This session demonstrates the use of mixture models for uncovering such subgroups were approaches included age, sex, race, ethnicity, education, region, insurance, and number (ch).KMable and their characteristics are detected. Other methods for explaining expenditures associated with OM using the CM method were lowest (median difference $14,339) and a negative binomial model (BIC: 38,559). A mixture model with two gamma distributions (BIC: 35,806) gave a better fit to the drug expenditure data than a model with a gamma distribution (BIC: 36,208). CONCLUSIONS: This study showed that mixture models provided more insights into the data with high positive skewness than regression models with single distribution when estimating the number of prescriptions and the prescription drug expenditures of patients with RA.

COMPARISON OF ANALYTIC APPROACHES TO ESTIMATE INCREMENTAL EXPENDITURES: A CASE OF OTITIS MEDIA AMONG CHILDREN IN THE UNITED STATES
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OBJECTIVES: To compare different approaches to estimate incremental expenditures using an example of estimating the direct cost of treating Otitis Media (OM) among children in the US. METHODS: Three approaches; covariate matched case-control (CM), probability matched case-control (PM), and the generalized linear regression (i.e. Gaussian with gamma variance function) with standard risk adjustment were developed using the 2005 Medical Expenditure Panel Survey (MEPS) data. Children with OM (age <18 years; n = 9,691) were identified using International Classification of Diseases (ICD)-9 diagnosis codes 381 or 382 for OM. All three approaches included age, sex, race, ethnicity, education, region, insurance, and number of medications used (proxy for comorbidity) as covariates. For the CM method, OM cases were matched with non-OM controls exactly on categorical variables and on the largest possible absolute difference (AD) of 0 to 5 for the two continuous variables (age and education). For the PM method, the case-control match was obtained using propensity probability of OM with an AD of 0.01 (vs. 0.0001). The estimated incremental expenditures and the number of matched pairs obtained using the above approaches were compared. RESULTS: The number of matched pairs ranged from 907 children for CM with AD = 0 to 1,664 children for PM with AD = 0.01. In contrast, the GLM approach included the entire sample (n = 9,691) for the analysis. Incremental expenditures associated with OM using the CM method were lowest (median difference [MD] range: $197,68 to $213,98) followed by GLM approach (mean difference: $245.6) and highest using the PM method (MD: $275.89 and $299.79). The mean differences using the CM and PM methods varied widely. CONCLUSIONS: Based on the relative ease in computing, use of the entire sample for analysis, and the consideration for the distribution function of expenditure data, CM with standard risk adjustment may be a preferred approach to estimate incremental expenditures.

DEVELOPMENT OF AN INTERACTIVE MODEL TO EVALUATE THE ECONOMIC IMPACT OF CHD EVENTS AMONG ADULTS WITH DYSLIPIDEMIA FROM AN EMPLOYER PERSPECTIVE
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OBJECTIVES: Coronary heart disease (CHD) is associated with one-half of all cardiovascular events in the US among working-age adults, with an estimated cost of $156.4 billion in 2008. Several lifestyle and treatment interventions are associated with reductions in CHD events and mortality. Our goal was to develop an interactive model based on rigorous analytic methods that would enable employers to assess, through the use of a simple interface, the expected occurrence of CHD events and associated costs among covered employees and retirees with dyslipidemia. METHODS: An analytic model framework was developed to estimate expected CHD events and costs from an employer perspective. Model inputs include demographics, presence of CHD risk factors, employment details (active vs. retired; full-time vs. part-time; salary), direct medical costs of CHD events, work-loss (disability insurance details, worker replacement scenarios), and discount and medical cost inflation rates. Default input parameter values are based on nationally-representative NHANES data, commercial insurance claims data, and published literature. The model interface allows employers to modify default values to fit their population and to conduct sensitivity analyses. Prediction equations derived from NHANES data and Framingham risk equations are used along with employer data to predict the expected number of CHD events and the proportion achieving lipid goals. Employer costs are calculated based on the predicted number of events, medical costs per event, and indirect costs resulting from absences. RESULTS: Model outputs include the percentage of employees/retirees expected to reach lipid control targets, expected number of CHD events, and total costs associated with CHD events (sum of direct and indirect costs). Employer-specific results are compared to national benchmarks. CONCLUSIONS: This interactive model for pragmatic outcomes research can be converted into a tool available on an upcoming interactive clinical tool. TAT inMEDI Research, London, UK

EXTENDING RANDOM EFFECT MODELS TO CENSORED COST DATA
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OBJECTIVES: Challenges in analyzing cost data include addressing skewness in cost distributions, observed and unobserved heterogeneity across samples, and even more challenging complexities due to censoring. We combined generalized random effect models for personalized medicine: Factor mixture models for investigating differential response to treatment
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If all patients responded to treatment in a similar way, there would be little or no variability in outcomes within treatment groups. Experience suggests otherwise, raising the question, what accounts for this variability in response? Some of the heterogeneity in response may be attributable to observable variables that are included as covariates in analyses (age, gender, dose, dosing schedule or missed doses, comorbidities); some may be the result of unobserved but potentially identifiable factors, such as genetic background and other variables that are collected as part of the trial but are not explicitly included as covariates in analyses such as baseline levels of variables or changes in study variables. In this latter case, the cause of heterogeneity must be inferred from the data. Methods have been developed to aid in categorization of responders but these methods are not used to full advantage in trials and outcomes studies. Factor mixture models are a combination of common factor and latent class analysis that can be used to explore unobserved population heterogeneity. Mixture models can be used to identify trial patients that exhibit within-class homogeneity yet are themselves different categorically from other classes of patients; this method enables identification of variables that may account for the categorical differentiation. This session demonstrates the use of mixture models for uncovering such subgroups as hyper- or hypo-responders to treatment in the context of clinical trials. Examples from a clinical trial and a simulation study are presented to show how these subgroups and their characteristics are detected. Other methods for exploring what personal characteristics of trial enrollees influence treatment response using logistic and polynomial regression will also be demonstrated.

DEVELOPMENT OF AN INTERACTIVE MODEL TO EVALUATE THE ECONOMIC IMPACT OF CHD EVENTS AMONG ADULTS WITH DYSLIPIDEMIA FROM AN EMPLOYER PERSPECTIVE
Madden P1, Lang K2, Zhang B1, Korn JR1, Simko RJ2, Zachry WPM2, Patel NV2
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OBJECTIVES: Coronary heart disease (CHD) is associated with one-half of all cardiovascular events in the US among working-age adults, with an estimated cost of $156.4 billion in 2008. Several lifestyle and treatment interventions are associated with reductions in CHD events and mortality. Our goal was to develop an interactive model based on rigorous analytic methods that would enable employers to assess, through the use of a simple interface, the expected occurrence of CHD events and associated costs among covered employees and retirees with dyslipidemia. METHODS: An analytic model framework was developed to estimate expected CHD events and costs from an employer perspective. Model inputs include demographics, presence of CHD risk factors, employment details (active vs. retired; full-time vs. part-time; salary), direct medical costs of CHD events, work-loss (disability insurance details, worker replacement scenarios), and discount and medical cost inflation rates. Default input parameter values are based on nationally-representative NHANES data, commercial insurance claims data, and published literature. The model interface allows employers to modify default values to fit their population and to conduct sensitivity analyses. Prediction equations derived from NHANES data and Framingham risk equations are used along with employer data to predict the expected number of CHD events and the proportion achieving lipid goals. Employer costs are calculated based on the predicted number of events, medical costs per event, and indirect costs resulting from absences. RESULTS: Model outputs include the percentage of employees/retirees expected to reach lipid control targets, expected number of CHD events, and total costs associated with CHD events (sum of direct and indirect costs). Employer-specific results are compared to national benchmarks. CONCLUSIONS: This interactive model for pragmatic outcomes research can be converted into a tool available on an upcoming interactive clinical tool.