and 0.0032 for obese men. But a lower risk of death for both diabetics than non-diabetics and increased with age and BMI. CONCLUSIONS: Our results showed that women had a higher risk of diabetes but a lower risk of death for both diabetics and non-diabetics than men. Moreover, both risks increased with BMI and age. This joint estimation of the transition probability of the Markov model overcome the problem of negative probabilities resulting from separate estimations.

PRM56  
**TREE-BASED CLAIMS ALGORITHM FOR MEASURING PRE-TREATMENT QUALITY OF CARE IN MEDICARE DISABLED HEPATITIS C PATIENTS**  
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OBJECTIVES: To develop quality of care (QC) metrics using claims data in hepatitis C (HCV) Medicare patients with disability, a vulnerable population facing high barriers to access barriers and representing the majority of HCV patients in Medicare, and quantify metrics’ correlation with treatment receipt. METHODS: We adapted 14 Veterans Affairs-developed quality metrics (QMs) for measurement in a cohort of 1,936 disabled HCV patients (2006-2009) with 6 months continuous Medicare parts A, B, D enrolment before diagnosis and no previous treatment. Based on the machine-learning principle of recursive partitioning, the proposed algorithm implements a random forest model of conditional inference trees, identifies the forest’s representative tree, and aggregates its terminal nodes into QC patient groups. We linked county-level data from the Area Health Resource Files, we compared contextual characteristics across QC groups. RESULTS: On average, 10.4% received peg-aspartate monomethionine (Peg-Asp, the least cost-effective drug) vs 8.7% Peg-Interferon (Peg-IFN, moderate cost-effective) vs 6.0% Interferon (IFN, the most expensive). The “HCV genotype testing”, “visit to specialist”, “confirmation of HCV viremia”, and “iron overload testing”. High QC (n=360; treated=33.3%) was defined for patients who had at least 2 from the above-mentioned metrics. Good QC patients (n=302; treated=12.3%) had either “HCV genotype testing” or “visit to specialist”, while fair QC patients (n=282; treated=7.1%) only had “confirmation of viremia”. Patients in low QC group (n=1,292; treated=4.1%) lacked expanded treatment modeling paradigm by allowing a sequence of therapies (two lines of biologic therapies followed by standard of care). A short-term decision tree allows for a clinical determination of PASI response at 12 or 16 weeks post-initiation of therapy. Within the initial 12 or 16 week treatment period, we model the change in PASI levels over time to better reflect quality of life for patients on treatments with better speed of response. Following the decision tree, patients enter a semi-Markov (semi-Markov due to time dependent death probabilities) to estimate long-term costs and outcomes. As new drugs allow some patients to achieve complete psoriasis clearance, we included a PASI 100 health state. Finally, we model disabilities related to severe adverse events to distinguish drugs with better safety profiles. CONCLUSIONS: This new framework will help decision makers by better differentiating potential treatments and determining the optimum order of biologic therapies in the psoriasis treatment pathway.

PRM57  
**COST-EFFECTIVENESS EVALUATION OF GENOTYPE-GUIDED ANTIPATELET THERAPY VERSUS UNIVERSAL NEW ANTIPATELET THERAPY IN PATIENTS WITH ACUTE CORONARY SYNDROME**  
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OBJECTIVES: Polymorphism of CYP2C19 affects metabolism and drug response of clopidogrel. New antipatelet drugs such as prasugrel and ticagrelor are not affected by CYP2C19 polymorphism. CYP2C19 genetic testing could guide the selection of clopidogrel (second-line agent) vs prasugrel/ticagrelor (first-line agent) in cost-effectiveness analyses of universal prasugrel or ticagrelor treatment versus genotype-guided therapy for patients with acute coronary syndrome (ACS) and planning personalized and optimal therapy interventions. CONCLUSIONS: Higher quality of care correlated with higher treatment rates. Limited healthcare access among Medicare disabled patients with HCV was not associated with lower quality. Future research is needed to assess pre-treatment QM with newer HCV therapies.

PRM58  
**REAL-WORLD DATA UTILITY FOR HEALTH ECONOMIC MODELING: AN ASSESSMENT OF CURRENT DATA SOURCES**  
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OBJECTIVES: Real-world costs averaged from 2009-2013 were used to build a reliable, accurate, electronic clinical data sources. With the availability of various real-world data sets, the objective of this study was to examine several real-world data sets and rate their overall utility for use in health economic models in the United States. METHODS: Real-world data was obtained and assessed in the automated electronic medical record (EMR) dataset, 11 state-level all payer claims databases (APCDs) and data from the Healthcare Cost and Utilization Project (HCUP). Factors assessed included: coverage of national and regional populations, inclusion of various sites of care, free/public access, and availability of longitudinal patient-level data on utilization and outcomes. Each factor was rated by three independent reviewers on a scale from 1 to 5, with 1 being limited use in economic modeling and 5 being highly useful for health economic modeling. Ratings were summed for each review and averaged to produce a score out of 20 possible points. RESULTS: Of the 14 real-world data sets assessed for utility in health economic modeling, claims data rated highest (15 out of 20) due to the availability of patient-level data from multiple sites of care but lacked a link between utilization and patient outcomes. Despite the availability of patient outcomes associated with utilization with EMR data, the data set was rated the lowest (1 out of 20) due to the lack of nationally representative data and proprietary access. CONCLUSIONS: Of the currently available real-world data sets, claims data was viewed as most useful for health economic models because they include patient-level utilization data from multiple sites of care. Data mined from EMR represents a significant opportunity to better measure care utilization, but currently available EMR data lacks national representation and is expensive to obtain.

PRM59  
**A NEW COST-EFFECTIVENESS FRAMEWORK FOR MODELING PSORIASIS TREATMENTS**  
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OBJECTIVES: As more psoriasis treatments come to market in both new and existing drug classes, health care payers will need assistance in determining the most cost-effective regimen or sequence of regimens to control budgets. We sought to devise a cost-effectiveness modeling structure that will aid in decision making by highlighting differentiating factors between drugs and meet the changing needs of payers. METHODS: A systematic literature review was conducted to identify preclinical and clinical data for new psoriasis treatments (2001-2015) and to verify differences in quality of life (QoL), psoriasis Area Severity Index (PASI) response, and costs. We developed a model structure expanded treatment modeling paradigm by allowing a sequence of therapies (2 lines of biologic therapies followed by standard of care). A short-term decision tree allows for a clinical determination of PASI response at 12 or 16 weeks post-initiation of therapy. Within the initial 12 or 16 week treatment period, we model the change in PASI levels over time to better reflect quality of life for patients on treatments with better speed of response. Following the decision tree, patients enter a semi-Markov (semi-Markov due to time dependent death probabilities) to estimate long-term costs and outcomes. As new drugs allow some patients to achieve complete psoriasis clearance, we included a PASI 100 health state. Finally, we model disabilities related to severe adverse events to distinguish drugs with better safety profiles. CONCLUSIONS: This new framework will help decision makers by better differentiating potential treatments and determining the optimum order of biologic therapies in the psoriasis treatment pathway.

PRM60  
**NATIONAL BURDEN OF HOSPITALIZATIONS FOR NECROTIZING ENTEROCOLITIS**  
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University of Southern California, Los Angeles, CA, USA  
OBJECTIVES: To calculate national estimates of Necrotizing Enterocolitis (NEC)-related hospitalization and associated use of health care resources to explore the effectiveness of cost-effectiveness health economic models. We evaluated quality of life, quality-adjusted life-year (QALY), and cost-effectiveness analyses of universal prasugrel or ticagrelor treatment versus genotype-guided therapy for patients with acute coronary syndrome (ACS) and planning personalized and optimal therapy interventions. CONCLUSIONS: Higher quality of care correlated with higher treatment rates. Limited healthcare access among Medicare disabled patients with HCV was not associated with lower quality. Future research is needed to assess pre-treatment QM with newer HCV therapies.

PRM61  
**REDUCTION OF INFLUENZA DISEASE COST WITH SUBOPTIMAL VACCINATION**  
Bailey N, Wilson A, Li Y  
University of Murray, UT, USA  
OBJECTIVES: The burden of disease due to seasonal influenza in the United States (US) remains high, despite vaccination efforts. In 2003 it was estimated that the annual cost due to influenza was $10 billion. As vaccination rates have plateaued in the US, recent studies have estimated that the current cost to US society due to influenza is at least $87.1 billion. Although the seasonal influenza vaccination is not always a con- summate match, we suggest that the burden of disease is still greatly reduced even when vaccine matching to circulating strain is suboptimal. This study aims to estimate the reduced cost burden associated with the seasonal influenza vaccine, even in seasons of suboptimal match, by comparing historic published trends to large claims data. METHODS: Previously published data were compared to sea- sonal influenza records, queried from a claims database containing over 55 million unique patients. Regression modeling was used to compare cost burden of persons
unvaccinated with the seasonal influenza vaccine and persons vaccinated during seasons where vaccine was considered by the CDC-reported vaccine effectiveness
percentage (VE%) (1-relative risk)*100% a suboptimal match for seasonal flu strain. RESULTS: Published vaccine effectiveness for a suboptimal seasonal influenza vaccination ranged from 30%-63% from flu seasons 2006-2007 through 2012-2013. This was approximately the same protection observed in the larger claims database for the same year ranges. When modeled together with cost it was shown that this mismatch of vaccination to circulating virus still equated to a substantial reduction in overall disease when vaccinated. Validation of results still ongoing.

CONCLUSIONS: The burden of disease of influenza significantly decreases even when the seasonal influenza vaccine is a suboptimal match to the prevalent circulating strain. It is recommended that all persons receive the influenza vaccination each year to decrease hospitalization.

PMR63 FEASIBILITY AND ACCEPTABILITY OF MINIMAL MODELING VALUE OF INFORMATION ANALYSES FOR REAL-TIME PRIORITIZATION DECISIONS WITHIN A LARGE CANCER CLINICAL TRIALS COOPERATIVE GROUP

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OBJECTIVES: Value of Information (VOI) analyses can help align research investments with areas that could have the greatest impact on patient outcomes, but many questions remain concerning its feasibility and acceptability to inform real-world prioritization decisions. Our objective was to develop a process for calculating VOI in “real-time” and in a suboptimal setting. This was accomplished through the development of an identical protocol for each trial, which included tools to assess the impact of VOI in the design stage of a trial. We then used a multi-institutional structured approach to address VOI analyses where discussed.

METHODS: We adapted a novel and efficient modeling approach - minimal modeling VOI - using a sample of nine phase II/III trial proposals from the Breast, Gastrointestinal, and Genitourinary committees reviewed by SWOG’s leadership between 2018-2019. We created decision models for each trial proposal and devised an efficient process to characterize prior uncertainty in treatment effect by linking evidence across trials and linking evidence to the impact on trial success rates of SWOG trials. We adapted a minimal expectation-VOI was calculated using Bayesian updating methods. We customized the process using iterative stakeholder input.

RESULTS: The VOI modeling process was feasible and sufficiently captured key expected health and health economic outcomes and attendant uncertainty for 8 of 9 trial proposals. Model construction and calculations took one researcher ≤ 1 week per proposal. We accommodated stakeholder input by: a) deconstructing VOI metrics into expected health benefits and incremental healthcare costs, b) assuming treatment decisions were based on health benefits alone, and c) providing both individual and population level results. Following this customization, SWOG again accepted the VOI framework and results for the retrospective analyses and felt that VOI analyses would be useful for identifying future data sources and future research opportunities. We developed an efficient and customized process for calculating the expected VOI of clinical trials that is feasible for use in real-time decision-making and is acceptable to stakeholders. We find that diagnostic testing for malaria is cost-saving in Angola. In Tanzania the cost per life-year gained is $5.54 and $9.54 in Uganda. Both are cost-effective compared to the WHO-recommended $15-$50 per life-year gained. Our results are robust under varying cost, prevalence and behavioral assumptions. Probabilistic sensitivity analyses indicate that testing is cost-saving or cost-effective: 80% of the time in Angola, 89% in Tanzania, and 90% in Uganda.

CONCLUSIONS: Our findings strongly suggest pursuit of policies that facilitate full implementation of testing, including promoting clinician adherence to test results.

PMR64 ALTERNATIVE METHODS FOR GENERATING ARBITRARY MARGINAL DISTRIBUTIONS AND THE IMPLICATIONS FOR SIMULATION OUTCOMES

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OBJECTIVES: Generating multivariate random variables is essential in disease simulation applications. In this study we examine the implications of alternative approaches to arbitrarily marginal distributions on correlation in simulation outcomes. METHODS: We adopt three alternative methods including Cholesky Decomposition (CD), CD with conditional matching, and the NORmal-To-Anything (NORTA) method to generate a hypothetical simulation sample with arbitrary marginal distributions and pairwise correlation matrix. As the comparator, we also create an independent and identically distributed (iid) simulation sample. The samples are individually populated in a previously developed type 2 diabetes microsimulation model to predict the major clinical endpoints over 15 years. The endpoints include all-cause mortality, diabetes-related mortality, and major cardiovascular events. We examine the goodness of fit by total deviance, i.e., the aggregated values of the relative difference between the individual predictions with the endpoints observed in the actual data, in the overall and stratified samples. RESULTS: The results show that the model predictions deviate from the observed data with an iid sample. Over 15 years, the model over-predicts all the numbers of endpoints events by 20%, with the total deviance of 0.73. The over-prediction is even more pronounced in the younger patients. With a sample of a constructed multivariate normal distribution using the CD and CD plus conditional matching approach, the deviance is reduced to 0.41 and 0.58 respectively. A further improvement is observed when using the NORTA method, with the deviance of the endpoints between model prediction and actual data further reduced to 0.11. The reduction was mainly contributed by better approximations in the dispersion of the risk factors among patients.

CONCLUSIONS: Random simulation method is better in capturing the increased deviance in younger patients. With a sample of a constructed multivariate normal distribution using the CD and CD plus conditional matching approach, the deviance is reduced to 0.41 and 0.58 respectively. A further improvement is observed when using the NORTA method, with the deviance of the endpoints between model prediction and actual data further reduced to 0.11. The reduction was mainly contributed by better approximations in the dispersion of the risk factors among patients.

Cancer C

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OBJECTIVES: This study aims to evaluate four alternative models that each describe the relationship between LDL-C and CV event rates in secondary prevention.

Methods: Data describing LDL-C and nMLDL-C and CV Death outcomes were abstracted from several landmark secondary prevention statin trials in clinically stable patient populations (45, CARE, LIPID, HPS, TNT, IDEAL, GReACE, AVeKT, and LIPS). Linear (L), quadratic (Q), one-knot linear spline (S1L), and two-knot quadratic spline (S2Q) models were fit using LOOCV and Monte Carlo cross validated (MCCV) RMSE (90% training, 1,000 replicates) were used to evaluate predictive performance. Predicted event rates based on LDL-C and nMLDL-C were compared to illustrate the clinical implications of each model. To encourage full reproducibility and transparency, all raw data and code (R) will be made freely available for download online via authors Git repository.

RESULTS: A total of eight models were fit and evaluated, including four distinct functional forms (Q, S1L, and S2Q) across two sets of data (all data (A) and data censored for high leverage studies (C)). Of all the models evaluated, S2Q-C exhibited the lowest RMSE (0.317) while L-C produced both the lowest LOOCVRMSE (0.463) and MCCVRMSE (0.385) but was predicted perfectly in one trial. These models capture key dimensions of uncertainty associated with our primary data sources. Preliminary sensitivity analyses demonstrated that diagnostic testing for malaria is cost-saving in Angola. In Tanzania the cost per life-year gained is $5.54 and $9.54 in Uganda. Both are cost-effective compared to the WHO-recommended $15-$50 per life-year gained. Our results are robust under varying cost, prevalence and behavioral assumptions. Probabilistic sensitivity analyses indicate that testing is cost-saving or cost-effective: 80% of the time in Angola, 89% in Tanzania, and 90% in Uganda.

CONCLUSIONS: Our findings strongly suggest pursuit of policies that facilitate full implementation of testing, including promoting clinician adherence to test results.

PMR66 THE WORLD HEALTH ORGANIZATION AND UNIVERSAL DIAGNOSTIC TESTING FOR SUSPECTED MALARIA IN CHILDREN: IS THE NEW POLICY COST-EFFECTIVE AND FEASIBLE FOR SUB-SAHARAN AFRICA?

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OBJECTIVES: Malaria is a substantial global disease burden with 198 million cases reported worldwide in 2013. It disproportionately affects sub-Saharan Africa, particularly young children and accounts for 14% of the region’s childhood deaths. In an effort to improve disease management, the World Health Organization (WHO) recommended that all patients with a history of fever and clinical symptoms consistent with malaria be tested for Plasmodium falciparum using a rapid diagnostic test (RDT) in 2010.

METHODS: We evaluate a model of diagnostic testing for malaria to determine its cost-effectiveness across six child outcomes: death in secondary prevention; malaria and death in primary prevention; and three malaria-related outcomes: death in secondary prevention; and three malaria-related outcomes: death in primary prevention; and three malaria-related clinical outcomes: mortality and severe malaria in children under 5 years of age.

RESULTS: These models capture key dimensions of uncertainty associated with our primary data sources. Preliminary sensitivity analyses demonstrated that diagnostic testing for malaria is cost-saving in Angola. In Tanzania the cost per life-year gained is $5.54 and $9.54 in Uganda. Both are cost-effective compared to the WHO-recommended $15-$50 per life-year gained. Our results are robust under varying cost, prevalence and behavioral assumptions. Probabilistic sensitivity analyses indicate that testing is cost-saving or cost-effective: 80% of the time in Angola, 89% in Tanzania, and 90% in Uganda.

CONCLUSIONS: Our findings strongly suggest pursuit of policies that facilitate full implementation of testing, including promoting clinician adherence to test results.

PMR67 WHOLE-DISEASE MODEL APPROACH: METHODOLOGIES AND CHALLENGES IN COMMUNICATING THE ECONOMIC BURDEN OF RARE DISEASES

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OBJECTIVES: The concept of whole-disease model has rarely been applied in practice or considered in the published literature. No studies to date have addressed the applicability of this approach in rare diseases. This research aims to demonstrate the applicability, technique, and framework of the model designed to educate US Payers of the estimated patient-level resource utilization, diagnosis costs, and 12-month treatment cost from the US Payer’s perspective, a clinical guideline-based approach was developed.

We reviewed diagnosis and treatment guideline recommendations to develop a resource utilization algorithm which was subsequently validated by clinicians to provide the disease burden estimation, serving as an information tool for Payers of the estimated patient-level costs and resource utilization, using a rare disease as a case study. METHODS: The lack of specific ICD-9 CM code, prevalence overestimation, poorly documented US epidemiology data, complex diagnostics, and off-label pharmacotherapy were evident in rare diseases. In order to estimate patient-level resource utilization, diagnosis costs, and 12-month treatment cost from the US Payer’s perspective, a clinical guideline-based approach was developed.

We reviewed diagnosis and treatment guideline recommendations to develop a resource utilization algorithm which was subsequently validated by clinicians to provide the disease burden estimation, serving as an information tool for Payers of the estimated patient-level costs and resource utilization, using a rare disease as a case study. METHODS: The lack of specific ICD-9 CM code, prevalence overestimation, poorly documented US epidemiology data, complex diagnostics, and off-label pharmacotherapy were evident in rare diseases. In order to estimate patient-level resource utilization, diagnosis costs, and 12-month treatment cost from the US Payer’s perspective, a clinical guideline-based approach was developed. Our model also provides a platform for manufacturers to: 1) incorporate real-world data as they become available; 2) add/remove interventions as the market evolves; and 3) add various economic elements to further calculate budget impact or cost-effectiveness of an intervention over a product’s cycle.