parable studies were pooled to obtain summary measures of cost and effect. Cost data were converted to US dollars and expressed as year 2002 prices. **RESULTS:** In total, 53 studies were identified and reviewed, of which 13 were analysed. Median survival of BSC was estimated at 4.90 months (95% CI 4.46–5.35). The 12-month and 24-month survival proportions were 16% (95% CI 13–19) and 4% (95% CI 2–7) respectively. Survival was not affected by the stage at which BSC was given. Four papers from two countries were suitable for pooling total costs of BSC, and resulted in an estimate of US $6519 (95% CI $5740–$7297) per person. **CONCLUSION:** Absolute effects, as observed in clinical trials, pooled with meta-analysis techniques can provide key information for outcomes research, such as pharmaco-economic modeling studies. Here we provide pooled survival and cost estimates for BSC. These can be used for economic evaluations of recently developed drugs in stage IIIb and IV NSCLC where an indirect comparison may need to be made with BSC. Pooling cost data is problematic due to differing treatment patterns and relative prices over years and across countries. Consequently, caution should be taken when pooling costs and it is advised to only pool costs if studies are comparable. Otherwise ranges of costs as observed in the different studies should be reported.

**PCN43**

**MAPPING HEALTH-RELATED QUALITY OF LIFE (HRQOL) MEASUREMENTS INTO GENERIC UTILITY MEASURES (EQ-5D): A CASE STUDY WITH BORTEZOMIB (VELCADE)**

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**OBJECTIVES:** Pharmaco-economic studies for terminal cancer require preference-based rather than disease-specific measures of QoL. Mapping enables evaluators to elicit information about societal preferences where only disease-specific QoL data are available. **METHODS:** Responses to HRQoL questions from a phase-2 trial of VELCADE for relapsed and refractory multiple myeloma patients (n = 202 in SUMMIT1 trial), were used to derive utility scores from the original scales used in SUMMIT and those from a generic QoL tool (EQ-5D). Questions relevant to the EQ-5D were identified (EORTC-QLC30, EORTC-MY24, FACT-Fatigue and FACT/GOG-Ntx) and five summary measures of severity (corresponding to the five EQ-5D dimensions) obtained. The summary measures were transformed into the corresponding EQ-5D scale for each dimension. EQ-5D utility scores were validated using the answers to questions on “Overall QoL” and “Overall Health” from EORTC-QLQ-C30 (Questions 29 & 30). **RESULTS:** Utility scores appear similar across patient groups as defined by serological response to VELCADE, for an overall utility score of 0.65. Utility mapping is sensitive to differences in overall QoL and overall health. This finding is robust to the passage of time for overall QoL differences, but derived utility scores decline as time passes for a given overall level of health. The utility scores are robust to mapping algorithms that use summary measures (i.e. mean/median) to aggregate reported severity levels for relevant questions within each EQ-5D dimension but change markedly if the worst reported level of severity for each dimension is used instead. **CONCLUSIONS:** A method for deriving utility scores from reported HRQoL outcomes is proposed that yields results consistent with previous reports for MM patients. Using mapping algorithms to derive utility scores from generic instruments in situations where information on societal preferences for QoL outcomes is not available is a feasible and sensitive option for providing valid estimates of patient well-being for terminal conditions.

**PCN44**

**META-ANALYSIS OF THE DIAGNOSTIC ACCURACY OF SCREENING TESTS FOR COLORECTAL CANCER**

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**OBJECTIVES:** To conduct a meta-analysis on the diagnostic accuracy of five screening tests for colorectal cancer (CRC): fecal occult blood test (FOBT), double-contrast barium enema (DCBE), flexible sigmoidoscopy (FSIG), conventional colonoscopy (COL) and computed tomography colonoscopy (CTCOL). **METHODS:** A literature search was carried out in MEDLINE for each test. Articles were reviewed by two independent reviewers. Inclusion criteria were: 1) RCTs or observational studies of CRC screening; 2) patients with low/average risk of CRC; 3) complete data to calculate sensitivity and specificity. Exclusion criteria were: 1) non-peer reviewed articles; 2) articles whose primary aim was not to assess CRC screening; 3) articles not in English/French; 4) articles published prior to 1975; and 5) high risk screening populations. Weighted linear regression was used to identify significant covariates. Sensitivity and specificity were pooled for relevant subgroups. **RESULTS:** The initial literature search found 399 articles for FOBT, 253 for DCBE, 394 for FSIG, 434 for COL, and 345 for CTCOL. Of these, 12, 8, 10, 8, and 13 articles, respectively, were included in the final analysis. With the exception of colonoscopy the remaining tests showed evidence of heterogeneity and threshold effect. Significant covariates included study design and type of FOBT. Pooled sensitivity and specificity (95% CI) for randomized FOBT and FSIG trials were 0.738 (0.705,0.768), 0.960 (0.959,0.961), 0.822 (0.770,0.864), and 0.997 (0.994,0.998) respectively. For the remaining tests, the pooled sensitivity and specificity (95% CI) were 0.767 (0.728,0.802), 0.975 (0.970,0.979) for all DCBE studies, 0.867 (0.828,0.898), 0.995 (0.991,0.998) for all COL studies and 0.879 (0.840,0.910), 0.964 (0.956,0.971) for all CTCOL studies. **CONCLUSIONS:** When heterogeneity is present within test groups, results from pooled sensitivity and specificity can be misleading. A planned future step is to estimate diagnostic odds ratios and build summary ROC curves which are more reliable estimates of test accuracy for evidence synthesis.

**PCN45**

**MODELING EFFECT IN PHARMACOECONOMICS ANALYSIS USING ARTIFICIAL NEURAL NETWORKS**

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**OBJECTIVE:** The aim of the project is to use Artificial Neural Networks (ANNs)—representatives of computational intelligence—for medical effect prediction, which could help in the extrapolation of pharmaco economics analysis’ results. **METHODS:** To depict neural data analysis tools, a database containing 100 non-small cell lung cancer (NSCLC) patients in non-operative IIIB and IV stage has been used. Each patient was described using 30 factors (i.e. sex, age, anticancer drugs dosage) and, as an output value, the expected survival time was established. The role of the ANN based system was to predict the patient’s survival time based on the above mentioned information. Binary values were tested as outcomes. Positive values (coded as 1) meant that patient survival time would be equal to or longer than 35 weeks. Negative values (coded as 0) meant that the patient survival time would be shorter than 35 weeks.
Binary values were obtained using a threshold, which based on the mean survival time of patients derived from literature. RESULTS: Back-propagation as well as fuzzy-logic neural networks were applied. A 10-fold cross validation method was used to obtain the appropriate models. Final results were compared with the generic, logistic regression-based model. The best prediction score of the ANN model was 82% (generalization) and was higher than logistic regression prediction rate. Best obtained model was tested under its practical application in the in-silico study to model switching from theophylline to carboplatin therapy in NSCLC. The results demonstrate that thanks to the better survival rate such operations could be cost-effective. CONCLUSIONS: Artificial Neural Networks could be applied in pharmacoeconomics analysis as additional modeling tools.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)—Clinical Outcomes Studies

DRUG USE PROFILES AFTER HOSPITALIZATION FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) IN THE NETHERLANDS AND THE RISK ON RE-HOSPITALIZATION

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OBJECTIVES: To analyze the risk of re-hospitalization for COPD following different treatment regimens. METHODS: A retrospective cohort study with data from the Dutch PHARMO system, including medication and hospital admission records of 1.6 million inhabitants of 34 Dutch cities was performed. Patients >40yrs with a first admission for COPD during 1992–2002 were identified. Treatment was assessed in the period of 90 days following first discharge. Cox proportional hazard analysis was performed to analyze the time to re-hospitalization for COPD for different treatment regimes. Hazard rate (HR) and 95% confidence intervals (CI) were adjusted for potential risk factors including gender, age, year of hospitalization and disease severity. The maximum follow-up time was two years. RESULTS: From the total cohort of 3855 patients, 1118 (29%) were re-hospitalized within two years after the first hospitalization. The mean period to re-hospitalization was 230 days. Compared to ICS as a reference group, an increased risk for re-hospitalization was found in the following treatment groups: theophylline (HR 1.83, CI 1.12–2.99), and ICS combined with anticholinergics and beta-agonists (HR 1.50, CI 1.02–2.20). CONCLUSIONS: This study found re-hospitalizations occurred in approximately one-third (1/3) of patients. Differences in COPD re-hospitalization risks between treatment groups were observed. Anti-inflammatory therapy alone demonstrated a significant protective effect compared to theophylline therapy alone or a combination therapy of ICS, anticholinergics and beta-agonists.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)—Methods and Concepts

ITEM SELECTION FOR COPD-SPECIFIC UTILITY INSTRUMENT

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OBJECTIVE: To identify items in the existing disease-specific St. George’s Respiratory Questionnaire (SGRQ) that might be suitable for use in a COPD specific utility instrument. METHODS: The SGRQ has three domains. We planned to use three items per domain (mild, moderate and severe) for the new instrument. Using data from 893 patients we first reduced the original 50 SGRQ items to the 40 “best” items using classical test methods and Rasch modelling (RUMM 2010 software). The Person Separation Index for these 40 items was 0.9 (an “excellent” fit to a unidimensional model). We then used Rasch location maps to identify suitable items. We examined those items that covered 95% of the patients, then divided the population into tertiles according to their person location value: mild (mean location = −0.97 logits, SD = 0.35), moderate (mean location 0.09 logits, SD = 0.39), severe (mean location 1.45 logits, SD = 0.56). For each level of patient severity we chose one item per SGRQ domain using criteria based upon quality of fit of the item to the unidimensional model of all 40 items. RESULTS: We were able to identify one suitable item per domain at each severity level. The locations of the nine items ranged from −1.16 logits to 1.47 logits. The mean item location for the three mild items was −0.55 logits, moderate items 0.18 logits, severe items 1.16 logits. CONCLUSION: We have now identified nine items from three domains of health in COPD. Each item has a clearly defined level of severity. This approach should ensure that the utility instrument, when fully developed, has good discriminative properties and may also have good evaluative properties.

DEVELOPMENT OF A COPD SEVERITY SCORE IN CLAIMS DATABASE

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OBJECTIVES: The purpose of this study is to establish a measure of the COPD severity using claims data. METHODS: The study sample was identified from a large claims database covering the period 1999–2002. Patients of age 18–65 with previous acute exacerbation of COPD (AECB) were included in the study sample (n = 2068). Variables associated with COPD severity were extracted. Variables with low face validity, high endorsement rate (>97%), or low homogeneity (measured by Chronbach’s alpha) were excluded. Principal component analysis with orthogonal solution was conducted to identify the latent severity score. Scree test and eigenvalue-one criterion were used to determine the number of latent factors. The severity score was standardized (mean = 50, SD = 10). Construct validity was tested by comparing severe COPD patients to moderate/mild patients of 3-month AECB incidence rate and by comparing the failure rate (ER/hospitalization) of antibiotic treatment in AECB. RESULTS: Six variables were excluded from the original 18 potential variables due to low face validity or high endorsement rate. Principal component analysis based on the remaining 12 variables produced a single latent factor (eigenvalue = 3.6), therefore no factor rotation was performed. The score loaded high on the use of oxygen therapy, corticosteroids, and bronchodilators, etc. The resulting factor loading agreed with the clinical recommendation in GOLD criteria of treating COPD by severity. Chronbach’s alpha test showed good homogeneity of the severity score (0.71) and no input variables were rejected. The construct validity tests showed that, compared with mild/moderate COPD patients, severe patients were about 3 times more likely to have AECB episodes and 60% more likely to have antibiotic treatment failure in AECB episodes. CONCLUSIONS: The COPD severity score developed in this study can be applied to a wide range of retrospective studies of COPD, where results from