designed to support both the collection of PRO data and the development of an economic model.

**PMC19**

**COST-EFFECTIVENESS ANALYSES OF BEHAVIORAL INTERVENTIONS: TOWARDS A MORE REALISTIC COST-EFFECTIVENESS RATIO BY INCLUDING INTERMEDIATE OUTCOME MEASURES**

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**OBJECTIVES:** Behavioral health interventions traditionally use a simple dichotomous outcome criterion: 'success' or 'failure'. In reality, though, behavior change is a complex process in which several steps towards success are taken. There has been little consideration, however, about whether future behavior change should be incorporated in cost-effectiveness analyses (CEAs). The aim of the present review is to identify and evaluate the usage of cognitive, intermediate outcomes in CEAs of behavioral interventions.

**METHODS:** Electronic data sources (PsycInfo, WebofScience, Medline, ScienceDirect and Scopus) were searched for CEAs published before February 2008.

**RESULTS:** Most CEAs and CUAs reporting cognitive, intermediate outcomes of behavior change fail to incorporate partial behavior changes. Only nine studies were eligible for inclusion in this review. Smith et al 2007 [1] conducted the only study in which partial behavior change was incorporated in the final outcome by modeling cognitive, intermediate outcomes: the stages of change, derived from the Transtheoretical model (TTM). The TTM is a stage-oriented model that describes the process by which a change in behavior takes place. It describes the readiness to change and the processes employed by individuals to achieve behavioral change. With inclusion of future behavior change, Smith et al showed that the incremental cost-effectiveness ratio declined compared to the standard analysis.

**CONCLUSIONS:** The results suggest that CEAs of behavioral interventions can be further optimized by the measurement of intermediate outcomes and use these to determine partial behavior change at the end of an intervention period as well. In other words, when partial behavior change and relapse rates are incorporated in CEAs of behavioral treatments, a more realistic and transparent final outcome can be calculated. [1]

**PMC20**

**QUANTITATIVE APPROACH TO DETERMINE THE EFFECT OF SEGMENTATION ON REVENUE GENERATION, POSITIONING AND PRICING OF PHARMACEUTICALS**

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**OBJECTIVES:** To develop a quantitative model that can determine the effect of segmentation and positioning on revenue generation based on different variables, health economic considerations and pricing scenarios, creating a tool which is easy to use for the first evaluation of options.

**METHODS:** Literature review and interviews with industry experts were conducted followed by the development of qualitative framework, logic and the subsequently a quantitative model. The model was tested and validated using real life examples.

**RESULTS:** A qualitative model was developed which presents an iterative strategy to align stakeholders' interest with different scenarios of segmentation. From a given asset base of active ingredients, the pharmaceutical company defines therapeutic areas for a component and determines segments within them, evaluating both attractiveness and specific propositions for patients, payers and prescribers in comprehensive scenarios. For the payer’s perspective in particular, health economic benefits of the proposed segmentation approach must be contemplated. Following this analysis, objectives and strategies for the chosen segments are developed and a holistic value proposition can be delivered to the market. Ideally, the process should be initiated early during development in order to design clinical trials according to the segmentation strategy. The process should also be monitored throughout the marketing and sales process in order to make improvements, and to react to changes in health care policies or the competitive landscape.

**CONCLUSIONS:** Following the qualitative analysis, a quantitative model was developed in Excel that captures the effect of multiple variables such as age, gender, disease severity, co-morbidities, insurance type and multiple price points on revenue generation, positioning and pricing of pharmaceuticals. The model was tested and validated using the example of bipolar disorder (BD) in women with childbearing potential. A new product with lower teratogenic risks was evaluated along different segmentation scenarios in order to determine improved overall cost-effectiveness when compared to conventional treatments.

**PMC21**

**ASSESSING THE RELATIONSHIP BETWEEN COMPUTATIONAL SPEED AND PRECISION: A CASE STUDY USING A DISCRETE EVENT SIMULATION MODEL IN DIABETES CARE**

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**BACKGROUND:** In model-based health economic evaluations, to achieve a given level of precision surrounding modelled outputs there is a trade-off between treatment effect estimates and the computational time associated with the programming format used to ‘code’ the model. **OBJECTIVES:** To explore the relationship between modelled effect size, statistical precision and the computational time associated with two commonly used programming frameworks. **METHODS:** A published and validated cost-utility discrete event simulation (DES) diabetes model (Cardiff model) was programmed in MS Excel with Visual Basic (VB), and more recently reprogrammed in C as with other models in this area, to illustrate the efficiency gains in terms of computational speed achieved under different programming frameworks. A treatment effect of 0.4% HbA1c improvement was applied to a mean cohort profile of 10,000 patients; precision in the predicted number of clinical events was used to assess relative efficiency of VB and C. **RESULTS:** In the C programmed model in order to show a significant difference at the 95% level in the predicted number of events in the control and treatment arms required 50 iterations of the model using mean values. This equated to a model run time of 1 minute. The equivalent number of iterations in VB took 133 minutes to demonstrate a significant difference in the predicted number of events. Typically, one-way sensitivity analysis using this model to explore 40 scenarios would equate to a run time of 40 minutes in C and 5,320 minutes (88.7 hours) in VB. **CONCLUSIONS:** Programming format can impact the computational time associated with running the model with subsequent practical implications for the usability of the model. We conclude that with reasonably complex models,
more computationally efficient programming languages (such as C) are preferred; concerns regarding model transparency using compiled languages are best addressed via thorough documentation and model testing.

CONCEPTUAL PAPERS & RESEARCH ON METHODS—Patient-Reported Outcomes Studies

THE IMPACT OF COMORBIDITY BURDEN AND AGE ON PREFERENCE-BASED HRQL IN THE UNITED STATES

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OBJECTIVES: Gains in life expectancy have lead to aging populations with more chronic comorbidity. This study aims to examine the impact of age and comorbidity on EQ-5D index scores in a nationally representative sample of the U.S.

METHODS: The pooled 2001 and 2003 Medical Expenditure Panel Survey (MEPS) was used. MEPS is a nationally representative survey of the U.S. civilian, noninstitutionalized population based on self-report which collects detailed information on socio-demographic characteristics, medical conditions and HRQL. The total number of chronic conditions for each individual was calculated based on ICD-9 codes. Spline regression was used to allow for nonlinear age effects: individuals were separated into 4 quartiles based on age: 18–31; 32–44; 45–58; and >58 years. Censored least absolute deviations (CLAD), Tobit and OLS methods were used to regress EQ-5D index scores on age and chronic comorbidity, controlling for income, gender, race, ethnicity, education, physical activity and smoking status. Interactions between age and chronic conditions were also explored.

RESULTS: After controlling for chronic comorbidities and other confounders, age was not statistically significant except for those >58 years and the magnitude of this coefficient was very small (coefficient age >58 years = 0.0006). However, the coefficients for chronic comorbidities were highly statistically significant with large magnitudes for those with ≥2 chronic conditions (coefficient 2 chronic conditions = -0.16; coefficient 9 chronic conditions = -0.28). Having only one chronic condition was not statistically significant. The interaction between age and chronic comorbidity was significant, but the deleterious impact of their interaction was largely dominated by the existence and number of chronic conditions. CONCLUSIONS: Chronic conditions have a significant deleterious impact on EQ-5D index scores regardless of age. The negative impact of age on EQ-5D index scores may be due to the existence and degree of chronic comorbidity.

SELF-ASSESSED HEALTH STATUS IN POLAND: EQ-5D FINDINGS FROM POLISH VALUATION STUDY

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No population norms for any generic health related quality of life questionnaire are currently available in Poland. OBJECTIVES: To measure the health of a representative sample of the general population of Poland by using EuroQol questionnaire.

METHODS: Visitors of patients in seven medical centers in Warsaw, Skierzyniewice and Pulawy, aged 18 and over, were interviewed during Polish EQ-5D valuation study. Stratified quota sampling was used. Respondents completed EQ-5D questionnaire and provided information on age, sex, marital state, education, employment, income, housing tenure, medical history and smoking behaviour. The interviews took place since February till May 2008. RESULTS: The final sample comprising 317 subjects (62% Warsaw residents) was representative of the general population with respect to age and sex. A moderate problem on at least one dimension was reported by 57% respondents, whereas only 4.7% of respondents reported any extreme problem. Forty percent of respondents reported any problems with pain or discomfort, 38% with anxiety or depression, 16% with mobility, 13% with usual activities and 3% with self care. The mean state of health recorded on the visual analogue scale was 81.6 (SD 14.4). The mean VAS value decreased from about 87 and 91 in the youngest age group to 67 and 72 in the oldest age group, in men and women respectively. CONCLUSIONS: Pain and anxiety are commonly reported in Polish society.