OUTCOME VALIDATION OF A SUCCINCT HPV INFECTION MODEL FOR FRANCE

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OBJECTIVE: An HPV/cancer epidemiology model has been developed aiming to be succinct in structure and data input providing valid long-term HPV infection and cancer case predictions, a first step for estimating cost-effectiveness of new HPV vaccines. METHOD: A lifetime Markov process model with one year cycle length has been selected as basic matrix and is developed in Microsoft®Excel software. The model structure describes the natural history of High-Risk HPV (HR-HPV) infections through 9 health states: No-HPV; HR-HPV without lesions; low and high grade Cervical Intraepithelial Neoplasia (CIN1 and CIN23); persistent CIN23; CC; cured CC; CC death; and overall death. A screening module (organized and/or opportunistic) simulates early detection and treatment of CIN lesions reducing their progression to CC. Two types of data-sets for data-input are created: related to the natural history of the disease (supposed to be equivalent across countries and extracted from literature or from expert opinion) and country-specific (HPV incidence, death rate, screening practice, CIN and cancer specific treatment). Outcome model validation is performed with French data comparing model predicted cervical cancer incidence and mortality rates with estimates from national cancer registries. RESULTS: The model predicts 1.7 cases per 100,000 subjects in 20 to 24 age-group (1.3 observed); 21.3 cases in 40 to 44 age group (19.8 observed); 17.9 cases in 75 to 79 age-group (17.2 observed). Overall the model overestimates the CC cases with only 5% (n = 3569 modeled cancer cases; 3387 observed for the year 2000). CONCLUSION: Succinct model development is able to replicate within 5% confidence the CC incidence observed. The model is a helpful tool for simulating economical consequences of HPV vaccine in those countries with paucity of data which doesn’t allow using the more complex models.

TRASTUZUMAB USE FOR METASTATIC BREAST CANCER—IS “MEDIAN TIME TO TREATMENT FAILURE” AN ACCURATE PARAMETER FOR BUDGET IMPACT ANALYSIS?

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OBJECTIVES: Budget Impact Analysis (BIA) preformed for new and expensive anti-cancer drugs should rely on precise data regarding the cost and amount of drug that would be utilized. Besides epidemiology & required doses, BIA needs to take into account the mean duration of treatment (DOT). In metastatic cancer, patients are usually treated by each line until disease progression. When reporting phase III trials, not all patients have failed treatment, and only “median time to treatment failure” is available. Therefore, BIA would rely on the median rather than the mean DOT. Five years after introducing Trastuzumab in the Israeli national formulary, we evaluated whether the original BIA based on a phase III trial, was accurate. METHODS: Clalit Health Services’ computerized database was used to determine Trastuzumab DOT in all patients that started treatment during 2000–2002. The mean & median DOT was compared to the “median time to treatment failure” (5.8 months) in a phase III trial. RESULTS: In year 2000, the median and average DOT were 6.0 months and 9.9 months, respectively (n = 132) (patients have received prior treatment with AC & T, as determined by formulary criteria). In 2001 the median and average DOT were 9.0 and 13.6 months, respectively (n = 89) (criteria were changed, and patients were only required to be pretreated with AC). In 2002, the median DOT was 11.0 months and the mean DOT was 14.4 months (n = 71). CONCLUSIONS: In “real life” patients, mean trastuzumab DOT for metastatic breast cancer was 31–65% higher than the median DOT in the same patients. Median DOT itself was up to 55% higher than reported in the phase III trial. When performing BIA for treatments of metastatic cancer, the estimation of the budget impact may be substantially higher when using the mean rather than the median value, reported in phase III clinical trials.

PRESCRIPTION MEDICATION COSTS TO PROSTATE CANCER PATIENTS: SURVEY RESPONSES COMPARED TO AN ADMINISTRATIVE REGISTER

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OBJECTIVES: Economic evaluations conducted from a societal perspective may include estimates of out-of-pocket expenses. Surveys and administrative registers offer two sources of out-of-pocket cost data for use in economic evaluations. We highlight potential problems in using questionnaires or administrative data alone. METHODS: Data are obtained by surveys and from an administrative register. Survey data include responses concerning out-of-pocket expenditure on prescription medications from men (N = 1400) who have been diagnosed as having prostate cancer prior to the 2004 survey. Register data concerning out-of-pocket expenditure on physician-prescribed medications are available for the survey population for pertinent time periods from the Finnish Social Insurance Institution. Register data and questionnaire data are linked using unique personal identification codes. Statistical comparison of these sources of estimates is performed using t-tests. RESULTS: The survey–based estimate of mean out-of-pocket expenditure on prescription medications from men (€38) and the corresponding figure from the administrative register is €255. The listwise estimate of survey–based overestimation is €38 and the difference between the two estimates of mean out-of-pocket expenses are statistically significant at the 5% level. We find that, performing imputation for unit and item non–response in the survey database and for non–inclusion in the administrative register, the survey–based estimate becomes 252€ and the register–based estimate becomes 225€—no longer a statistically significant difference. CONCLUSIONS: The problems of recall error and non–response can complicate the estimation of out–of-pocket expenditure using survey methodology. High–quality public sector administrative registers can serve the information needs of health economic evaluations. However, register–based information can also be usefully supplemented by questionnaire responses and vice versa.

THE ECONOMIC VALUE OF INNOVATIVE TREATMENTS OVER THE PRODUCT LIFE CYCLE: THE CASE OF TRASTUZUMAB

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OBJECTIVES: Most pharmacoeconomic evaluations use indication–specific models based on clinical trial data projected over a lifetime horizon for a typical patient. This study estimates the incremental cost–utility ratio (ICUR) and the aggregate economic value over the product life cycle considering multiple indications using trastuzumab (H, Herceptin®) for both metastatic (MBC)
and adjuvant (ABC) breast cancers as an example. METHODS: Estimates of the combined ICUR and the economic value to society (defined as monetized cumulative net quality-adjusted life years—QALYs—gained minus net treatment costs) created over the product life cycle are based on projections of the annual disease incidence of HER2+ ABC and MBC from launch in 1998 through patent expiry and projected ICURs in MBC and in ABC over this period. Model assumes a U.S. perspective and lifetime horizon for the CU models. All cost and outcomes are discounted at 3% to 1998. RESULTS: We project that in 2016 the volume of ABC treatment with H will be approximately 3 to 4 times that of MBC. For MBC, the estimated ICUR is $95,500 (mean gain 0.5 QALYs); for ABC, the estimate is an ICUR of $26,417 (mean gain 1.7 QALYs). Over the product life cycle, the overall ICUR is $34,400 per QALY with a total of 465,000 discounted QALYs gained. If these QALYs were valued at $50,000 or $150,000, the projected economic value of H treatment would range from $23 to $70 billion, respectively. CONCLUSIONS: Using the case of trastuzumab, we show how the addition of the ABC indication and the product life cycle approach affects the overall economic impact. The indication-specific models used typically do not account for the important interdependence of drug development and adoption decisions over the life cycle. This raises an important policy question about the meaning of the “societal perspective” for drugs with multiple indications.

**PCN60**

**ASSESSMENT OF THE COMPUTATIONAL INTELLIGENCE BASED MODELS USEFULNESS FOR PHARMACOECONOMICS NEEDS**

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OBJECTIVES: Modeling techniques are widely used in pharmacoeconomics studies. Computational intelligence (CI) is an example of modeling approach successfully applied in various areas of science and technology. The aim of the study was to assess the usefulness of CI tools in pharmacoeconomics analysis.

METHODS: Database contained 100 patients with Non-small Cell Lung Cancer (NSCLC) in IIB and IVth stage. Every patient was described by 30 features (pharmacotherapy and diagnostics path). The pharmacotherapy characteristics included chemotherapy schemes based on cisplatin or carboplatin with vinorelbine, gemcitabine, etoposide and the additive therapy. The output value had binary characteristic (35 weeks of survival as a threshold). Data Mining Software WEKA was used. Support vector classifier (SMO), naive Bayes classifier (NB), and decision trees (RandomForest, J48) were applied. The quality of models was assessed based on their generalization abilities. The 10-fold cross validation procedure was applied. RESULTS: The best results obtained for each one of above mentioned tools were as follows: SMO—80% of all positive, 70% of good positive and 86% of good negative; NB—69%, 70%, 68%; RandomForest—75%, 68%, 79%; J48—74%, 57%, 84% respectively. Using best obtained models, the in silico tests with various chemotherapy schemes were applied. Simultaneously, the cost-effectiveness studies with modeled survival were performed as the effectiveness measure of simulated in silico chemotherapeutic schemes. The results confirm the literature information about the clinical and economical efficacy of abovementioned chemotherapy schemes (i.e. no statistical significance in clinical outputs between vinorelbine—cis-platine and gemcitabine—cis-platine but the vinorelbine based scheme was more cost-effective). The experiment with in silico cytotastics dose reduction from 100% to 0 showed that BSC therapy could be the valuable alternative for palliative chemotherapy. CONCLUSIONS: Computational intelligence was found to be powerful and flexible tool allowing reliable models creation to perform in silico search for optimal therapy.

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**UTILITY ELICITATION IN PATIENTS WITH FOLLICULAR LYMPHOMA**

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OBJECTIVES: Follicular Lymphoma (FL) is the most common type of indolent Non-Hodgkin Lymphoma, making up around 22% of all cases. It has an incidence of 13–15 cases per 100,000 (Olsen JH, 2005). A literature review revealed a paucity of Quality of Life research in this area with no published utility values. The objective of this study was to collect utility values for active disease and remission health states for use in a health economic model. METHODS: Patients with follicular lymphoma (n = 222) were recruited from 8 sites around the UK. Utility scores were obtained using the EQ-5D questionnaire. Patients were analysed according to 5 health states (newly diagnosed, relapsed, partial response to treatment, full response to treatment/remission, and disease-free). These categories were grouped to form two broader health states; firstly “progression-free” which included patients experiencing partial or full response to treatment and those categorised as disease-free; and secondly “progression” which included relapsed patients. RESULTS: The results of this study show that the utility score of an individual with follicular lymphoma differs according to his or her disease state. The patients with the highest utility scores were those who had experienced a full response to treatment or who were categorised as “disease-free”. Those patients who had the lowest utility were those who were categorised as relapsed. Those patients who fell between these two groups were those who were categorised as having partially responded to treatment. CONCLUSIONS: Differences in utility were apparent between patients in the 5 health states. These differences were particularly highlighted when scores were grouped according to “progression-free” and “progression” health states.