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

PRM51 APPLICATION OF SURVIVAL ANALYSIS TO ADULT PNEUMOCOCCAL VACCINATION 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 a minimum of 6 months preceding the study period. RESULTS: Of these, 20% had a history of pneumococcal vaccination. Significant associations were found between high-risk conditions and pneumococcal vaccination rates. CONCLUSIONS: This study found that survival analysis can be used to estimate vaccination rates in high-risk populations.

PRM52 FROM PRIVATE SITES TO BIG DATA WITHOUT COMPROMISING PRIVACY: A CASE OF PREDICTION USING AGGREGATED DATA CLASSIFICATION

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OBJECTIVES: Privacy is an economic and resource-wasteful approach that does not scale well with participating sites. Criticality, 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 statistical summaries, as a notable alternative allowing data holders to maintain control over data access. Privacy protection, if implemented via the differential privacy framework, can quantify and controllably reduce the risk of sharing the results of computations on private data. Unfortunately, it can impair the quality of statistical estimates at a single site. Using structural MDR data we present a distributed differentially private classifier that greatly improves the accuracy. METHODS: We used a combined data set from four separate schizophrenia studies conducted 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). RESULTS: With the combined MRI dataset from four separate schizophrenia studies conducted 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), the sample comprised 198 schizophrenia patients and 191 matched healthy controls. We trained differentially private classifiers on these data using a method that minimizes a perturbed version of the SVM classifier. A combined 50% vs plus logistic regression classifier was tested for accuracy. RESULTS: Using 100 random splits of data into 70% training and 30% validation groups followed by splitting the training set into 11 sets of 24/5 subjects each, we assessed classification accuracy at each site and of combination per split. Average site-accuracy was below 78%, while our combined classifier averaged to 96%: substantial and significant improvement with Bonferroni-corrected p-values below 1.8e-33. CONCLUSIONS: Our approach provides a way to enable use of distributed big data while still providing privacy and thus a much larger effective sample size.

RESEARCH ON METHODS — Modeling Methods

PRM53 THE IMPACT OF ALTERNATIVE ESTIMATES OF DISULITITIES ASSOCIATED WITH HYPOGLYCEMIA ON NET QALYS: CANAGLIFLOZIN VERSUS SITAGLIPTIN AS ADD-ON THERAPY IN INDIVIDUALS WITH TYPE 2 DIABETES MELLITUS (T2DM) INADEQUATELY CONTROLLED ON A BACKGROUND OF METFORMIN (MET) PLUS SUFLONYLUREA IN THE CANADIAN T2DOUTCOME STUDY

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OBJECTIVES: Differences in the frequency and severity of hypoglycemic episodes associated with alternative treatments often contribute significantly to differences in QALYs (the denominator of the cost-effectiveness ratio). The 2013 T2DM CADTH report on sitagliptin and canagliflozin therapy used disutility values from studies conducted before 2009 based on small samples. A new study with over 1,600 individuals with T2DM (including Canadian respondents) found disutility estimates that were meaningfully greater (e.g. 0.005 vs 0.0000476 per non-severe hypoglycemic event). This analysis examined the impact of these alternative estimates on QALYs in an evaluation of canagliflozin 300mg versus sitagliptin 100mg in patients inadequately controlled on metformin (MET) plus sulfonylurea. RESULTS: The mean QALYs (the denominator of the cost-effectiveness ratio) were calculated for an intermediate and high-risk population model (using combined estimates) in the Canadian T2DOUTCOME study. We used the independent Waltham model (IWald) to estimate baseline disutility effects in diabetes mellitus subjects. The impact of canagliflozin therapy was investigated in the two population models. CONCLUSIONS: The mean QALYs were similar in both population models. The higher disutility estimates associated with canagliflozin versus sitagliptin were largely attributable to the delay in the need for insulin in canagliflozin-treated patients. The contribution of hypoglycemic events to these total QALY differences was greater in scenario A versus scenario B. The latter scenario (B) is likely to be more relevant. Risk stratification was accordingly needed to carefully consider downstream assumptions in economic evaluations. Using the older disutility values yielded 20% fewer net QALYs, implying that the corresponding ICER would be approximately 25% greater.

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 clinical trials is largely determined by the selection of the trial participants. In this study, we examined the risk heterogeneity across three large trials. METHODS: Using the older disutility values from studies conducted before 2009 based on small samples. A new study with over 1,600 individuals with T2DM (including Canadian respondents) found disutility estimates that were meaningfully greater (e.g. 0.005 vs 0.0000476 per non-severe hypoglycemic event). This analysis examined the impact of these alternative estimates on QALYs in an evaluation of canagliflozin 300mg versus sitagliptin 100mg in patients inadequately controlled on metformin (MET) plus sulfonylurea in the Canadian T2DOUTCOME study. We used the independent Waltham model (IWald) to estimate baseline disutility effects in diabetes mellitus subjects. The impact of canagliflozin therapy was investigated in the two population models. CONCLUSIONS: The mean QALYs were similar in both population models. The higher disutility estimates associated with canagliflozin versus sitagliptin were largely attributable to the delay in the need for insulin in canagliflozin-treated patients. The contribution of hypoglycemic events to these total QALY differences was greater in scenario A versus scenario B. The latter scenario (B) is likely to be more relevant. Risk stratification was accordingly needed to carefully consider downstream assumptions in economic evaluations. Using the older disutility values yielded 20% fewer net QALYs, implying that the corresponding ICER would be approximately 25% greater.

PRM55 DEALING WITH COMPETING RISKS IN DIABETES MELLITUS: COMPARISONS OF RESULTS FROM A MARKOV VS A MICRO-MARKOV SIMULATION MODEL: A SYSTEMATIC REVIEW AND META-ANALYSIS

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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 by comparing the cost-effectiveness results predicted by a Markov model using published outcomes predicted by a well-known Micro-Markov model (CARDIFF). METHODS: The Markov model (DELTA) 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 chain is propagated throughout the entire model. Advantage of this approach is a considerable decrease in computational time. In order to test the validity of the DELTA 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 incidence of diabetes related events (equations UKPDS 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 ICER in the CARDIFF and DELTA models are 0.051 LYG, £1,246.57, 0.467 QALY, £2,671/QALY, and 0.031 LYG, £1,021, 0.555 QALY, £1,841/QALY, respectively. Differences between model outcomes may be explained by underlying independency assumptions of the DELTA 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 insight can be provided by extending the modeling approaches. REMARKS: Combination of the two models will still be incorporated shortly. It seems the DELTA approach offers a flexible way to model multiple diseases simultaneously. The loss of subitivity and necessary assumptions may outweigh the gains in clarity and computational speed.

PRM56 OPTIMAL INFORMATION ACQUISITION POLICIES: APPLICATION TO HEPATITIS C TREATMENT SELECTION

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OBJECTIVES: The DELTA model incorporates a flexible way to model multiple diseases simultaneously. The loss of subitivity and necessary assumptions may outweigh the gains in clarity and computational speed.