DEALING WITH COMPETING CAUSES OF DEATH, ILLNESS AND COSTS: THE DISEASE ELIMINATION LIFE TABLE ANALYSIS (DELTA) MODEL

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OBJECTIVES: The Disease Elimination Life Table Analysis (DELTA) approach allows deterministic modelling of interventions which affect the incidence of several diseases, such as smoking cessation, hormone therapy and diabetes prevention, without causing the number of health states to explode. To analyse the differences of applying the DELTA approach to an individual patient simulation model for modelling diabetes.

METHODS: Five diseases are modelled; macrovascular disease (including MI’s and strokes), heart failure, retinopathy, renal disease and peripheral vascular disease. The price for modelling these diseases deterministically is three assumptions concerning independence: the probability to get a disease (to die) in sub-model A is independent of the probability to get a disease (to die) in sub-model B. The same UK Prospective Diabetes Study (UKPDS) risk equations are used in the patient simulation model as in the DELTA model. Using both models estimates are obtained and compared concerning life expectancies and the time in different diseases. Probabilistic sensitivity analyses are carried out to obtain confidence intervals surrounding the estimates.

RESULTS: The expected life time QALY’s for females of ages 47, 52, 57, and 62 in the UKPDS and DELTA models are 20.2, 19.0, 18.2, 17.9, 17.0, 15.7 and 15.3; respectively. Similarly for males the expected life time QALY’s in both models are 20.2, 19.0, 17.9, 17.0, 15.7 and 15.3; respectively. The time needed for a probabilistic sensitivity analysis with 100 draws from the uncertainty distribution is approximately 10 seconds. CONCLUSION: The DELTA approach offers a flexible way to model multiple diseases at the same time. The underlying independency assumptions—which may restrict its need—do not seem to affect the outcomes in the case of modelling diabetes. The loss in terms of subtlety seems to be outweighed by the gains in clarity and computational speed.

DRUG ADMINISTRATION SERVICES: AN INFUSION STAGE MODEL IN A MULTI-SITE STUDY OF U.S. PHYSICIAN OFFICES

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OBJECTIVES: Drug administration via intravenous infusion is an important incident-to-service for numerous U.S. physician practices. Effective staffing and patient scheduling can be better achieved by recognizing the individual components of the infusion activity. This project built a detailed infusion model and applied it to multi-site infusion observations. METHODS: A model of drug administration activity via intravenous infusion as performed in the physician’s office was created that defined a series of individual tasks divided into sequential stages. The model was then applied to observations of infusions in 75 physician offices located in 26 states. Observation instruments were prestated. The sampling frame was a broad-based convenience sample. Measures were taken to ensure a representative sample as to practice type and size. Observation data were recorded in a database. Unit of analysis was the individual physician office. Statistical analysis yielded descriptive statistics. RESULTS: The activity analysis model consisted of sequential service types (pre-; intra-; and post-service) comprised of 48 tasks. Intraservice tasks, representing the overall infusion activity, were divided into four stages. On-site observers applied the model in time-and-motion observations. Mean direct labor time totaled 129.7 minutes, of which 111.9 minutes per patient (86%) was intraservice. Intraservice therapy administration was divided into two sub-stages. Sub-stage 1 consisted of tasks to commence the infusion, while sub-stage 2 consisted of patient monitoring after the drug began to flow. The mean direct labor time for infusion sub-stage 1 totaled 20.5 minutes (16%), while infusion sub-stage 2 totaled 79.9 minutes (62%). Only minor variations in infusion protocol were observed. CONCLUSION: Physician office decision-makers need actionable methods in order to better manage drug administration services and to increase patient satisfaction. This study provides important detailed activity analysis information and process mapping that can be readily applied to practice-specific relevant scheduling, staffing and management decisions.

NONLINEAR SMOOTHING TO ASSESS PROBABILITIES OF ANTIBIOTIC-RESISTANT INFECTIONS IN THE COMUNITAT VALENCIANA (SPAIN)

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OBJECTIVES: Resistance to antibiotics is a serious public health problem with an increasing economical impact. A wide knowledge of the evolution and characteristics of these bacterial is thus critical to manage and develop treatment and prevention strategies. The main goal of this study is assessing probabilities of MRSA infection in the Comunitat Valenciana according to hospital and nonhospital setting, gender, age and specimen.

METHODS: Data are supplied by RedMIVA, the microbiological surveillance network that collects information from the public microbiology laboratories. A total of 2034 determinations are recorded from January to June 2006. The statistical model is based on the Analysis of Risk Factors and the price for modelling multiple diseases at the same time. Probabilistic sensitivity analyses are carried out to obtain confidence intervals surrounding the estimates. RESULTS: The expected estimated probability of MRSA is less in women than in men in all the ages. The exception occurs in hospitalised women aged 20 to 40 which exhibit significant fluctuations. Urine and oftalmological specimen produce always the largest and smallest probabilities. The fitted model allows the estimation of probabilities of MRSA for any combination of the factor levels and age. For example, in the case of urine specimen, the posterior expected probability in hospitalised (nonhospitalised) men with ages 20, 40, 60 and 80 is 0.3974 (0.2236), 0.5127 (0.2608), 0.6753 (0.5062) and 0.8094 (0.73332), respectively. In the group of urine specimen supplied by hospitalised (nonhospitalised) women the results are 0.3334 (0.4720), 0.5400 (0.009), 0.6716 (0.4473) and 0.6463 (0.5458) for ages 20, 40, 60 and 80, respectively. CONCLUSION: We have fitted an stochastic model for learning about MRSA that essentially captures its behaviour in the population. The probabilities of MRSA are, in general, higher for men than women. They increase as people get old but its difference decreases with age.

ORDINAL OR CARDINAL? THE VAS STRIKES BACK

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OBJECTIVES: Visual analogue scales (VAS) are widely used to value health. The relative merits of VAS include minimal cognitive burden, ease of administration and low cost. Additionally, psychometric performance can be quite robust. However, the legitimacy of VAS-generated values in economic evaluation is
often challenged despite recent literature that advocates a more sympathetic assessment. Integral to this debate is the question of whether VAS-based methods generate cardinal scales necessary for economic evaluation. This study reports on that issue.

METHODS: A UK postal survey was used to elicit values for all 243 health states defined by EQ-5D. A factorial block design was used to construct 21 questionnaire versions in which a sample of 14 EQ-5D health states were valued by each respondent. Data were obtained from 825 participants. Health states were ranked in terms of their VAS scores on a within-respondent basis and analysed using a conditional logit model to obtain estimated values on an interval scale. The estimated values were compared with directly observed VAS values rescaled so that the best state (11111) was 100 and the worst state (33333) was 0.

RESULTS: The estimated values derived from this analysis were as much as 10 points higher than the rescaled, directly observed VAS scores. Some differences in the rank order of health states were seen between the computed and observed VAS values with a Pearson correlation coefficient as 0.969. OLS regression confirmed this relationship between estimated and observed VAS values with the estimated value = VAS value + 1.079 + 5.527.

CONCLUSION: Convergence between the two sets of values confirms the interval scale properties of the VAS value set, confirming the necessary cardinal measurement property to be legitimately used in economic evaluation.

CONVERGENT, DISCRIMINANT, CONCURRENT VALIDITY AND RELIABILITY OF THE EQ-5D(CHILD): RESULTS

**PMC15**

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OBJECTIVES: Generic Quality-of-life (QoL) instruments allow to compare QoL in populations different for culture, languages, health. If utilities are derivable, QoL data can be used in economic research. Unfortunately children often remain excluded from being part of these populations, hence information for optimal decision-making in pediatric context can be limited. The Child-Task-Force operating within the EuroQol group is translating and validating a EQ-5D child version. Within the Child-Task-Force, the Italian team conducted a validation study involving 8–15 years old children in Italy.

METHODS: Children from general population were enrolled at schools, those with chronic diseases enrolled at hospitals. Participants self-completed a core-set containing EQ-5D(child), open-questions on reasons for initial state, organization health scale, questions on demographic, socio-economic, health status. After 10 days some kids underwent to a re-test interview. Convergent and Discriminant validities were tested by computing correlation coefficients between every couple of items/scores, as appropriate; concurrent validity was tested by comparing the EQ-5D(child) responses of chronically sick versus general population children; reliability was tested by calculating agreement levels of test with re-test responses.

RESULTS: In total, 415 valid children from schools (31.1% were re-tested), 11 Acute Lymphoblastic Leukaemia patients form hospitals were enrolled. Relevant Spearman’s correlation coefficients (>0.2, p < 0.0001) were found between every conceptually similar items/scores; not significant coefficients were found between most of not conceptually similar items. Weighted Cohen’s Kappa were 0.2–0.5 in the profile items. Intraclass-Correlation Coefficient for VAS = 0.715. Leukaemia patients more frequently reported problems/trouble in every EQ-5D item, lower median (92.5 vs 98.0) and mean (83.0 vs 93.9) VAS.

CONCLUSION: EQ-5D(child) shows acceptable levels of validity and reliability. Further research will be conducted to improve its properties and allow appropriate use in both research and clinical practice.

**SF-6D REFERENCE VALUES FOR SPANISH GENERAL POPULATION**

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OBJECTIVES: SF-6D is an utility index, recently developed and which has been validated for its use in Spanish population. It was derived from SF-36 Health Survey, the most frequently used generic HRQoL assessment instrument. Spanish general population values for the SF-6D are presented here, along with some of its characteristics and the comparison of two ways of using those values.

METHODS: The original database used to obtain the General Population norms of the SF-36 in our country was used in present analysis. This database includes the SF-36 data of 9131 non institutionalized subjects aged over 18, obtained in a cross-sectional study of a random selected sample from GP. SF-6D was calculated with and without the weights which represent the preferences of population about different health status. The formula and the weights used were those used in the original SF-6D version (Brazier et al). RESULTS: SF-6D score was higher in men than in females ($F_{(1,977) = 177.467}$; $p < 0.01$). Statistically significant differences were observed in the SF-6D score among different age groups ($F_{(4,977) = 188.262}$; $p < 0.01$), lower scores corresponding to elder age groups. There was a significant interaction between both factors ($F_{(4,977) = 5.456}$; $p < 0.01$). Variance of SF-6D scores increases with the age. Direct SF-6D score (without weights) and that obtained with weights of previous preferences studies showed a high correlation ($\beta = 0.953$; $p < 0.01$; $R^2 = 0.91$) CONCLUSION: Values calculated in present analysis may be used as a reference for the SF-6D in Spanish GP. They will allow a better interpretation of scores in concrete groups of patients and in the individual patient (with respect to age and gender). Results show that the use of weights obtained in preference studies may not have the expected relevance.

**ACCOUNTING FOR INITIAL HEALTH STATUS IN MEASURING THE BENEFITS OF HEALTH CARE TECHNOLOGIES**

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OBJECTIVES: In current economic evaluation methods, ‘QALYs gained’ is used as a summary outcome. The value of a patient moving from a health state with utility 0.8 to full health (i.e. 1.0) is considered equivalent to a change from 0.3 to 0.5, since both show improvements of 0.2. However, there is evidence to suggest that the initial state may play an important role in the patient’s own valuation of the health change. That is, the more severe the initial state, the more a patient will value an ‘equal’ health gain.

METHODS: Two experiments were developed, using the visual analogue scale (VAS) and health utilities index 3 (HUI:3) methods of presenting health states. Participants...