigate the potential effect of eliciting time preferences in these two domains. We examine potential differences in time preferences and time inconsistent preferences between the two domains.

Preferences over time for individual risk profiles were elicited using a stated preference matching method. Using a split sample design, the health domain is described in the context of back pain. Individuals were

to match a certain sooner shorter period of pain relief against a later longer period of pain relief in the health domain, while the match in the financial domain was described as a match between a sooner smaller monetary reward and a larger later monetary reward. Data was collected through an online survey, distributed to a selected sample of members of fitness dk – a large fitness company in Denmark. Apart from the time preference tasks, the questionnaire also contained information on a range of health behaviors and outcome.

In the analyses we assume quasi-hyperbolic discounting which allows us to estimate both a parameter measuring present bias and a parameter measuring impatience at an individual level. The preliminary results show remarkable similarities with respect to time preferences across domains.

Abstract number: 30

"I postpone decision making whenever possible": Accounting for decision making styles in individuals' choices for healthcare programmes

Author: Nicolas Krucien
Co-author: Christopher Burton; Alison Elliott; Vikki Entwistle; Terry Porteous; Mandy Ryan

Abstract:
Context: Discrete choice experiments (DCEs) are frequently used in health to elicit preferences. Heterogeneity of preferences has been mainly explored in terms of observed characteristics of individuals. There is a limited recognition of the role of attitudes and decision making skills in individuals' choices. We investigate the role of decision making styles (DMS) in individuals' choices.
Methods: We ran a discrete choice experiment to measure individuals' preferences for different personalisation aspects of chronic pain self-management programmes (SMP). A sample of 517 respondents took part, each answering 12 choice tasks. Participants' DMS were measured with 10 attitudinal questions derived from the General Decision Making Style (GDMS) questionnaire. We focused on two particular DMS likely to explain how participants answer multi-attributes (and multi-alternatives) decision problem: rational decision making (RDM) and avoidant decision making (ADM). We first analysed the impact of these DMS on individuals' preferences. We then link individuals' differences in DMS with individuals' differences in choice behaviour using a hybrid latent class hybrid logit (H-LCL) model. We specify two classes, random utility maximisation (RUM) or random regret minimisation (RRM), and model probability of belonging to these classes.
Results: Preliminary results suggest that classical socio-demographic characteristics (i.e., age, income,

education level), except gender, are of limited use for predicting whether a particular respondent would be best classified as a utility maximiser or regret minimiser. However, latent decision making styles show a large effect on class membership probabilities. For example, respondents are less likely to make RUM-

based choices when their score of avoidant decision making increases (Estimate = -0.4636; SE = 0.1061; p. < 0.001). This key result indicates that "observable" characteristics, such as age or education, are not necessary relevant for exploring heterogeneity in preferences and other more qualitative variables, such as decision making styles, may be more useful. Our result also suggests that one should take into account individuals' attitudes towards decision making when analysing preferences for healthcare programmes. Indeed individuals might not feel comfortable in making their own health-related decisions, raising questions about the practicality of shared decision making.

Abstract number: 31

The effect of agent- versus principal-selected performance indicators in relation to hospital governance

Author: Kristian N. Larsen
Co-author: Rikke Søgaard, Søren R. Kristensen

Abstract:
Objective: In 2013 the Central Denmark Region initiated a trial where the responsibility for selecting performance indicators was delegated to the agents of the hospital departments. We investigate if this delegation of authority has lead to increased performance at the department level. Furthermore, we compare hospital department performance on the agent-selected versus the principal-selected performance indicators.
Data: Our data is collected from 9 departments at 5 different hospitals that are exposed to delegation of authority for selecting performance focus. We observe monthly department level performance. The trial act of Central Denmark Region provides a longitudinal material from the departments that participate. These departments have chosen a total of 83 different agent-selected performance indicators. Furthermore, we have also selected performance indicators chosen by the principal from before (2012-2013) and after (2014-2016) the trial act.
Methods: Performance indicators chosen by the principal are viewed as primarily extrinsic motivation for the agents, while performance indicators chosen by the agent are viewed as appealing to the agents'

intrinsic motivation. We compare hospital department performance on agent-selected versus principalselected
performance indicators and expect performance to increase for agent-selected indicators, due to intrinsic motivation, while development in principal-selected indicators is expected to remain constant.

The development in performance is investigated with an interrupted time series study (ITS) that analyses how the 9 hospital departments' performances on the agent-selected indicators before and after the new trial act. We compare these results to the development in performance in the principal-selected indicators.
Results: The preliminary results for the agent-selected indicators show that the coefficients of the post intervention trends for 14 out of the 83 indicators have the expected sign at a statistically significant value.
In addition, 28 indicators have the expected sign but are not statistically significant at a 0.05 percent level, and another 9 indicators are statistically significant but with the opposite sign than expected. The remaining 32 indicators show a non-expected sign but they are not statistically significant at a 0.05 percent
level.
The preliminary results for the principal-selected indicators show that 6 of the 9 indicators have the expected insignificant parameter coefficient of the post intervention and 5 of these have the expected sign as well. The remaining 3 indicators have a non-expected coefficient sign and 2 of these are also significant.
Conclusion: The preliminary results of the study are mixed. Some of the agent-selected indicators show the
expected change in trend, some does not. The same conclusion stands for the principal-selected indicators where a majority of the indicators are in favor of the hypothesis. Next step is to compare the ITS results of
the agent-selected and the principal-selected indicators in a difference-in-difference design.

Abstract number: 32

Did Norwegian Hospitals Respond to a Change in the Reimbursement for Day Surgery?

Author: Camilla Beck Olsen
Co-author: Hans Olav Melberg

Abstract:
Background: In 2015, the reimbursement that Norwegian hospitals receive for day surgeries, through the activity-based financing system, was increased by 10 percent in an effort to incentivise the provision of more day surgery treatment. Day surgery procedures are surgeries where the patient enters and leaves the hospital on the same day. Treating more patients with day surgery could lead to potential cost-savings for the hospitals.
Objectives: The first objective is to estimate whether the total number of day surgeries increased in 2015 compared to previous years for all hospital treatment episodes. The second objective is to estimate whether hospitals chose day surgery over inpatient surgery for a subset of "split DRG codes" i.e. the codes that are split into two related codes where a treatment is performed either as day surgery or inpatient surgery.
Data and Methods: Data on day surgery activity was obtained from aggregate hospital records for 27 hospital trusts from the Norwegian Patient Registry for 2011 to 2015. 130 day surgery DRG codes received a 10 percent increase in their DRG weight. The subset of split DRG codes includes 126 DRG codes and they were selected by identifying the surgical DRGs with an O-code that indicates day treatment and their respective inpatient DRG code. Due to the nature of the data, where repeated measurements of DRG activity over time are clustered within hospitals, we used a linear marginal model with clustered robust standard errors for both analyses.
Results and Conclusions: 501 470 surgical procedures were performed at Norwegian hospitals in 2015, and 50.3 percent of these procedures were registered as day surgery. For the subset of split DRG codes the proportion of surgeries performed as day surgery was on average 53.2 percent in 2015. The results from the analysis on the number of day surgeries as a proportion of all surgeries show that the change in reimbursement led to a significant increase of 1 percent. When we analysed the data on the subset of split DRG codes there was a non-significant increase in the proportion of day surgeries of 0.3 percent. The results suggest a modest response to the change in reimbursement for day surgery. For the DRG codes where the procedure can either be performed as a day surgery or inpatient surgery, the results indicate that on average, there is little evidence of a switch from inpatient to day surgery.

Abstract number: 33

WTP for a QALY. Disentangling some nonlinearities

Author: Jytte Seested Nielsen
Co-author: Dorte Gyrd-Hansen and Trine Kjær

Abstract:

Objective

The question of establishing a unique value for the willingness-to-pay (WTP) per quality adjusted life-year (QALY) has been much debated in the health economics literature. Previous estimates of WTP per QALY have been found to vary non-linearly with survey design factors, such as the magnitude of the QALY gain being valued.

The 'chained' approach of deriving a WTP for a QALY was developed as part of the EuroVaQ (European Value of a QALY) project (Robinson et al, 2013). This was a three-step approach; firstly, utility values were elicited for two health states using the standard gamble (SG) or time trade off (TTO) methods. Secondly, based on these self-reported utility values, the risk or duration of the health states were tailored such that each respondent was offered the same QALY gain.. Lastly, respondents were asked to state their maximum WTP for this QALY gain, allowing a WTP per QALY estimate to be derived at the individual respondent level.

This paper will set out to test the robustness of the chained approach for eliciting individual WTP/QALY estimates. Across four different survey arms, we will analyse within individual nonlinearities of the WTP estimates with respect to health state, method of eliciting utility values, the utility score and QALY gain offered.

Data and methods

Each individual answered four WTP questions which varied by severity of health state and QALY gain (0.1 and 0.05). Respondents were randomised into four different survey arms. The four survey arms varied by way of 1) method of health elicitation format used (SG or TTO) and 2) whether the health gain on offer was generated by a reduction in risk of falling into the ill health state or a by decrease in the duration spent in the ill health state. In all arms the respondent were asked to state their WTP for the QALY gain on offer.

Within treatment fixed effect regressions were used to analyse individual differences in WTP/QALY depending on severity of health state, the individual utility score and the magnitude of QALY gain on offer.

Results

A four-way split sample survey was conducted as part of the EuroVaQ project. We received responses from 1983 Danish respondents. Significant variation in WTP/QALY were found within respondents depending on health state and utility score. Hence, on an individual level there is heterogeneity with respect to how individuals apply the monetary scale, time scale and risk scale, respectively. WTP/QALY

estimates were to a lesser extent sensitive to the magnitude (0.1 or 0.05) of the QALY gain offered. The overall conclusion is respondents are highly sensitive to the manner in which the question is framed, whilst they (paradoxically) demonstrate little sensitivity to scale.

Abstract number: 34

Exposure to job insecurity and depression No link between payment for medication review coding and appropriate medication among the elderly – an observational study

Author: Anders Boman
Co-author: Ödesjö H., Anell A., Fastbom J., Thorn J., Björck S.

Abstract:
Pay for performance is a concept where incentives are linked to goal achievement and has been an integrated part in many health care reforms. Since measures of quality of care are hard to define, easy-to-obtain metrics have been used as goals. It is often not clear whether the achievement of defined goals actually leads to higher quality of care. One type of goal is a certain procedure or action taken, the underlying expectation being that this surrogate measure leads to the desired medical result. Such measures, process indicators, are often based on coding of the action in an administrative system.
A common process indicator is the proportion of elderly patients receiving a medication review, which is the process indicator we have chosen to study. Medication reviews among patients ≥ 75 years of age has been a financially rewarded process indicator in a detailed pay for performance payment scheme in Västra Götalandsregionen in Sweden since 2009.
Since incentive programs often use process indicators it is important to find out if the desired effect is obtained. This study will add to the knowledge if rewarding coding for a process indicator primarily leads to an increased administrative burden or also the desired outcome.
The aim of the study was to assess whether primary care units with the highest payment for medication reviews improved their medical treatment more than those with the lowest payment according to national indicators of appropriate drug therapy among the elderly
The study is based on information from linking the Regional health care database (VEGA), the Swedish Prescribed Drug Register and the Swedish Population register.The Regional health care database contains health care contacts of the Västra Götaland County. It includes place of residence, age, sex, principal as well as ancillary diagnoses. The database covers all private and publicly owned primary health care centers. Diagnoses are coded according to the International Statistical Classification of Diseases and Related Health Problems, ICD-10. ACG (adjusted clinical groups) was calculated from diagnoses in primary care and ACG-weight was used as a measure of patient morbidity.
The Prescribed Drug Register contains information about all dispensed prescriptions in Sweden since 1

July 2005.

The Population registry in Sweden is the civil registration of vital events (e.g. births, deaths, and marriages) of the inhabitants of Sweden. The Swedish population registry is administered by the Swedish Tax Agency.

Using this data we study the change for studied indicators from 2009 to 2013. Primary care units with the lowest compensation for coding for the studied process indicator improved equally well as primary care units with the highest compensation. Overall, the proportion of patients with a reported code for a medication review increased and the studied measures of appropriate drug treatment in elderly patients improved during the study period. Primary care centers that registered a high proportion of medication reviews performed better for some indicators but did so already before payment was introduced. An effect on prescribing patterns that can be attributed to the payment linked to coding for medication reviews was thereby not seen.

Abstract number: 35

Is primary care quality affected by a mystery shopper programme?

Author: Ge Ge
Co-author: Roland Cheo, Geir Godager, Rugang Liu, Jian Wang, Qiqi Wang

Abstract:

Abstract Objective

To implement effective health policies, knowledge on behavioral responses of key decision makers in the sector is highly valuable. The aim of this study is to assess the impact of a mystery shopper programme in primary care.

Data and Methods

We apply the method of experimental audit study of primary care clinics. We let students with basic medical training play the role of mystery shopping pseudo patients visiting primary care clinics presenting symptoms of the common cold. Our sample of 96 primary care clinics are randomized to a control- or intervention group, and clinics in both groups are visited both before and after intervention. Our intervention consists of announcing the mystery shopper programme to clinics in the intervention group. Pseudo patients record variables describing the practice style at the

clinic, such as waiting time, duration of consultation, diagnostic procedure and which drugs were prescribed.

Results

The mystery shopping programme did not reduce the prescription of antibiotic drugs, while effects were found on diagnostic procedures.

Conclusion

While a mystery shopper programme does not reduce the inappropriate prescription of antibiotic drugs, the practice style is affected by the intervention.

Abstract number: 36

Normative Frameworks of Health Care Valuation - Democratic deliberation as an alternative to individual preference elicitation

Author: Ruben Sakowsky
Co-author: Mandy Ryan, Vikki Entwistle

Abstract:

"We have not stopped to ask citizens what they want from health care systems, perhaps because we are so tied to neoclassical economics that we do not see citizens qua citizens – only consumers"

Gavin Mooney

The need for a readily-available measure to compare the value of health interventions has lead health economists to adopt a standard of valuation that is highly useful – and rather narrow in focus. By asking survey participants to imagine themselves as potential patients rather than citizens that are involved in a policy-making process, valuable perspectives might be lost. The preferences an individual might hold as a potential patient might differ drastically from her preferences as a citizen and a member of her community. For instance, one might prefer to end one's life rather than to live with a certain condition (and even desire a physician's help with this matter) – but at the same time be politically opposed to establish assisted suicide as a medical practice due to concerns about abuse. Such a disconnect in preferences would not be picked up by current valuation efforts.

The aim of this presentation is to start to explore what perspectives and considerations health economists might be missing, discuss why this is important, and to think of ways to supplement current valuation

research. In particular, this talk will focus on discrete choice experiments, and the benefits and challenges of enhancing these via democratic deliberation methods. Democratic deliberation is the name for a class of multi-agent decision-making processes all operating on the same assumption: that the outcome of a deliberative process in which participants must justify their preferences to others by referring to other-regarding conceptions (such as justice and fairness) is significantly different from the aggregated sum of purely self-regarding individual preferences.

This talk will focus on three major areas of interest: First, it will explore some of the normative and epistemological assumptions inherent to the practice of preference evaluation
via discrete choice experiments; Second, there will be a look at how deliberative methods compare to discrete choice experiments in these respects; and third, a discussion of how current research in health valuation could be complimented by approaches based on deliberation will take place. The latter will include some preliminary thoughts on how some of the presumed differences between discrete choice experiments and deliberative methods could be explored empirically.

Abstract number: 37

No Effect of Penalties for Readmissions in the English National Health Service

Author: Søren Rud Kristensen
Co-author: Meredith Rosenthal, Matt Sutton

Abstract:

Objectives The US Medicare Hospital Readmission Reduction Program (HRRP) and a recent policy in the English National Health Service both aim to decrease emergency readmission rates through financial penalties for hospitals with high rates of unplanned readmissions. Although the objectives are similar, there are substantial differences in the design of penalties in the two health systems. The HRRP targeted acute myocardial infarction (AMI) heart failure and pneumonia and was associated with decreases in the readmission rates these and a set of unincentivised conditions. We test whether the English penalty policy was associated with similar decreases in readmissions for conditions included in both the Medicare and the English policies.

Data and methods: We use a 25% sample of the English Hospital Episode Statistics before (2009/10-2010/11) and after (2011/12-2013/14) penalties for readmissions were introduced. Our data set contains 48,387 admissions for AMI, 58,520 heart failure admissions and pneumonia 149,723 admissions for pneumonia which were all targeted by the policy and 4,187,641 admissions for a range of control

conditions that were not targeted by the policy. We conducted patient level logistic regression of readmission probabilities to estimate risk-adjusted readmission rates for each of the 161 hospitals in each of the 48 months included in the study. The effect of the reform was estimated using an Interrupted time series analysis of changes in trends in risk-adjusted readmissions at the announcement and introduction of the English penalty policy for targeted and control groups using generalized linear models that allow for clustering at the hospital level.

Results The preliminary results do no indicate that the introduction penalties for readmissions in the English NHS was associated with statistically significant decreases in readmission rates for AMI, heart failure or pneumonia. Trends in readmission rates for control conditions were also not different in the post policy period.

Conclusions The HRRP issues penalties for higher than expected readmission rates based on an algorithm that uses historical data for all hospitals included in the policy. This design policy has been criticised for being insensitive to local differences in patient populations such as local rates of deprivation that are thought to affect readmission rates but not included in the algorithm. The English readmission policy relies on locally agreed performance thresholds which in principle can be made sensitive to unobserved local differences in populations, but while the HRRP was associated with significant decreases in readmission rates, the English penalty policy was not found to affect readmission rates in the 3 conditions also targeted by the HRRP. Further research is needed to establish whether differences in the effectiveness of the policies can be attributed to differences in policy design.

Abstract number: 38

Scale and quality in Nordic hospitals

Author: Sverre A.C. Kittelsen

Abstract:

Objectives

Empirical analysis of hospitals in production economics often find little or no evidence of scale economies and quite small optimal sizes. Medical literature on the other hand provide evidence of better results for hospitals with a large volume of similar procedures. Based on a sample of Nordic hospitals and patients, we examines whether the inclusion of quality variables in the production models changes estimates of scale elasticity.

Data

A sample of 60 million patient records from 2008 and 2009 in 146 hospitals in Finland, Sweden,

Denmark and Norway were collected by the Nordic Hospital Comparison Study Group (NHCSG) in the EuroHOPE project. Patient data DRG-points were aggregated into 3 outputs (medical inpatients, surgical inpatients and outpatients) and linked to operating costs for 292 observations . The patient data were used to calculate quality indicators on emergency readmissions and mortality within 30 days, adjusted for age, gender, comorbidities, hospital transfers and DRG using DRG-specific logistic regressions.

Methods

The hypothesis that the elasticity of scale increases when quality variables are included was tested against the null hypothesis of no change in the scale elasticity. The observations were used to estimate a cost function using Stochastic Frontier Analysis (SFA). The Cobb-Douglas functional form was chosen since the estimated scale elasticity is then a constant. Country dummies as well as dummies for University hospitals, capital city hospitals and the average travelling time for the patients were included as environmental variables. To test rubustness a Data Envelopment Analysis (DEA) cost function was also estimated. Since Sweden does not have indicators of emergency readmissions, analysis was done with and without Sweden.

Results

The estimated scale elasticities did not change with the inclusion of quality indicators. With both quality indicators (mortality and emergency readmissions) included and Sweden excluded the point estimates of the scale elasticity changed from 1.024 to 1.023 with a z-value for the change of -0.02. With only the mortality indicator included the estimates changed from 1.035 to 1.033 (z=-0.13). In the latter model the scale elasticity was significantly larger than 1.0 at the 99% level (z=2.76). Both models estimated that the larger part of the residual variation was due to inefficiency rather than stochastic noise (lambda=0.94 and 0.58). Travel time and University hospital significantly increased costs. University hospitals had an estimated 11% higher cost than non-university hospitals (z=4.33).

Conclusions

The analysis does not support the existence of medical volume effects on key quality indicators of a sufficient strength to increase the scale elasticity at the hospital levels. This may be because medical volume effects are confined to few patient groups or possibly even offset by other groups where quality is reduced by volume. The result of increasing returns to scale contradicts previous studies which have found decreasing returns. This may be because previous studies have not included a University hospital dummy and thus have attributed the cost disadvantage of this group to size in itself.

Abstract number: 39

The Impact of Premium Refunds on Individual Claiming Behaviour in the German Private Health Insurance Market

Author: Simon Decker
Co-author: Daniel Avdic, Martin Karlsson

Abstract:
Health care expenditures have been steadily increasing over the last decades in most industrialized countries. Cost containment is therefore of enormous interest for policy makers given the strain that these expenditures put on already limited public sector budgets. Of particular importance are health insurance markets where moral hazard and adverse selection might be responsible for severe inefficiencies. Because of this, some health insurers in Germany offer plans with premium refunds as monetary incentives for the insured to reduce unnecessary claims. That means, contingent on being claim-free at the end of the calendar year, an insured receives a multiple of monthly premiums back. In this study we empirically assess how such incentives influence individual claiming behaviour in the German private health insurance market.

Different measures of cost containment such as deductibles or co-payments have been extensively studied in the previous literature. However, to the best of our knowledge, Zweifel (1992) is the only other study that analyses refund options of private health insurers in Germany. Overall, refunds are found to be associated with reduced costs as suggested by both general intuition and theoretical predictions. However, these findings might be driven by selection of healthier individuals into contracts with refund options. While Zweifel (1992) lists several arguments that speak against this, these concerns cannot be ruled out completely given the data at hand.

In this paper, we make use of unique data on insurance claims from a large private health insurer in Germany. In addition, we exploit a policy shift in 2008 that asymmetrically increases the attractiveness of refunds in different insurance plans. Based on this setting we employ a difference-in-difference approach which enables us to account for a broad range of selection issues under the plausible assumption of common trends across different insurance plans.

We find striking evidence of behavioural responses to the changes. Specifically, increasing the size of the refunds, on average from EUR 400 to EUR 1,200, reduces the individual claiming probability by 11 percentage points (15%), which is in line with the earlier evidence by Zweifel (1992). Furthermore, we find that the average annual claim is reduced by EUR 111 (4%). Accordingly, individuals appear to react

strongly by reducing their health expenditures, both on the extensive and the intensive margin. The results seem to be driven by reductions in more elective types of care (e.g. outpatient, pharmaceutical and dental claims), while there is no response for urgent care, such as inpatient claims. Overall, the findings of this study enhance our understanding of individual behaviour under insurance and are therefore of relevance, for instance, for optimal contract design.

Abstract number: 40

Exploring Hospital Operational Adaptations to Single Payer Financing in the United States

Author: Jeffrey Helton

Abstract:
The costs of health care in the United States continue to grow toward levels that threaten to cannibalize resources from other sectors of the economy. Some argue that a reason for this growth is the administrative expense associated with billing and collecting fees from myriad health insurance plans. A proposed remedy is implementing a single payer system like that in Canada would yield efficiencies for health care provider entities. During 2016, the State of Colorado is considering creation of a single payer health care system for its residents called "ColoradoCare". Opposition to this initiative focuses on the notion that the monopoly afforded a single insurance plan in the market would reduce payment rates to unsustainably low levels. Such payment reductions are said to threaten the ability of healthcare providers to remain in business and so, reduce access to care. Further, there is some concern that the resources to provide actual clinical care to patients could be severely curtailed. Others counter that such arguments merely protect entrenched inefficiencies in the current system. Past analyses do not take into account the potential operational changes but instead evaluate the payment rates based on status quo and do not explore operational efficiency opportunities. This exploratory study will focus on general, acute-care hospital providers in Colorado and examine the operational and financial impacts of lower reimbursements to these healthcare providers. The study will also propose changes needed in operating expense structure to maintain fiscal solvency in these provider entities. Using financial and operational data from the US Centers for Medicare and Medicaid Services for the years 2012 – 2014 for hospitals in Colorado to establish a baseline financial condition for hospitals prior to ColoradoCare implementation. The model will use operating margin, net revenue per adjusted discharge (a metric that encompasses both inpatient and outpatient service outputs), FTE and labor expense per adjusted discharge, and non-labor

operating expense per adjusted discharge as bases of comparison. The labor components of the analysis will be further stratified by nursing disciplines (RN/LVN/Aide), other clinical practitioners, administrators, housekeeping, and other staff (including staff that bill insurance plans). The model will then restate revenues to the expected payment rate after implementation of ColoradoCare and describe expected changes in operating margin. The model will also consider potential increases in utilization arising from broader insurance coverage in the state.

The study will then evaluate the extent of expense reduction necessary to maintain existing operating margins with those lower reimbursement rates, inclusive of specific labor and non-labor cost adjustments. Data envelopment analysis (DEA) will be used to establish efficiency benchmarks to guide operational changes needed to maintain financial solvency with such reduced payments. It is expected that these changes may prompt expansion of this model to other states or comparisons with operational norms in hospitals in other singlepayer health care systems. Further the study can help guide conversation about the relative merits of a single payer system in Colorado and how such a system would impact hospital operations and care in the state.

Abstract number: 41

Time Inconsistency and Paternalistic Patient-Doctor Interaction

Author: Alastair Irvine
Co-author: Marjon van der Pol, Euan Phimister

Abstract:
Adherence to medical treatments is commonly measured between 30% and 50%. With approximately 70% of NHS England's primary and acute budget devoted to long term conditions, non-adherence represents large financial and economic losses. Treatment adherence is widely studied in the health literature, though less so in the health-economic literature. As adherence is associated with short-term costs and long-term benefits, time preferences – how individuals value outcomes that occur over time – can be used to create a model of non-adherence. Specifically, quasi-hyperbolic time preferences are a non-exponential form that allows for non-adherence and have been used elsewhere within economics to explore time inconsistency. Previous health-economic models have focussed largely on the patient's decisions, abstracting from the complex relationship between the patient and doctor. Similarly, economic models that address patient-doctor interaction have often approached the problem as Supplier Induced Demand, taking treatment adherence as given. This paper contributes to the literature by explicitly

modelling how asymmetric information in the patient-doctor interaction and quasi-hyperbolic time preferences can lead to non-adherence.

In the current model, a 'paternalistic doctor' makes only one treatment recommendation to a patient. We use β-δ preferences (O'Donoghue and Rabin, 1999) to model a one-shot patient doctor interaction in a 2 period environment, motivated by surgery non-attendance or short-term antibiotic adherence. These preferences allow us to generate potentially time inconsistent behaviour. Under the assumption that patients are naïve (do not anticipate their quasi-hyperbolic discount factor), patients will not take pre-commitment actions to limit inconsistency. Secondly, we allow for the asymmetry of information present in the interaction: doctors know more about the available treatments. Initially modelling patients and doctors as differing only in time preferences, we show the restrictions under which non-adherence due to time inconsistency is possible. Taking the view that ex-ante planned action is the reference point for welfare analysis, all patients would like to take the treatment. This allows us to demonstrate that in a non-market setting a single contingent contract could ensure adherence when the doctor can observe the discount rate. However, in a market with many patient types this contract is not enforceable if patients are naïve about their discounting type, leading to a pooling. The model will be extended to include different payment schemes for the doctor making the recommendation. A salaried doctor is likely to make very different recommendations to one who is paid by fee-for-service, or indeed one who is paid by some measure of results. The predictions of the model will be tested using a lab experiment with medical students taking the role of the doctor playing 'virtual' patients that follow the decision rules of the model, and the experimental plan will be outlined in the paper.

Abstract number: 42

Reactions to free hospital choice; the case of pregnancies with no need for highly specialized services

Author: Nasrin Tayyari Dehbarez
Co-author: Niels Uldbjerg, Dorte Gyrd-Hansen, Rikke Søgaard

Abstract:
Objective

Recent policy development in the Danish health system emphasizes free choice of hospital, which is

supposed to increase hospitals' competition in providing higher quality services and enhance individuals' utility of health system. The experiences of highly specialized hospitals in the capital and central regions in Denmark are that some women with uncomplicated pregnancies prefer to give birth at highly specialized hospitals in spite of no need for specialized facilities.
This study assess determinants of hospital choice for the case of obstetrics users in Denmark.

Data

The Danish medical birth registry covers all hospital deliveries in Denmark. The registry provides information about risk factors, pregnancy and birth in addition to information about the actual hospital and ward where the birth had happened. To include only uncomplicated pregnancies in the study, ICD-10 codes are used to classify pregnancy as complicated or uncomplicated. Individual characteristics on socioeconomics, health and health behaviour are obtained from the national registry of Danish residents, education registry, income registry and a national health survey.

Methods

This is a retrospective cohort study of women with uncomplicated pregnancies, who gave birth at hospitals during 2005 to 2014. Models for hospital choice were estimated using multivariate logistic regression. The dependent variable, hospital choice is defined as the actual hospital that the birth had taken place, which can be a highly specialized hospital or a non-highly specialized hospital. Independent variables cover sociodemographic, risk attitude, travel distance to hospital and some health related variables from the national survey. Analysis was conducted in Stata version 14.

Results

Among 251967 women who gave birth at hospitals in Denmark from 2005 to 2014, 121612 (48%) gave birth in a highly specialized hospital.
Higher education, higher family income and living in urban area were associated with choosing a highly specialized hospital ($p<0.001$). Risky health behaviour (proxied by smoking behaviour at the beginning of pregnancy or having a body mass index > 25) was negatively associated with choosing a highly specialized hospital ($p<0.001$). Travel distance to a specialized hospital was negatively associated with choosing a highly specialized hospital.

Conclusion

The theoretical expectations of socioeconomic resourcefulness and risk aversion being associated with

seeking more specialized-facilities were supported. As the study population is not in need of highly specialized care, from a clinical perspective, these results suggest that there is an excess demand. The observed patterns of demand suggest that some degree of inequity in access to highly specialized hospitals is present and that this inequity is linked to socioeconomic resourceful and risk aversion.

Abstract number: 43

Does medical innovation improve adherence to diabetes medication? Evidence from Danish registry data

Author: Gisela Hostenkamp

Abstract:

Objective: Adherence to therapy has been announced as the next frontier for improving the quality of pharmaceutical care. Healthcare systems all over the world are looking for ways to increase medication adherence in order to prevent hospitalizations, save lives and health care costs. This paper examines the effect of pharmaceutical innovation on adherence to oral anti-diabetic (OAD) medication using extensive claims and register data from Denmark.

Method: We measure medical innovation as the drug vintage of consumed OAD medication i.e. the launch year when a drug has first been approved by the European or Danish Medicines Agency. Next we estimate the propensity that an individual patient receives a medicine that was launched after 1995 based on the share of the GP's other patients that received a post1995 medicine. Whether other patients receive a new medication should be independent of the individual patient's adherence. Our main identification strategy exploits plausible exogenous assignment of patients to physicians using variation in physicians' propensity to prescribe new diabetes medication to other patients as an instrument. Adherence to OAD medication is assessed in terms of deviations from individually prescribed dosages. We categorize patients into patients taking less than 70%, between 70 and 90%, between 90 and 110%, between 110 and 130%, and over 130% of the prescribed dosage, taking potential over - and under consumption into account. Our analysis allows for an individual level panel data strategy enabling us to take a number of patient- and doctor level characteristics and financial incentives into account.

Results: We find that more than 50% of patients are non-adherent to their OAD medication, deviating from the prescribed dosage by more than 10% and that prescribing behavior varies considerably across physicians. This affects the vintage of the prescribed OAD medication and the probability to receive an

innovative medicine. Our results show that patients consuming newer, later vintage drugs are less likely deviate from the prescribed dosage by more than 10%, than if they consumed older medication. Moreover, we find that lowering copayments would not necessarily improve adherence as it reduces under- but increases overconsumption of OAD medication.

Conclusion: One way to improve patients' adherence to therapy is through their doctor's choice of medication. Patients are more adherent to newer medication, for example because they are easier to handle or have fewer side effects. Thus, medical innovation may improve health outcomes also through better adherence, which is usually not captured in randomized clinical trials, where adherence is near perfect for all treatments, but can first be assessed when the medication is used in clinical practice. Health policy makers should take this into account when negotiating about the reimbursement of new medications, as better adherence can reduce costs in other parts of the health care system.

Abstract number: 44

Preserving cognition, quality of life, physical health and functional abilities in Alzheimer's disease: Exploring cost-effectiveness based on a randomized controlled trial

Author: Jan Sørensen
Co-author: Liza Sopina

Abstract:

Background

Physical exercise may improve cognition, physical performance, functional ability and health-related quality of life in people diagnosed with an Alzheimer's disease. The ADEX study was a multicenter, single-blind, randomized trial with two arms: an intervention where participants attended 16 weeks of continuously supervised moderate-to-high intensity aerobic exercise and a control group receiving usual care. The objective of this study was to explore the cost-effectiveness of this intervention and estimate ICER using patient and proxy completed measures of HRQOL.

Method

Participants within their first year of diagnosis were recruited to the trial from eight Danish memory clinics. 192 individuals aged 50-90 years agreed to part take. Participation in the intervention program

was recorded and different physical, functional and health measures were obtained at inclusion (baseline), and 4, 16 and 20 weeks after inclusion. The intervention and transport costs were obtained for each individual. Health outcomes were derived from measures of physical ability and EQ-5D-5L/EQ-VAS reported by the participant and the primary relative. Incremental cost-effectiveness rates were estimated and illustrated in cost-effectiveness acceptability curves. Difference between health outcomes as reported by the participant and proxy were explored in sensitivity analysis as were different measures of the intervention cost. Further analyses were conducted to extrapolate the finding into a longer time perspective and testing the uncertainty using Bayesian methods.

Results

The intervention cost was estimated at nearly 3700-4500 DKK per participant and transport cost at 610 DKK. Patients in the intervention group and their proxy respondents reported a small, positive non-significant improvement in EQ-index and EQ-VAS after 16 weeks. The ICER was estimated at 470.000 DKK/QALY using patient reported outcomes and 117.400 DKK using proxy reported outcomes.

Discussion

The cost-effectiveness of this intervention is debatable. Although the health outcomes were positive they were small and probably less than clinical important difference. The positive intervention costs were not expected to be off-set by savings in derived health care cost.

It could also be debated whether interventions as this should be evaluated alone in terms of gain in health outcome of for the patient with Alzheimer's. Such an approach disregards potential gain in physical functioning and the social well-being by taking part in a group based activity. I could also be debated whether the health and relief from the care burden for the relatives should be included as potential outcomes of such interventions.

Abstract number: 45

The long-term health benefits of receiving treatment from qualified midwives at birth

Author: Volha Lazuka

Abstract:

This paper explores the importance of early-life conditions for health in adulthood and old age by using high-quality longitudinal individual-level Swedish data. In contemporary developed countries the socio-economic differences in health are uniform; however the causes of these differences remain widely debated. Recently, the literature emphasizing the role of early-life health in adult health trajectories has expanded, mainly by using negative exposures as early-life events. Empirically, this research is limited by the high requirements of the data, such as large age-depth and inclusion of the details about socio-economic and other factors. As a result, high-quality historical individual-level datasets are more useful for the early-life studies. The Scanian Economic Demographic Database, which is used in this paper, contains not only demographic and socio-economic information for all individuals born in a concise area in southern Sweden, but it is also linked to the modern Swedish national registries, which allows me to observe the entire life course. Most importantly, this study also exploits information on individual-level treatment by qualified midwives, recently added to the dataset and emerged to be unique worldwide. This treatment data is obtained from midwife reports for approximately 7,200 children born in 1881-1930, which includes information on the type of treatment at birth as well as child and mother health. The main empirical strategy is based on controlling for observables, such as maternal, individual and family-level characteristics, and the information on multiple children per family with different treatment status is also exploited. Therefore, pioneering this case in the field, this study investigates long-term beneficial health effects of receiving treatment from qualified midwives at birth.

Even though this study relies on a local area in Sweden, the case under study is representative of the other settings in developed countries. Due to the bacteriological breakthroughs, disinfection techniques were introduced into the skilled childbirth practice throughout the world. In the countries of Northern Europe, competent midwives, which began to systematically implement the new routines into home deliveries, were publicly subsidized. Treatment by qualified midwives in our setting is therefore not determined by wealth of the family (and it is also confirmed empirically with relation to different socio-economic variables and measures of maternal health). This study shows that receiving treatment from public qualified midwives leads not only to lower mortality in the early neonatal period, compared to newborns delivered by traditional midwives. Consistently with previous early-life studies, this study finds favorable

morbidity and mortality effects (mainly from respiratory diseases) in adulthood and cause-specific (cardiovascular diseases and diabetes) mortality effects in old age due to better conditions surrounding birth. It further shows that, in response to better infant health, parental factors attenuated the individuals' long-term health effects. In total, the findings demonstrate that qualified midwifery, positively affecting health at birth, produced divergence in health inequalities in individuals' later life. The main results therefore stay entirely consistent with the recent indications of increasing health gaps between socio-economic classes in developed countries.

Abstract number: 46

Evaluation of the hospital resource use and costs of the Finnish Colorectal Cancer Screening study

Author: Mäklin Suvi

Abstract:

Objective. To estimate the difference in the use of hospital resources in the Finnish Colorectal Cancer (CRC) Screening study between those invited and controls. The final paper will also estimate the average and incremental costs of CRC screening compared to the no screening option. The decision about a national CRC screening will be made based on the evaluation of effectiveness and costs of the CRC screening study.

Data and methods. CRC screening was implemented in Finland in 2004 as a population-based randomized design using biennial fecal occult blood test (FOBT) for 60-69 years old men and women. People randomized to screening and control groups during years 2004-2009 were included in this analysis and all use of hospital resources during years 2004-2014 was estimated (5-11 years follow-up on resource use). Data were collected from the national hospital discharge register and from the national CRC screening center. Descriptive statistics (means, medians, standard deviations, frequencies and percentages) were calculated for outpatient visits, inpatient episodes, length of stay, and colonoscopies. Resource use was compared between screening and control groups. Within the screening group, the resource use after first, second and third screening rounds were calculated separately for those eligible. The costs are based on NordDRGs.

Results. Screening group comprised of 123 149 and control group of 122 930 people. According to the preliminary results, only a minority (9%) of people in both groups had not used hospital resources at all during the study period. More people in the screening group than in the control group had at least one

hospital-based outpatient visit, inpatient episode and colonoscopy. After the first screening round, the proportion of positive FOBT people with at least one outpatient visit, one inpatient episode or one colonoscopy was 4 times, 3 times or 9 times that of those with a negative FOBT result, respectively. During second and third screening rounds the difference diminishes.

Conclusion. CRC screening using FOBT increased slightly the volume of hospital outpatient visits, inpatient episodes and hospital colonoscopies in Finland after the first screening round and most of the increase is due to positive screening tests and following procedures. In the long run, there are no statistically significant differences in hospital resource use between screening and no screening.

Abstract number: 47

Can use of Electronic Health Records in General Practice improve quality of care for diabetes patients? Using a natural experiment for causal analysis

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Abstract:

Background: Chronically ill patients are due to
the demographic transition towards an older population taking up a larger share of health care spending. Disease management programmes (DMP) in the general practice sector are increasingly used to increase health of these patients and reduce hospitalizations and thereby costs.

Objective: The aim of this paper is to assess whether general practice (GP) enrolment in a DMP based on electronic Health Records (EHR) had an impact on diabetes patients total hospitalizations and hospitalizations with diabetes related Ambulatory Care Sentive Conditions (ACSC).

Methods: We use a rich nationwide panel dataset (2004-2013) with information of stepwise enrolment of GPs in the EHR program. The stepwise enrolment allows for a control group identification strategy. However, as time of enrolment, were voluntary within a 3 year framework (2011-2013) we expect selection bias. The dataset includes rich information on observables expected to explain selection into the programme as well as a long series of pretreatment outcomes (2004-2010). To solve the selection problem, following the recent literature on causal inference with panel data, we use a standard propensity score matching estimator (PSM hereafter) were we also match on pre-treatment outcomes. Assuming that all the unobserved confounders were already present in the pre-treatment outcomes we control for both observable and unobservable (time invariant and time varying) confounders. Results/conclusions: Our

results show that enrolment in EHR reduced diabetes patients risk of hospitalizations with up to 10%.Treatment effects are higher and more significant after two years of enrolment. The results are comparable with studies on EHR programs from California and the magnitude of the reduction in hospitalizations are comparable to DMP's including both EHR and financial incentives. Our results hence indicate that more analysis on disentangling the role of EHR from financial incentives may be important to understand how drive quality improvement.