

patient with larger information about medical treatments may be less reluctant to undergo surgical procedures, due to better knowledge of his own needs. The gender issue is particularly relevant from all these viewpoints, since women are poorer on average, lower educated among the elderly, and potentially subject to discriminations.

METHODS: Data include all patients in waiting lists for 10 elective surgery procedures at NHS Portuguese hospitals from the 31st of June 2004 until the 6th of February 2006. After restricting our sample to patients older than 17, our data includes 147,358 patients waiting for elective surgery, 47,636 men and 98,722 women (32.5 and 67.5% respectively). Survival data analysis is used in order to account for censoring (those still waiting by the 6th February) and withdrawal (those dropped out of the list because of death or opting out to private facilities). We model the probability of admission to a NHS hospital for elective surgery.

RESULTS: Gender is significantly associated to waiting times for a series of surgical interventions. Women are admitted later for cataract surgery, septoplasty and varicose veins intervention. Men wait significantly longer for wrist intervention and hip replacement. On the contrary, no association between gender and waiting time was found for knee replacement, arthroscopy and gall bladder removal. These findings are obtained controlling for age and the priority level of intervention.

CONCLUSIONS: Explicit priority criteria for managing waiting lists have been implemented in Portugal since 2004, based on clinical needs. This first study on equity in waiting times for elective surgery shows that men and women differ in the time between referral for treatment and in-patient admission, and that discrepancies are not justified by differences in priority levels. These findings question the effectiveness of explicit prioritization for patients included in waiting lists.

C31 Avaliação económica de três estratégias de prevenção de infeção relacionada com catéteres tunelizados para hemodiálise

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OBJECTIVOS: A hemodiálise requer acesso adequado à circulação sanguínea. Os catéteres colocados em veias centrais são o acesso utilizado quando é necessário iniciar hemodiálise de imediato ou em doentes em que não é possível a construção de um acesso mais aceitável. Os catéteres tunelizados são os mais utilizados mas estão associados a uma incidência de infeções considerável, com potencial para complicações mais graves, eventualmente fatais. Este trabalho tem como objetivo a avaliação económica de três estratégias de prevenção de infeção em doentes com catéter tunelizado.

MÉTODOS: Cento e quarenta e sete catéteres tunelizados colocados ao longo de dois anos em 122 doentes de 6 uni-

dades de hemodiálise, num hospital público da região de Lisboa, foram submetidos aleatoriamente a uma de três estratégias para prevenção de infeção: aplicação de pomada de mupirocina no local de inserção (grupo A), preenchimento do lume do catéter com uma solução de gentamicina (grupo B) ou aplicação das duas medidas simultaneamente (grupo C). Foram registadas prospectivamente os episódios de infeção de acordo com os critérios do CDC («Dialysis surveillance network program»). Para cálculo dos custos utilizou-se os preços do fornecedor em 2007, apurando-se os custos adicionais de cada um dos protocolos relativamente à prática clássica (penso simples). A medida de eficácia utilizada foi o número de episódios de infeção evitados por cada mil dias de catéter. Como referência base utilizou-se a incidência de infeção referida na literatura e a encontrada num coorte de 57 doentes da mesma região num estudo prospectivo em 2004. Os custos relacionados com o diagnóstico, tratamento e complicações das infeções não foram contabilizados. Foi feita análise de sensibilidade para diferentes consumos estimados de mupirocina (3g/mês vs 1,5 g/mês). **RESULTADOS:** Verificaram-se 23 episódios de infeção ao longo do período de observação que contemplou 19 145 dias de catéter, correspondendo a uma incidência de 1,2 infeções por cada mil dias de catéter. A incidência no grupo A foi de 2,4, no grupo B de 0,43 e no grupo C de 0,81. A incidência média referida na literatura é de 3,13 e a do estudo referido de 4,14 episódios por mil dias de catéter. Os custos calculados para cada mil dias de catéter para os três grupos A, B, C foram respectivamente de 211,44€, 81,51€ e 292,95€. Para diferente consumo de mupirocina os custos dos protocolos A e C são de 105,7€ e 187,2€. Utilizando como termo de comparação a incidência média de infeções referida na literatura a relação de custo-efectividade, traduzida em custo por cada episódio de infeção evitado foi de 289,64€ (grupo A), 30,18€ (grupo B) e 126,3€ (grupo C). Quando utilizado como referência o estudo referido atrás esses custos são respectivamente: 121,5€, 22€ e 88€.

CONCLUSÕES: Na prevenção da infeção relacionada com os catéteres tunelizados para hemodiálise o preenchimento do lume do catéter com uma solução de gentamicina é a estratégia que apresenta uma relação custo-efectividade mais favorável quando comparada com a aplicação tópica de mupirocina.

C32 Health care utilization and self-assessed health: specification of a bivariate model using copulas

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OBJECTIVES: The discernment of relevant factors driving health care utilization constitutes one of the main research

areas in Health Economics. Among others, the assessment of the effect of health insurance status and the estimation of income-elasticities of utilization provide two well-known examples of applied work in this area. This type of question is frequently addressed through specification of regression models for health care utilization (Y – often measured by number of doctor visits), which include, among other covariates, an indicator of self-assessed health (SAH). Expectably, usual estimation methods rely on the assumption of regressors' exogeneity, SAH included. Some authors, however, have cast doubt on the exogeneity of SAH as individuals' health assessments might depend on the quantity of medical care recently received. As is well known, this simultaneity concern calls for alternative estimation strategies, namely IV or GMM, which require valid instruments. When no such variables are available, researchers usually face two options: either to exclude SAH (probably a relevant regressor) from the model, or to adopt a nonrobust method (usually, NLS or conditional maximum likelihood); clearly, a considerable risk of inconsistency is involved in either choice. This paper addresses the potential simultaneity of (SAH, Y) by specifying a bivariate distribution for both variables, conditional on a set of exogenous regressors (x). This is achieved with copula functions, which enable separate — and flexible — consideration of each variable marginal distribution and their dependence structure. The approach is also compared to the more traditional method of modelling features of the conditional distribution of the dependent variable of interest, given (x, SAH) .

METHODS: Copulas are used to specify the joint distribution of (SAH, Y) , with Y measured by the number of physician visits in a three month period. The corresponding marginals are modelled, respectively, as ordered probit (SAH) and negative binomial (Y), conditional on x . The chosen copulas are common in the literature: Frank, Ali-Mikhail-Haq (both “Archimedean” copulas) and Farlie-Gumbel-Morgenstern. Unlike others, these copulas allow for both negative and positive dependence between SAH and Y , a potentially relevant feature for the present application. Estimation of these models is through maximum likelihood (ML). The current results are based on cross-section data taken from the National Health Survey of 1998/99. An update is desirable, with data taken from the last version of the National Health Survey (2005/06).

RESULTS: Preliminary results indicate that estimates of regression parameters do not vary much across different copula models, which, accordingly, display a similar ability to predict Y frequencies. In addition, all three models produce similar estimates of the average effects of SAH on Y (as measured by the value of the conditional mean of Y , given SAH , at the average value of x) and Y on SAH . These estimates differ from those produced by, respectively, a negative binomial (NB2) regression model of Y on (x, SAH) and an ordered probit model of SAH on (x, Y) . Such differences can be a consequence of simultaneity of (Y, SAH) , which is also suggested by the precision of dependence parameters estimates within each copula model.

CONCLUSIONS: Copulas offer a feasible alternative to the traditional approach of modelling the conditional expectation function, when simultaneity is feared and instrumental variables methods are not easy to implement. Instead of incurring the risks associated with the former approach, copulas afford both reliability and computational tractability, not too demanding in terms of coding. The present application illustrates an implementation of the method in the area of Health Economics and illustrates some of its associated estimation results.

C33 A decision support system to improve efficiency, quality and profit in a private nuclear medicine unit

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OBJECTIVES: As in any other business, operational and strategic management of health care units demands for decision support tools to deal with complex information and to pursue efficiency and quality in health care delivery. This is true for both the public sector, since efficiency in the use of resources within health care providers has increasingly become one of the prime concerns in health policies, and for private health providers for which efficiency improvements are required for profit maximization and for survival in a competing market. In addition, improving efficiency in health care units involves taking a wide set of decisions on operational issues which interact and influence each other - such as scheduling patients and staff, defining inventories and deciding upon staffing levels. There have been few studies to address these issues simultaneously. In this work we propose a decision-support tool which aims at informing decision-makers in the context of a private nuclear medicine diagnosis unit about the following questions: which operational processes and input mixes should be used in a unit so as to maximize quality, efficiency and profit? Does current demand for services and forecast of future demand justifies a change in the unit's resources?

METHODS: In order to develop a decision support tool to address those issues, we require a methodology able to model: processes within a unit; uncertainty in demand and in the execution of some services within the unit; the level of inputs and their utilization; and patients' quality, as measured by waiting times to access the service and spent within the service. Thus we found appropriate the use of a discrete simulation modeling to build a decision support tool.