ing will drive up the quality and efficiency of pharmacoeconomic and epidemiological database studies.

PRM51 APPLICATION OF SURVIVAL ANALYSIS TO ADULT PNEUMOCOCCAL VACCINATION DATA IN THE UNITED STATES

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OBJECTIVES: Using observational databases to calculate vaccination rate is challenging because of limited continuous enrollment and loss to follow-up. The objective of this study was to apply the concept of survival analysis in estimating rate of pneumococcal vaccination among adults with the high-risk medical conditions included in the ACIP (Advisory Committee on Immunization Practices) recommendations. METHODS: This was a retrospective cohort study using a large administrative claims database. The study cohort was 19-64 years old adults with newly diagnosed high-risk conditions (e.g., chronic lung disease, diabetes, chronic kidney disease, organ transplant, cerebral palsy, chronic liver disease and alcoholism) during 2007 to 2010 and had at least three years of continuous enrollment. Subjects were followed from the initial diagnosis date to the end of enrollment or 2013, whichever came first. The survival analysis was conducted using the Kaplan-Meier method and the log-rank test was used to test the equality of the survival functions. RESULTS: A total of 946,898 eligible subjects were followed for a total of 2,585,563 person-years, of which 71,298 subjects received pneumococcal vaccine. The overall pneumococcal vaccination rate was 3.033/100 person years (95%CI = 3.001, 3.045). Pneumococcal vaccination rate was the highest in HIV/AIDS patients (16.499/100 person years, 95%CI = (15.374, 17.683) followed by diabetics patients (6.520/100 person years, 95%CI = (4.466, 5.747)) and was the lowest in alcoholism patients (1.042/100 person years, 95%CI = (0.953, 1.137)). After controlling potential confounders, high-risk conditions had a significant association with pneumococcal vaccination. Compared to patients with alcoholism, HIV/AIDS patients had a significantly greater (e.g. 0.005 versus 0.000004767 per non-severe hypoglycemic event). This analysis examined the impact of these alternative estimates on QALY in an evaluation of canagliflozin 300mg versus sitagliptin 100mg in patients inadequately controlled on metformin (MET-SU).

PRM52 FROM PRIVATE SITES TO BIG DATA WITHOUT COMPROMISING PRIVACY: A CASE OF FREE IMAGING DATA CLASSIFICATION

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OBJECTIVE: Open-source data studies is an expensive and resource-intensive approach that does not scale well with participating sites. Critically, some data simply cannot be shared due to privacy concerns and/or risk of re-identification. We pursued distributed computation that only shares data derivatives, such as feature vectors, to large-scale datasets. METHODS: We used a combined database from four separate sites: dementia-related data collected at Johns Hopkins University (JHU), the Maryland Psychiatric Research Center (MPRC), the Institute of Psychiatry, London, UK (IOP), and the Western Psychiatric Institute and Clinic (WPIC) in Pittsburgh. These datasets were merged with the UK Biobank (UKB) data of 500,000 participants and the outcome rate of the trial determined the EQRR (r-square) 0.87 and the MMRR (r-square) 0.81. CONCLUSIONS: Clinically significant risk heterogeneity is common even in phase 3 “efficacy" trials. The typical patient is generally at lower risk than reflected by the trial summary results. A risk stratified approach to trial analysis is feasible and may be most clinically informative where the outcome is predictable and uncommon.

PRM54 RISK HETEROGENEITY IN CLINICAL TRIALS: AN EVALUATION OF 25 LARGE CLINICAL TRIALS USING INDIVIDUAL PATIENT DATA

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OBJECTIVES: Risk of the outcome is a mathematical determinant of the absolute treatment benefit of an intervention. While substantial risk heterogeneity can lead to clinically important differences in treatment effect, the degree to which risk varies within an intervention is largely unreported. The current work evaluated all RCTs that had greater than ~1000 enrollees and clinical outcomes from several sources (NHBLI, NIDDK, Trials journal). We derived Cox or logistic regression models using pooled baseline data for each treatment arm. Risk heterogeneity was evaluated using the extreme quartile ratio (EQRR, the ratio of outcome rates in the lowest risk quartile to that in the highest). Skewness was evaluated with median to mean risk ratio (MMRR, the ratio of risk in the median risk in the patient to the average risk). RESULTS: We described 24 of 34 interventions from 25 heterogeneous large trials. Overall event rates across studies ranged from 5% to 63% (median=15%, interquartile range [IQR] 10% to 23%). The number of established risk factors included in each risk model ranged from 4 to 32 (median, IQR 9 to 11); events per variable ranged from 13 to 1515 (median=46, IQR 32 to 66). Models had estimated C-statistics of 0.50 to 0.81 (median 0.69, IQR 0.65 to 0.73) EQRR ranged from 1.8 to 21.6 (median=4.1, IQR 3.0 to 5.5). The MMRR ranged from 0.5 to 1.0 (median=0.87, IQR 0.80 to 0.90). CONCLUSIONS: The model C-statistics and the outcome rate of the trial determined the EQRR (r-square) 0.87 and the MMRR (r-square) 0.81. CONCLUSIONS: Clinically significant risk heterogeneity is common even in phase 3 “efficacy" trials. The typical patient is generally at lower risk than reflected by the trial summary results. Risk stratified approach to trial analysis is feasible and may be most clinically informative where the outcome is predictable and uncommon.

PRM55 DEALING WITH COMPETING RISKS IN DIABETES MELLITUS: COMPARISON OF RESULTS FROM USING A MARKOV VERSUS A MICRO-MARKOV SIMULATION MODEL

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OBJECTIVES: To present an efficient new methodology to calculate cost and effects of alternative interventions for Diabetes mellitus (DM), and to validate this approach with a well-known cost-effectiveness model. METHODS: We simulated this model by Markov model (DELA) or by a well-known Micro-Markov model (CARDIFF). RESULTS: The Markov model (DELA) deals with multiple competing events; complications are modeled as individual Markov chains. By creating a dynamic link between the life table and the subdiseases, any change in the individual Markov chains is propagated throughout the entire model. Advantage of this approach is a considerably decrease in computational time. In order to test the validity of the DELA model and its applicability in modeling interventions and treatment sequences in T2DM, cost-effectiveness results were compared with published outcomes predicted by the CARDIFF model. Similar treatment sequences were applied as well as identical key data sources for predicting the occurrence of diabetes related events (equations UKPD Outcomes model), quality of life effects attached to BMI changes and hypoglycemia, and inputs related to drug- and health care costs. RESULTS: Incremental life years gained (LYG), discounted incremental costs, incremental QALYs and ICUR in the Cardiff and DELA models are 0.50 LYQ, £1,246, 0.46 QLY, £6,271/QALY, and 0.031 LYQ, £1,021, 0.555 QALY, £1,841/QALY, respectively. Differences between model outcomes may be explained by the underlying independency assumptions of the DELA model. CONCLUSIONS: The point estimates obtained by both models using similar scenarios seem to resonate quite well. However, further research is needed to substantiate the observed differences in outcomes. Additional information can be provide by comparing the cost-effectiveness results in other situations. We will still be incorporated shortly. It seems the DELA approach offers a flexible way to model multiple diseases simultaneously. The loss of subtility and necessary assumptions may outweigh the gains in clarity and computational speed.

PRM56 OPTIMAL INFORMATION ACQUISITION POLICIES: APPLICATION TO HEPATITIS C TREATMENT

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OBJECTIVES: To apply the framework of the optimal information acquisition policy (OIMP) to the partially observable Markov decision process (POMDP) formulation of therapy selection for hepatitis C. METHODS: We model the expected discounted incremental cost of acquiring an additional piece of information on the patient’s disease and payoffs of choosing different treatment sequences to be functions of the probability distribution of the patient’s disease state. RESULTS: The OIMP offers a flexible framework for modeling how well a decision maker can adapt to new information in the context of a partially observable MDP. The optimal information acquisition policy may outweigh the gains in clarity and computational speed.
OBJECTIVES: CDC guidelines recommend hepatitis C virus (HCV) screening for the awareness of HCV-positive status and the fifteen-stage distribution at age-specific screening is less cost-effective in later cohorts. To inform the optimal time to discontinue screening, collecting additional information may be valuable, though when this information should be collected is unclear. METHODS: We applied a Markov decision process framework to evaluate how long to continue HCV screening in US men. We identify the optimal information collection policy for two parameters assumed constant across cohorts - reductions in quality-of-life from awareness of HCV-positive status and the fifteen-stage distribution at screen-detected diagnosis at age 50 - alone and in combination with information collection about HCV prevalence which is decreasing across cohorts. We estimate lifetime costs and benefits using a previously-developed HCV screening model and HCV prevalence dynamics derived from NHANES. The assumption made of a $75,000 per QALY. RESULTS: The percentage of a parameter which varies across cohorts influences the per-person value-of-information about both time-maintained screening and type of transplant (autologous or allogeneic), and prior transplant history. Descriptive statistics and logistic regression analyses were performed to assess the effect of these variables on each of the four outcomes: GVHD, liver toxicity, neurotoxicity, and mortality. Concluding this study, collect information on HCV prevalence 3 to 20 years in the future. This strategy increases the expected incremental net monetary benefit by $2.3 million compared to a strategy of collecting information about both immediately and then, depending on the result of that study, collect information on HCV prevalence 3 and 20 years in the future. The re-created model accurately predicted CHF recurrence. The DES modeling approach is well-suited to model-objects: Vaccination coverage rate is usually obtained from the decision of an immunization policy. Actual impacts to the outcomes by different vaccinated recipients selection and their coverage rates were seldom discussed. This study aims to use a transmission dynamic model (TDM) based on a system of differential equations in susceptible-infectious-recovered model to optimally explore the estimates of coverage rates. METHODS: 23-valent pneumococcal polysaccharide vaccines (PPV23) and 13-valent pneumococcal conjugate vaccines (PCV13) have been shown their cost-effectiveness in elderly and children, respectively. Results: The c-statistics for each model were: GVHD (0.87), liver toxicity (0.74), neurotoxicity (0.75), and mortality (0.72). CONCLUSIONS: The logistic regression models were used in determining the outcomes of GVHD, liver toxicity, neurotoxicity, and mortality, among a cohort of patients undergoing hematopoietic stem cell transplantation.

PMF59
HEMATOPOIETIC STEM CELL TRANSPLANTATION OUTCOMES: LOGISTIC REgression model development
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OBJECTIVES: The objective was to determine the most effective logistic regression models in terms of explaining the greatest amount of variance regarding four outcomes: graft versus host disease (GVHD), liver toxicity, neurotoxicity, and mortality, among a cohort of patients undergoing hematopoietic stem cell transplantation. METHODS: Busulfan is used in combination with fludarabine or clofarabine as part of an effective chemotherapy based myeloablative preparative regimen for patients undergoing HSCT. Pharmacokinetic data regarding patient busulfan clearance was used in the analysis, since dosing is very sensitive. Other clinically relevant covariates included: age, gender, race, primary cancer type and the type of transplant (autologous or allogeneic), and prior transplant history. Descriptive statistics and logistic regression analyses were performed to assess the effect of these variables on each of the four outcomes: GVHD, liver toxicity, neurotoxicity, and mortality. Hosmer and Lemeshow goodness-of-fit tests and c-statistics were used to optimize the models. Only aggregate level information was reported. Statistical significance was set at a 0.05. RESULTS: Data on a cohort of 752 patients undergoing hematopoietic stem cell transplantation were collected.

PMF60
THE ESTIMATION OF VACCINATION COVERAGE RATE USING TRANSMISSION DYNAMIC MODEL: A EXAMPLE OF PNEUMOCOCCUS VACCINES
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OBJECTIVES: Vaccination coverage rate is usually obtained from the decision of an immunization policy. Actual impacts to the outcomes by different vaccinated recipients selection and their coverage rates were seldom discussed. This study aims to use a transmission dynamic model (TDM) based on a system of differential equations in susceptible-infectious-recovered model to optimally explore the estimates of coverage rates. METHODS: 23-valent pneumococcal polysaccharide vaccines (PPV23) and 13-valent pneumococcal conjugate vaccines (PCV13) have been shown their cost-effectiveness in elderly and children, respectively. Results: The c-statistics for each model were: GVHD (0.87), liver toxicity (0.74), neurotoxicity (0.75), and mortality (0.72). CONCLUSIONS: The logistic regression models were used in determining the outcomes of GVHD, liver toxicity, neurotoxicity, and mortality, among a cohort of patients undergoing hematopoietic stem cell transplantation. This will provide value-based information of vaccination policy in the decision of vaccine quantity and recipients.