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POS304
COST-EFFECTIVENESS MODELLING STRUCTURES FOR CHRONIC RHINOSINUSITIS WITH NASAL POLYPS - A SYSTEMATIC LITERATURE REVIEW
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Objectives: To conduct a systematic literature review (SLR) of published model structures assessing the cost-effectiveness of treatments for chronic rhinosinusitis with nasal polyps (CRSwNP). Methods: EMBASE, MEDLINE, and Cochrane Database of Systematic Reviews were searched through April 2021. Relevant conference proceedings and HTA guidance was identified from January 2015 to April 2021. The SLR followed PRISMA guidelines. Results: 8 unique cost-effectiveness models were identified, and all had surgery as a comparator. Model structures included a Markov model, a decision-analytic model (1), or a comparison of both (6). The most common model compared 2 surgical approaches: endoscopic sinus surgery (ESS) and endoscopic polyectomy in clinic (EPIC). Health states included post-operative adverse events, symptom relief, and death. The 1 decision-analytic model compared polyectomy to intranasal budesonide. Of the 6 mixed-model structures, 1 compared ESS to EPIC. In the post-surgery space, there were 3 health states: healthy with no revision, symptomatic requiring revision surgery, and death. 4 models, all from the same author group, started with a decision tree for initial treatment and then used a Markov model to assess progression through post-treatment health states. 1 compared ESS to duplextopy and the other compared ESS to other medical treatments. The final model compared ESS to exhalation delivery system with fluticasone. It was described as a Markov decision tree model but did not define health states within the available health states. Overall, use of comparative efficacy data and robust methodology were lacking in these models. Funding: GSX [214518]

POS305
A SYSTEMATIC COMPARISON OF THE META-ANALYSIS SOFTWARE LANDSCAPE AND VALIDATION OF METAXTACT FOR META-ANALYSIS OF SPARSE OUTCOMES
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Objectives: While meta-analysis has become a prominent cornerstone of scientific medicine in the domain of therapeutics, there is no consensus on which software has the state-of-the-art features to be used for health technology assessment submissions with high degree of methodological comprehensiveness, flexibility, and usability. Furthermore, no systematic evaluation of meta-analysis software has been conducted since 2007 and since then, the meta-analysis software landscape has changed dramatically. The Objectives of this study were to systematically compare features, flexibility, and usability of MetaXTact, RevMan 5.0, Comprehensive Meta-analysis Software, STATA, and R and to validate MetaXTact outputs against other meta-analysis software platforms. Methods: A list of comparison criteria for features and usability of software was developed using a comprehensive user-tested software landscape meta-analysis software platforms. The list of criteria was modified and adapted via a consensus session with meta-analysis experts from the disciplines of health economics and biostatistics. Three investigators compared the features of each software and validated their findings for basic characteristics (e.g., comparing software platforms). Furthermore, a previously published meta-analysis from Nissen 2007 was used as a test case to generate and compare Results: Findings from the analysis were used to validate MetaXTact outputs and compare the usability and flexibility of each software. Conclusions: MetaXTact have the most advanced features for analysis settings, methodological methods, graphical output, and sensitivity analysis capabilities. Each software can produce validated and publication-ready results; the results of the test case agreed irrespective of software choice. MetaXTact is the only point and click software with the capability to conduct exact analyses; researchers may want to consider using a software platform which can accommodate exact inference in the case of rare events.

POS306
RECOMMENDED APPROACHES FOR ANALYZING CLINICAL OUTCOMES ASSESSMENT DATA FROM ONCOLOGY TRIALS FOR DIFFERENT STAKEHOLDERS
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Objectives: When making decisions about evaluation, approval, reimbursement, and use of oncology treatments, various stakeholders such as health technology assessment agencies, payers, oncologists, and medical journal editors have different questions that must be answered to determine the efficacy of treatments. Each stakeholder requires different evidence that is informed by different approaches to clinical outcomes assessment (COA) measurement and analysis. Methods: A review was undertaken in September 2020 to identify recommended COA analytic strategies in stakeholder guidance documents. Strategies were compared between stakeholders to provide an ‘evidence reference guide’ for the comprehensive analysis of COA data in oncology clinical trials. Results: Three important considerations in the selection, application, and analysis of COAs were identified in the guidance documents. First, implementation and analysis of COA-based endpoints should be done in the context of a decision-framework. Second, study protocols should consider COA data as central to determining efficacy and/or safety of treatments. COA-based endpoints will not be used to inform regulator and payer decision-making without pre-specification, alpha-control, and appropriate positive direction. Endpoints need to be supplemented with descriptive analyses and sensitivity analyses to provide data on group- and individual-level treatment response. An easy reference guide has been developed including evidence that is required for regulators, payers, and “others,” such as MAIEs, sponsors, clinicians, or patients to structure analysis plans and analytic methods for COAs, to help meet the needs of multiple stakeholders. Conclusions: The reference guide will supplement current recommendations from the SISAQOL Consortium by specifying different analytic approaches for various stakeholders.

POS308
A COMPARISON OF STC AND MAIC UNDER MISspecification OF THE TREATMENT EFFECT AND EFFECT-MODIFIER RELATIONSHIP
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Introduction: Recent simulations comparing the accuracy of simulated treatment comparisons (STC) and matching adjusted indirect comparisons (MAICs) to adjust for imbalances in effect modifiers (EMs) have revealed deficiencies in MAICs when matching on continuous covariates. However, the extent of bias with STC from misspecification was also assessed, assuming B and C have equal efficacy. Results: Findings from the analysis are consistent with previous simulations and offer important guidance for how MAIC may offer an advantage, however, when the form of effect misspecification is missspecified (e.g., adjusting for age groups when EM is a linear function of age) since the EM-outcome relationship is not modeled explicitly. We examined the simulations in a simulation framework. Methods: Simulations considered 2 continuous EMs and a dichotomous outcome to compare treatments B and C, anchored to A. Data are generated assuming the relationship between EMs and the log-odds ratios (LORs) for B vs. A and C vs. A is either linear or a step-function. STC and MAIC were performed adjusting for EMs as continuous and setting the LOR changes as a step-function, and as dichotomous when LOR changes linearly. Performance under correct specification was also assessed, assuming B and C have equal efficacy, but varied distribution of EMs in the trials. Average LORs (aLORs) for C vs. B across replications are used to assess accuracy. Results: When correctly specified, the absolute bias was small but relatively larger with MAIC when EM was continuous (aLOR: 0.06 vs. 0.02). MAIC was more accurate with categorical EMs (0.003 vs. 0.02). Under misspecification, STC and MAIC were similarly biased (0.09 vs. 0.08) when the EMs are incorrectly matched as dichotomous, while larger biases were observed with STC when EMs were incorrectly matched as continuous (0.22 vs. 0.03). Conclusion: As shown previously, MAICs appear deficient with continuous EMs even under correct specification but are relatively more robust to misspecification. Findings highlight the importance of understanding the presence and shape of effect modification to avoid bias with STC from misspecification.

POS310
ARTIFICIAL INTELLIGENCE APPLIED ON ADMINISTRATIVE BIG DATA TO PREDICT THE SEVERITY OF SARS-COV-2 INFECTION
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Introduction: Artificial intelligence (AI) has shown great promise in healthcare, particularly in the management of infectious diseases. The advent of big data collection has further accelerated the development of AI applications. Methods: This study aimed to evaluate the potential of AI in predicting the severity of SARS-COV-2 infection using administrative big data. Results: The model achieved high accuracy in predicting hospitalization, ICU admission, and mortality. Conclusions: AI can be a valuable tool in predicting the severity of SARS-COV-2 infection, potentially improving patient outcomes and resource allocation.
POTA311 SURROGATE OUTCOMES FOR OVERALL SURVIVAL IN PRETREATED NON-SMALL CELL LUNG CANCER: EXPANDING THE PREDICTION RANGE

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Objectives: For many emerging cancer treatments, establishing efficacy by direct observation of overall survival (OS) is considered unethical or impractical, and progression-free survival (PFS) is used as a surrogate endpoint for OS. Though many studies have explored PFS as a surrogate for long-term outcomes, the prognostic factors such as treatment switching or imbalance in subsequent therapies have also been analyzed, to our knowledge no studies have focused on approaches to extrapolating the association when the hazard ratio (HR) for PFS is lower than the range observed in existing trial-level Results: This work explored approaches to expanding the potential prediction range for the association between PFS and OS in pretreated non-small cell lung cancer (NSCLC).

Methods: Randomised trials in pretreated NSCLC (with or without activating alterations) were identified via systematic searches; trials with treatment switching or imbalance in subsequent therapy were excluded. HRs were then calculated in the trials ranged from 0.48-1.13 for PFS and 0.73-1.14 for OS. To expand the range of HRs, additional data from subgroups in which greater efficacy was observed were included. The association between the HRs for PFS and OS was explored by bivariate meta-regression and models with Wishart prior and product normal formulation (PNF).

Results: Including subgroup data extended the HR range to 0.20-2.87 for PFS and 0.42-2.03 for OS. Bivariate models and models with Wishart prior were more influenced by subgroup data and estimated larger treatment effects for OS for a given effect on PFS than PNF models. Slopes for models including subgroup data (i.e. the change in ln(HR) for OS per unit change in ln(HR) for PFS) were 0.333, 0.342, and 0.236, respectively.

Conclusions: Inclusion of subgroup data may allow prediction of OS over a wider range of PFS HRs and PNF models may provide a conservative estimate of the association.

POTA312 EXPLORING HEALTH RELATED FACTORS INDICATING SUSCEPTIBILITY TO COVID19

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Objectives: The objective of this paper is to explore the possible health related causes of behind the cases and deaths due to Covid 19. Our data pertain to the 3135 cases and 353 deaths due to Covid 19 in Manchester, UK and University of Wisconsin Population Health Institute data on the county level health, healthcare, health outcomes and lifestyle factors affecting Covid19 cases and deaths. We have used New York Times Covid data from January 2020 through May 2021 and University of Wisconsin Population Health Institute data on the county level health, healthcare, health outcomes and lifestyle factors affecting Covid19 cases and deaths.

Methods: The proposed methodology is a new planning tool as it can provide a clear rigorous road map for each R&D stage from the outset. In addition to often misleading net present value estimations, this approach allows numerical simulation of various project shocks and risk parameters. The proposed methodology might be helpful to improve the R&D productivity.

POTA313 NEW COMPOUND REAL OPTION APPROACH FOR MANAGEMENT OF PHARMACEUTICAL R&D PROJECTS TO TARGET PRODUCT QUALITY

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Objectives: To develop a new planning and evaluation methodology based on barrier compound real option approach for pharmaceutical R&D management to (i) target product quality, (ii) evaluate conditional values and risks of each R&D stage, (iii) to incorporate multiple technological and commercial shocks. Methods: A new real option multiple stage Lévy process methodology is developed for advanced evaluation of R&D projects. The methodology is illustrated with numerical estimations of expected losses, risks, and the net present value of a known 6-stage pharmaceutical R&D project to demonstrate that this methodology provides a rigorous road map for realistic R&D management with product relative efficacy thresholds. The project’s value and risk money evolution can be numerically estimated for various project parameters, which were often omitted in the literature on real options. Results: The dynamics of the net present value and expected losses is estimated in the relationship with the underlying product relative efficacy process for six R&D stages. The estimated dynamics allows more flexible decision making based on multiple realistic criteria, which can be taken into consideration in advance of actual cost commitments. Conclusions: The proposed methodology is a new planning tool as it can provide a clear rigorous road map for each R&D stage from the outset. In addition to often misleading net present value estimations, this approach allows numerical simulation of various project shocks and risk parameters. The proposed methodology might be helpful to improve the R&D productivity.

POTA314 PREDICTING OUTCOMES IN MULTIPLE SCLEROSIS THROUGH MACHINE LEARNING USING DATA FROM PHARMACEUTICAL CONSULTATION

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Objectives: Pharmaceutical consultation (PC) is part of the clinical pathway of all Multiple Sclerosis (MS) patients in our hospital and generates structured data. We propose a new method to systematically analyze PC data and predict relevant outcomes using machine learning (ML) algorithms. Methods: Data of patients between 2019 and 2021, which was collected from PC database. The selected features were drug, disease type, gender, age, days of treatment, Expanded Disability Status Scale (EDSS), number of previous relapses and annual relapse rate (ARR). This data was loaded and analyzed using VSCode (Microsoft) on an environment running python 3.8.8 and Jupyter Notebook kernel. Data was analyzed and visualized. The selected outcome to predict was ARR. Data was split in train and test subsamples (ratio 0.3). Models were compared using cross-validation (CV) 10 folds. Selected metrics for model comparison were Mean Absolute Error (MAE), Root Mean Squared Error (RMSE) and R², both for train and test subsamples. The best performing model was selected and hyper-parameters were tuned to minimize overfitting, using a GridSearch Method. The final model was then put into production and available through a web-based interface using Streamlit. Results: The study included 103 patients, 75.3% were female, mean age of 42 (19-66) and a median EDSS of 1.5. Of all the compared models, XGBoost was the better performing model. To minimize overfitting learning rate was changed to 0.05, max_depth to 3, min_child_weight to 1 and 500 estimators were used. Most important feature was the number of previous relapses (magnitude 0.3). The final model has a MAE of 0.06, a RMSE 0.01 and R² of 0.9. Despite the small dimension of the dataset, it is possible to use machine learning algorithms to predict relevant outcomes with good performance and adequate fit. The use of this model will allow for tailored clinical intervention and better decision support.