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ISPOR 2014 Analysis Group Workshop Presentation

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Objectives: Describe the prevalence of contraindications to chronic hepatitis C (CHC) treatment among CHC patients not receiving CHC treatment (direct-acting antiviral [DAA] protease inhibitors, peg-interferon alpha, or ribavirin).

Results: Approximately 86.8% of the untreated cohort had no claim for any CHC treatment at any time in their claims history. The most common contraindications included arterial hypertension (32.1%), hepatic decompensation (22.3%), major system impairment (19.2%), and psychiatric depression (11.0%). Age-stratified results showed increasing prevalence of contraindications with age; rates of contraindications increased from 44.2% among patients 18-39 to 76.65% among patients 80 years old and older.

Conclusions: A high proportion of untreated CHC patients had diagnoses for contraindicated conditions, and the prevalence of these contraindications increased with age.
related mortality) came mainly from literature. Additionally, a cost-minimization analysis (CMA) compared the total 5-year costs of biologics (ADA, IFX and GOL) assuming IFX and GOL having the same efficacy as ADA. Results were expressed in costs per quality-adjusted-life-years (QALY) gained for ADA+SOC vs. SOC alone and in total cost differences for ADA+SOC vs. IFX+SOC and vs. GOL+SOC. Deterministic and probabilistic sensitivity analyses (DSA, PSA) were performed.

**Results:** In the base case, the incremental costs per QALY gained for ADA+SOC vs. SOC were C$96,812 (in 2013 Canada dollars [C$]). Results from DSA ranged from C$62,362 to C$109,461. PSA revealed that ADA+SOC was cost-effective in 58% and 81% of cases at C$100,000/QALY and C$120,000/QALY thresholds, respectively. The CMA predicted total cost savings of C$23,823 and C$4,279 comparing ADA+SOC to IFX+SOC and to GOL+SOC over 5 years. DSA and PSA results showed that ADA+SOC led to cost savings in all scenarios comparing to IFX+SOC and in all but one DSA-based and all PSA-based scenarios comparing to GOL+SOC.

**Conclusions:** The ADA+SOC strategy appeared to provide reasonable cost-effectiveness value compared with SOC alone and significant cost-saving benefits compared to IFX+SOC and GOL+SOC.

**PGI32**

**TREATMENT PATTERNS, HEALTHCARE RESOURCE UTILIZATION AND COSTS IN US PATIENTS DIAGNOSED WITH CHRONIC HEPATITIS C INFECTION**

**Objectives:** Evaluate treatment patterns, healthcare utilization and costs of chronic hepatitis C (CHC) patients receiving direct-acting antiviral (DAA) protease inhibitors.

**Methods:** Adult patients with ≥1 claim for CHC (ICD-9-CM codes 070.44, 070.54, 070.70, 070.71) and a fill of boceprevir or telaprevir were selected from a de-identified US-based claims database (2006-2012). The date of the first fill for a DAA after 5/13/2011 (date of first DAA availability) was defined as the index date; patients were categorized into either the telaprevir or boceprevir cohorts. Patients had continuous eligibility and no claims for hepatitis B during the 6-months before (baseline) and 12-months following (study period) the index date. Baseline characteristics and study period treatment patterns, healthcare utilization and costs were described. Adjusted study period costs were compared between the DAA cohorts using multivariate analyses.

**Results:** There were 871 telaprevir and 284 boceprevir patients identified. DAA patients were 54 years old on average and more often male (62%). Approximately 25% of telaprevir and 18% of boceprevir patients had cirrhosis, and 9% of telaprevir and 7% of boceprevir patients had decompensated cirrhosis at baseline. Less than 1% of patients were HIV co-infected. Approximately 54% of telaprevir and 74% of boceprevir patients did not complete minimum recommended therapy (telaprevir: 12 weeks of triple+12 weeks of dual, boceprevir: 4a+1 weeks of lead-in+24 weeks of triple). During the study period, over half of patients had anemia (boceprevir: 55%, telaprevir: 54%). Study period healthcare utilization measures were generally similar between the DAA cohorts. Telaprevir patients experienced numerically higher study period unadjusted medical (boceprevir: $16,927, telaprevir: $19,519) and drug costs (boceprevir: $59,953, telaprevir: $76,497) than boceprevir patients; however, after adjusting for baseline characteristics, only drug costs remained significantly different.

**Conclusions:** CHC patients receiving telaprevir or boceprevir experienced high rates of early discontinuation and high medical and drug costs.

**PND34**

**EFFECT OF IMPROVING ADHERENCE TO DISEASE-MODIFYING AGENTS ON HEALTHCARE RESOURCE UTILIZATION AND MEDICAL COSTS IN PATIENTS WITH MULTIPLE SCLEROSIS**

**Objectives:** Prior studies have compared multiple sclerosis (MS) patients who are adherent to disease-modifying drug (DMD) therapy with those who are not, but have not analyzed the effect of varying levels of adherence on patient outcomes. This study characterized the benefits and cost offsets of increasing adherence to DMDs. Healthcare costs and resource use were assessed for patients with different adherence levels at various periods following DMD initiation.

**Methods:** A retrospective analysis was conducted using OptumHealth Reporting and Insights employer claims database on MS patients (≥2 diagnoses of ICD-9-CM 340.xx) initiating DMD therapy in 2002 through Q1 2012. Direct medical costs (reimbursements to providers), indirect costs (disability payments and employer workloss costs), and resource use were analyzed in the six months prior to (baseline) and up to 36 months following (observation period) initiation. Adherence, persistence, and other outcomes were measured at 6, 12, 24, and 36 months, and stratified by DMD adherence level.

**Results:** 1,538 patients met the selection criteria (baseline age 43.6 years, 63% female). Adherence measured by proportion of days covered (PDC) declined from 82% at 6 months to 67% at 36 months following initiation (medication possession ratio of 79% over the observation period). By 36 months, 42% of patients had discontinued DMD therapy; 22%, 31%, and 47% of patients had PDC<40%, 40% to 79%, and ≥80%, respectively. Non-DMD direct costs ($36,119, $30,277, and $25,886) decreased substantially with higher adherence ($13,568) decreased substantially with higher adherence (PDC<40%, 40% to 79%, and ≥80% at 36 months, respectively). Higher adherence was also associated with
lower all cause and MS-related inpatient admissions and emergency visits. Similar trends were observed at each follow-up period.

Conclusions: This study shows higher adherence to DMD therapies is associated with lower non-DMD medical and indirect costs and decreased healthcare resource use for MS patients.

PCN33
TREATMENT AND SURVIVAL PATTERNS AMONG ALK+ NSCLC PATIENTS FOLLOWING CRIZOTINIB DISCONTINUATION

Objectives: To investigate treatment and survival patterns among ALK+ non-small cell lung cancer (NSCLC) patients following discontinuation with crizotinib monotherapy.

Methods: Medical charts for ALK+NSCLC patients who discontinued treatment with crizotinib monotherapy were retrospectively reviewed and abstracted by a panel of 27 oncologists. Patients were randomly selected by physicians among their eligible crizotinib-treated patients.

Results: A total of 119 ALK+NSCLC patients who received crizotinib monotherapy and changed regimen prior to death or last follow-up were analyzed. At primary NSCLC diagnosis, patients averaged 65 years old and 56% (n=66) were male. A majority of them received first-line crizotinib monotherapy (60% first-line; 33% second-line), and median crizotinib treatment duration for all 119 patients was 141 days (IQR: 92-209). Before changing crizotinib monotherapy regimen, 38 (32%) patients were diagnosed with brain metastases. A total of 102 (86%) patients had progressed while on crizotinib monotherapy after a median time of 140 days (IQR: 88-219) post crizotinib initiation, and changed regimen after a median of 1 day (IQR: 1-3) post progression. After discontinuing crizotinib, 50 (42%) patients did not receive antineoplastic therapy. Among the 69 patients (58%) who received treatment, 37 (54%) received chemotherapy, 15 (22%) radiation therapy without chemotherapy, 13 (19%) a targeted therapy, and 4 (6%) were enrolled in a clinical trial. Among all patients, median survival post crizotinib monotherapy was 61 days. The median survival was 180 days for the 69 patients who received treatment post crizotinib monotherapy and 17 days for those who did not receive antineoplastic therapy. The median survival was 44 days for the 38 patients with brain metastases.

Conclusions: There is significant unmet need among patients progressing on crizotinib. In this retrospective study, ALK+ NSCLC patients were found to have an overall survival of 61 days post crizotinib monotherapy; additional studies are necessary to understand clinical outcomes among patients progressing on crizotinib.

PCV2
EFFECT OF PRASUGREL VS CLOPIDOGREL ON HOSPITAL READMISSION AMONG ACUTE CORONARY SYNDROME PATIENTS TREATED WITH PRASUGREL

Objectives: During the last decade, the standard of care to treat acute coronary syndrome (ACS) patients was typically a combination of clopidogrel and aspirin. However, newer antiplatelet agents were approved recently. The aim of this study was to assess the effect on time-to-readmission and resource utilization of prasugrel vs. clopidogrel in prasugrel treated patients after hospitalization with an ACS event.

Methods: Based on the Truven Health Analytics MarketScan database from January 2009 through July 2012, a matched-cohort was created. Inferences for average treatment effect on time-to-readmission and numbers of hospitalizations, ER visits, and outpatient visits in prasugrel treated patients at 30 days and 1 year were performed by (1) frequentist Kaplan-Meier estimation with a log-rank test and Lin’s method for censored resource utilization outcomes; and (2) Bayesian discrete-time hazard models and negative binomial models. Bayes factors were also determined.

Results: 10,963 matched-pairs were well-balanced on baseline characteristics. Frequentist analyses of time-to-readmission at 1 year and resource utilization rates over 30 and 365 days showed no statistical differences between prasugrel and clopidogrel (log-rank test and Lin method p-values all >0.05 ). The posterior probability of equivalence between drugs for time-to-readmission at a margin of 10% was 98.7%, and based on the Bayes factor for superiority, there is little evidence of superiority. Based on Bayesian analyses of resource utilization outcomes, there are high probabilities of equivalence at a margin of 10% and little evidence of superiority for all outcomes except for number of hospitalizations at 30 days, for which there is positive evidence that clopidogrel is superior to prasugrel, although the probability that prasugrel is non-inferior to clopidogrel at the 10% margin is 0.765.

Conclusions: ACS patients treated with prasugrel had time-to-readmission and resource utilization outcomes equivalent to what they would have been if treated with clopidogrel.

PCV4
HOSPITAL LENGTH OF STAY: DOES RIVAROXABAN REDUCE INPATIENT STAY COMPARED TO WARFARIN AMONG PATIENTS WITH NON-VALVULAR ATRIAL FIBRILLATION?

Objectives: Unlike rivaroxaban, warfarin requires laboratory monitoring to document achievement of international normalized ratio goal, thereby potentially prolonging a patient’s hospital length of stay (LOS). The study objective was to compare hospital LOS among
hospitalized non-valvular atrial fibrillation (NVAF) patients using rivaroxaban versus warfarin in a real-world setting.

**Methods:** A retrospective claims analysis was conducted using the Premier Perspective Comparative Hospital Database from 11/2010 to 9/2012. Adult patients were included in the study if they had an index hospitalization for NVAF. Patients initiating rivaroxaban during hospitalization were matched with up to 4 warfarin users by propensity score analyses. Similar matched sub-analyses were conducted for patients who (1) had pre-treatment use of parenteral anticoagulants, and (2) were administered their oral anticoagulants on day 3 of their hospital stay or later. Comparison of hospital LOS was assessed using generalized estimating equations.

**Results:** The characteristics of the matched cohorts were well balanced. Among the matched rivaroxaban and warfarin users (2,809 and 11,085 patients, respectively), the mean age of the cohorts was 71 years and 49% were females. The average [median] hospital LOS for rivaroxaban patients was 4.5 [3] days compared to 5.3 [4] days for the warfarin cohort. The mean difference in hospital LOS of 0.81 days was found to be significant at p<0.01. In the sub-analyses of patients with pre-treatment use of parenteral anticoagulants, the average hospital LOS was found to be 1.38 days shorter (p<0.01) for the rivaroxaban group as compared to the warfarin group. Patients who were administered rivaroxaban on day 3 of their hospital stay or later had a 1.72 day shorter LOS as compared to their matched warfarin counterparts (p<0.01).

**Conclusions:** This study suggests that NVAF patients receiving rivaroxaban have significantly lower hospital length of stay as compared to patients receiving warfarin.

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**PCV33**

**THE ECONOMIC IMPACT OF IMPLEMENTING A MULTIPLE INFLAMMATORY BIOMARKER-BASED APPROACH TO IDENTIFY, TREAT, AND REDUCE CARDIOVASCULAR RISK**

**Objectives:** To develop a model for estimating reductions in the number of events and costs of myocardial infarction (MI) and ischemic stroke (IS) for a US health plan as a result of implementing routine testing with multi-tiered cardiovascular risk markers of vascular inflammation including hsCRP, Lp-PLA2 and myeloperoxidase.

**Methods:** An Excel model was developed to estimate reductions in MI and IS as well as reductions in the per-member-per-month (PMPM) and five-year costs before testing costs due to biomarker-based testing for a hypothetical US health plan. Inputs for the model included: incidence rates of MI and IS, direct costs associated with MI and IS, lab results of multi-marker testing, graded risk ratios of MI and IS based on combinations of abnormal risk markers, patient monitoring and intervention costs, and preventative pharmacotherapy. Preventative pharmacotherapy use and costs were based on an analysis of pharmacy claims data. Costs savings (2012 USD) were assessed for patients undergoing multi-marker testing as compared to patients with lipid panel testing only. Clinical expertise was relied upon for inputs relating to treatment
response and changes in preventative pharmacotherapy. Direct costs, incidence rates, and risk ratios were obtained from literature.

**Results:** For a health plan with 1,000,000 members, an estimated 21,104 MI and 22,589 IS events would occur over five years. Implementing this multi-tiered risk assessment of inflammatory biomarkers for patients ≥35 years old would reduce MI and IS events by 2,018 and 1,848, respectively, yielding almost $180.6m in cost savings ($3.01 PMPM). Results were sensitive to changes in treatment response. Nonetheless, cost savings were observed for most scenarios.

**Conclusions:** This study suggests that health plans can realize substantial cost savings by preventing MI and IS events after implementing routine biomarker testing. Cost savings before testing costs could reach more than $3.01 PMPM for a typical US health plan.

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**PCV43**

**COSTS OF VENOUS THROMBEMBOLISM (VTE) AMONG HOSPITALIZED PATIENTS IN CHINA**

**Objectives:** The prevalence of venous thromboembolism (VTE) has been increasing in China. However, the economic burden of the disease is not well understood. This study aims to estimate inpatient costs of VTE in China and identify key factors associated with costs.

**Methods:** Hospitalizations with a diagnosis of VTE (including deep vein thrombosis (DVT) or pulmonary embolism (PE)) were identified in a large hospital electronic medical record database that included 100% inpatient records from two tertiary hospitals between January 1st, 2010 and June 30th, 2013. Total costs per hospitalization as well as its components, pharmacy costs (all drug-related costs) and non-pharmacy costs (all other costs), were estimated using hospital billing data (in 2013 CNY) and converted to 2013 USD using an exchange rate of 6.12. Multivariate regressions were performed to assess factors associated with total hospitalization costs, including patient demographics, insurance status, VTE type, VTE diagnosis type, anticoagulant treatment, comorbidities, admission type, and surgical procedure.

**Results:** A total of 1,047 VTE-related hospitalizations were included in the analysis. The mean age at hospitalization was 62.4 years and 54.1% of hospitalizations occurred to men. DVT accounted for 77.1% of the total hospitalizations. The average pharmacy, non-pharmacy, and total costs per hospitalization were CNY 9,820 (USD 1,604), CNY 19,294 (USD 3,153), and CNY 29,114 (USD 4,757), respectively. Diagnosis of PE (vs. DVT), anticoagulant treatments (vs. no anticoagulant treatment), admission under critical condition, having surgical procedures, certain comorbidities, and VTE as secondary diagnosis were significantly associated with higher total costs per hospitalization (P<0.05).

**Conclusions:** In China, the inpatient costs of VTE are as high as 1.7 times the average annual household income. Multiple factors, including VTE type, treatments, admission condition, etc., are associated with inpatient costs among VTE patients. Future studies are indicated to understand the cost variations.

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**PHS71**

**HIGH COST PATIENTS AND COST PATTERNS FROM PEDIATRIC TO ADULT CARE IN A MEDICAID POPULATION WITH SICKLE CELL DISEASE**

**Objectives:** The aim of this study was to identify high cost sickle cell disease (SCD) patients (HCSPs) and analyze their cost patterns throughout lifetime and as they transition from pediatric to adult care.

**Methods:** State Medicaid data from 1997 to 2010 were analyzed. Patients with ≥2 SCD diagnoses and ≥1 blood transfusion were included. HCSPs were defined as the fraction of most expensive patients accounting for 50% of the total yearly costs. Periodic events associated with high costs are likely to be responsible for high total costs. High cost events (HCEs), defined as quarters with costs ≥$33,095, corresponding to the amount separating the top 5% most expensive quarters observed in the sample, were analyzed. A longitudinal logistic regression model was used to identify factors associated with HCEs.

**Results:** From a cohort of 3,208 eligible SCD patients, 449 (14%) were identified as HCSPs. The average yearly total cost of HCSPs was significantly higher at $108,524/year compared to $17,683/year for other patients. The share of the total yearly costs of HCSPs increased from 34.4% to 46.3% between age groups 11-15 and 16-20, reaching its maximum at 65.2% in the 26-30 age group. The frequency of HCEs increased by 122.6% in the transitioning group from 0.110 HCE/year among patients aged 11-15 to 0.244 HCE/year among patients aged 16-20. Patients were more likely to have a HCE during the post-transition period (adjusted odds ratio [OR]: 1.41, p=.0046) and when experiencing an SCD complication (OR: 3.79, p<.0001). Blood transfusions received during the previous quarter were associated with a lower likelihood of HCEs (OR: 0.87, p=.0080).

**Conclusions:** In this population of Medicaid SCD patients, 14% were responsible for over 50% of total yearly healthcare costs. Directing appropriate and targeted interventions can help providers improve outcomes and lower healthcare costs in this patient population.
PHS109
HIGH UTILIZERS OF HEALTHCARE RESOURCES:
RESULTS FROM THE MULTICENTER COMPACT STUDY
OF COMPLICATIONS IN PATIENTS WITH SICKLE CELL
DISEASE AND UTILIZATION OF IRON CHELATION
THERAPY

Objectives: To understand characteristics of sickle cell
disease (SCD) patients ≥16 years old with increased
utilization of inpatient (IP) and emergency department
(ED) resources.

Methods: Medical records of 254 SCD patients ≥16 years
old were retrospectively reviewed at three US tertiary care
centers. High utilizers (HUs) were defined as patients with
≥5 days of IP+ED care for SCD-related complications per
year. Patients were classified in cohorts based on cumulative
blood transfusion and iron chelation therapy (ICT): <15
units, no ICT (C1); ≥15 units, no ICT (C2); ≥15 units, with
ICT (C3). SCD complication rates were expressed as the
number of SCD complications per patient per year (PPPY);
cohort comparisons used rate ratios (RRs). A logistic
regression was used to identify risk factors for high IP+ED
utilization.

Results: Of 254 patients (C1: 69, C2: 91, C3: 94),
30% were HUs (C1: 14[18.4%], C2: 37[48.7%], C3:
25[32.9%]). HUs were younger (median [range]: 21 [16-
65] vs. 23 [16-59] years old), and had shorter observation
time (mean: 6.7 vs. 8.2 years). HUs accounted for 68% of
SCD-related complications and 88% of IP+ED days. Pain
(81%) and infection (7%) were key HU complications.
Mean (95% CI) PPPY IP+ED days was higher among HUs
(16.63 [16.28-16.99]) vs. other patients (0.89 [0.84-
0.94]). Among regularly transfused HUs (C2+C3), those
with ICT had fewer IP+ED days (C2 vs. C3 RR [95% CI]:
1.30 [1.24-1.36]) and IP+ED readmissions within 30 days
(1.70 [1.49-1.93]). History of infections was associated
with an increased risk of high IP+ED utilization (odds
ratio: 7.45, p<0.0001).

Conclusions: In this study of SCD patients, a minority of
patients accounted for a disproportionate share of IP+ED
use. Frequently transfused patients without ICT had more
IP+ED use than those with ICT. Identifying HUs can assist
payers and providers in directing targeted interventions to
deliver better care with lower costs.

PMH10
SYSTEMATIC REVIEW OF LONG-ACTING INJECTABLES
(LAI) VERSUS ORAL ATYPICAL ANTIPSYCHOTICS (OA)
ON HOSPITALIZATION IN SCHIZOPHRENIA

Objectives: The current study aimed at assessing the
impact of LAIs versus OAs on hospitalizations among
patients with schizophrenia by conducting a thorough
systematic review of studies with different study designs
and performing a meta-analysis.

Methods: Using the PubMed database and major
psychiatric conference proceedings, a systematic literature
review for 01/2000-07/2013 was performed to identify
English-language studies evaluating schizophrenia patients
receiving atypical antipsychotics. Studies reporting
hospitalization rates as a percentage of patients hospitalized
or as the number of hospitalizations per-person per-year
were selected. A meta-analysis of the percentage decrease
in hospitalization rates from baseline during treatment was
conducted as a primary analysis. The secondary analysis
was a meta-analysis of the absolute rate of hospitalization
during follow-up. Pooled treatment-effect estimates were
calculated using random-effect models. To account for
 differences in patient and study-level characteristics between
studies, meta-regression analyses were used. Subset analyses
further explored the heterogeneity across study designs. No
adjustment was made for multiplicity.

Results: Fifty-eight studies evaluating 25 arms (LAIs: 13
arms, 4,516 patients; OAs: 12 arms, 23,516 patients) in the
primary analysis and 78 arms (LAIs: 12 arms, 4,481
patients; OAs: 66 arms, 96,230 patients) in the secondary
analysis were identified. Reduction in hospitalization
rates for LAIs was 20.7 percentage points higher than
that of OAs (random-effect estimates: LAIs=56.2% vs
OAs=35.5%, P=0.023). Controlling for patient and study
c characteristics, the adjusted percentage reduction in
hospitalization rates for LAIs was 26.4 percentage points
higher than for OAs (95%CI: 3.3-49.5, P=0.027). As for
the secondary analysis, no significant difference between
LAI s and OAs was observed (random-effect estimate: -8.6,
95%CI: -18.1-1.0, P=0.077). Subset analyses across type
of study yielded consistent results.

Conclusions: Results of this meta-analysis, including studies
with both interventional and non-interventional designs
and using meta-regressions, suggest that LAIs significantly
reduce hospitalization rates for schizophrenia patients
compared to OAs.

PMH33
COMPARISON OF RE-HOSPITALIZATION, EMERGENCY
ROOM VISITS, AND HOSPITAL COSTS AMONG
PATIENTS WITH SCHIZOPHRENIA RECEIVING
PALIPERIDONE PALMITATE OR ORAL ANTIPSYCHOTICS
IN AN INPATIENT SETTING

Objectives: This real-world retrospective study aims at
comparing re-hospitalization patterns and costs among
patients with schizophrenia receiving paliperidone
palmitate (PP) or oral antipsychotics (AP) in an inpatient
setting.

Methods: Hospital discharge and billing records from the
Premier Perspective Comparative Hospital Database were
analyzed for adult patients who had a schizophrenia-
related hospitalization with either PP or oral AP treatment
(index hospitalization) between 1/2009 and 3/2012 and

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no evidence of prior treatment with other long-acting AP. Inverse probability of treatment weights (IPTW) based on propensity scores were used to weight cohorts in order to reduce confounding. Patients treated with PP during their index hospitalization were compared to those treated with oral AP in terms of re-hospitalizations and ER visits using the Andersen-Gill Cox extension of multivariate Cox proportional hazard models. Hospital costs (re-hospitalizations, ER, and hospital outpatient visits) of patients treated with PP were compared to those of patients treated with oral AP using a multivariate generalized linear model regression that was weighted by the combined weight of the IPTW and the observation period length.

**Results:** After applying IPTW, weighted mean age was 43.4 years for PP (N=374; N weighted=19,926) and 45.6 years for oral AP (N=45,251; N weighted=26,099) patients. The risk of all-cause re-hospitalizations or ER visits was significantly lower for the PP cohort compared to the oral AP cohort (hazard ratio [HR], [95%CI] = 0.61, [0.59;0.63] p<.0001). Similarly, hospital costs six months after index hospitalization were lower for the PP cohort compared to the oral AP cohort (adjusted mean monthly cost difference [95%CI]: - $404[-781;-148], p<.0001).

**Conclusions:** This hospital database analysis using the IPTW method found that, compared with oral AP, PP was associated with a lower risk of an ER visit and re-hospitalization in patients with schizophrenia receiving antipsychotics in the hospital setting, resulting in lower hospital costs.

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**PMH36**

DIFFERENCES BETWEEN HIGH-COST AND LOW-COST PATIENTS DIAGNOSED WITH OPIOID ABUSE

**Objectives:** Prior research has estimated the burden of opioid abuse in the U.S. However, older data may not reflect recent trends in abuse prevalence and associated costs. This study provides updated estimates of the burden of opioid abuse.

**Methods:** Patients aged 12-64 diagnosed with opioid abuse/dependence (“abusers”) were selected from the Truven MarketScan medical and pharmacy claims database, 2009-2012. A 12-month follow-up period centered on the index date (i.e., first abuse diagnosis) was used to assess costs and was preceded by a 6-month baseline period. Patients were required to have continuous non-HMO coverage throughout the 18-month study period. Potential controls met similar inclusion criteria but were not diagnosed with abuse, with their index date based on a random medical claim. Abusers were matched 1:1 to controls based on index year, baseline healthcare costs, and propensity score to account for baseline differences. Per-patient healthcare costs of abusers and matched controls were compared to determine the excess annual healthcare costs of diagnosed abuse. Costs reflect payments from payers to providers in 2012USD. Prevalence of abuse was estimated as the proportion of abusers among those with ≥1 one month of eligibility in a given year.

**Results:** 38,876 abusers and 955,202 controls met the inclusion criteria. 35,828 (92.2%) abusers were successfully matched. Post-matching, baseline characteristics were well-balanced. Abusers had $11,319
higher annual total healthcare costs than matched controls ($22,132 vs. $10,813) in the follow-up period. Costs were higher for abusers in all cost categories: inpatient, emergency department, outpatient, and prescription drug costs [all p-values <0.001]. Diagnosed abuse prevalence increased from 0.16% in 2009 to 0.27% in 2012.

Conclusions: We find substantial excess healthcare costs of opioid abuse, consistent with prior research. The rising prevalence of abuse suggests a growing economic burden but may also reflect increased physician awareness of previously undiagnosed patients.

PMH58
FACTORS ASSOCIATED WITH PERFORMANCE ON THE MEDICAID HEDIS MEASURE: CONTINUITY OF ANTI-PSYCHOTIC (AP) MEDICATIONS FOR TREATMENT OF SCHIZOPHRENIA

Objectives: To assess the impact of baseline characteristics, including prior year adherence and use of paliperidone palmitate (PP), on AP continuity metric performance.

Methods: Medicaid healthcare claims data from five states (2008-2011) were used to identify patients 25-64 years of age diagnosed with schizophrenia and ≥1 AP Rx in baseline year 2010 (BY) and in measurement year 2011 (MY). Adherence to AP was defined as the percentage with dispensed AP medication covering ≥80% of a given year. Baseline year characteristics including demographics, healthcare costs, AP treatment and adherence status were evaluated as potential predictive factors of MY continuity using multivariate logistic analyses. Two mutually exclusive cohorts (patients with any PP claim vs. all other AP patients in BY) were compared on continuity measure performance using inverse propensity score weighting (IPW), with propensity representing the likelihood of PP treatment based on BY characteristics.

Results: In the study population of 12,990 AP users, 48.6% successfully achieved the AP continuity criteria in MY. After controlling for other covariates, the likelihood of continuity measure success was improved by adherence in BY (odds ratio (OR): 9.42; 95% confidence interval (CI): 8.55-10.39), female sex (OR: 1.11; 95%CI: 1.01-1.22), age 55-64 (OR: 1.26; 95%CI: 1.09-1.46) relative to age 25-34, and Hispanic (OR: 1.37; 95%CI: 1.05-1.81) relative to white. An incremental $10K in BY inpatient admission cost was also associated with greater likelihood of success (OR: 1.11; 95%CI: 1.08-1.15). Accounting for baseline differences between treatment cohorts using IPW, PP use was associated with a 26% increase in the likelihood of continuity achievement compared to other AP use (OR: 1.26; 95%CI: 1.14-1.39).

Conclusions: Baseline factors associated with better performance on the HEDIS Continuity of AP Medications measure were prior year adherence, use of PP therapy, higher inpatient costs, older age, female gender, and Hispanic ethnicity.

PMH83
TREATMENT PATTERNS OF PATIENTS RECEIVING PALIPERIDONE PALMITATE IN AN INPATIENT SETTING

Objectives: To analyze treatment patterns of patients receiving paliperidone palmitate (PP) in the inpatient setting.

Methods: Hospital discharge and billing records from the Premier Perspective Comparative Hospital Database (1/2009-3/2012) were analyzed for adult patients who had a hospitalization (index hospitalization) with a schizophrenia diagnosis (ICD-9: 295.x), and who received their first inpatient PP treatment without evidence of prior inpatient treatment with other long-acting antipsychotics (AP). Patients with only a schizoaffective disorder diagnosis (ICD-9: 295.7) during index admission and patients discharged to a psychiatric institute were excluded. Length of stay (LOS), time to first PP, and PP dosage frequency and strength were used to describe treatment patterns. Statistical comparisons were conducted between patients receiving one versus multiple PP doses during hospitalization using Wilcoxon rank-sum tests. No adjustment was made for multiplicity.

Results: A total of 374 hospitalized patients treated with PP were identified. Mean LOS was shorter for one-dose (N=228) relative to multiple-dose (N=146) patients (11.4 vs. 16.7 days, p<0.0001) and mean time to first PP was 7.7 and 6.5 days (p=0.0161), respectively. Earlier first PP administration was associated with shorter LOS (Spearman rank correlation tests: 0.6953 (p<0.0001) for the one-dose and 0.5897 (p<0.0001) for the multiple-dose cohorts). Among one-dose patients, 48.2% received a first injection of 234mg. Most multiple-dose patients received the labeled initiation regimen (234mg followed by 156mg) as a second dose. The mean (SD) time to second PP injection was 5.93 (2.59) days.

Conclusions: 39% (146 of the 374 patients) of PP patients received multiple PP doses during their inpatient stay and had a shorter mean time to treatment initiation compared to one-dose patients. Most of these patients received the labeled initiation regimen (234mg followed by 156mg dose). In both dose cohorts, shorter time to treatment initiation was associated with shorter LOS.
**Psy10**

**Medical Complications and Resource Utilization in Blood Transfusion-Dependent Patients with Myelofibrosis by Iron Chelation Therapy Use**

**Objectives:** To compare incidence of myelofibrosis (MF)-related complications and all-cause and MF-related resource utilization (RU) in blood transfusion-dependent (TD) MF patients treated with vs. without iron-chelating therapy (ICT+ vs. ICT-).

**Methods:** Two commercial healthcare claims databases, Truven MarketScan (2000-2012) and PharMetrics (2001-2012), were analyzed. Patients with ≥2 MF ICD-9 diagnosis codes ≥30 days apart and ≥18 years at first MF diagnosis were included. First evidence of TD (index date) was defined as ≥3 transfusion events within any 3-month period. Adjusted incidence rate ratios (aIRRs) of MF-related complications and all-cause and MF-related RU in TD ICT+ vs. ICT- patients were assessed using Poisson regressions, controlling for baseline comorbidities and MF-related complications.

**Results:** Of the 571 eligible TD MF patients, 103 (18%) were ICT+ and 468 (82%) were ICT-. Mean age was similar between groups (ICT+: 67.2[SD: 10.4] vs. ICT-: 66.6[11.7]). Mean observation time was longer for ICT+ patients (months, 22.2[13.9] vs. 12.6[11.6]). ICT- patients had higher mean Charlson Comorbidity Index (1.8[1.8] vs. 2.3[2.1]), suggesting a greater burden of comorbidities. Mean number of transfusion events/year was similar between groups (22.4[19.5] vs. 22.2[28.5]; p=0.94). ICT+ patients had lower rates of thrombocytopenia (aIRR: 0.54; p<.001) and pancytopenia (0.53; p<.001). Rates of other MF-related complications were similar between groups. ICT+ patients had significantly lower rates of all-cause and MF-related ER visits (all-cause aIRR: 0.83 [95% CI: 0.72-0.95]) as well as inpatient stays (0.75 [0.64-0.87]) and days (0.52 [0.50-0.55]), but higher rates of outpatient visits (1.22 [1.19-1.25]).

**Conclusions:** Despite similar complication profiles, ICT+ patients had significantly lower rates of acute care, but higher rates of outpatient care vs. ICT- patients, suggesting a possible link between closer monitoring and decreased acute care utilization in MF TD patients. Potential short term and long term benefits of ICT in MF need to be validated in prospective clinical trials.

**Psy18**

**Impact of Chronic Hepatitis C (CHC) Treatment on Post Therapy Healthcare Cost**

**Objectives:** CHC is associated with significant economic burden. This study evaluated the healthcare cost alleviation associated with treatment of CHC.

**Methods:** Health insurance claims from 60 self-insured U.S companies 01/2001-03/2012 were analyzed. Adult patients with ≥1 diagnosis claim of CHC (ICD-9-CM: 070.44, 070.54), newly initiated on interferon with ≥2 dispensings, and with more than 48 weeks of follow-up were selected. Patients diagnosed with HIV or who completed only 24 weeks of interferon therapy (a surrogate for CHC genotypes 2 and 3) were excluded from the study. Interferon users were categorized into complete and discontinued therapy cohorts according to their adherence to therapy during the first 36 to 48 weeks of treatment. The post 48 week period, complete and discontinued therapy cohorts were compared for healthcare resource utilization using rate ratios (RRs), as well as all-cause and CHC-related healthcare costs using per patient per year (PPPY) cost differences. Confidence intervals (CI) and p-values for cost differences were calculated using a nonparametric bootstrap.

**Results:** A total of 1017 patients with complete and 953 patients with discontinued interferon therapy were identified. For the complete and discontinued therapy cohorts, respectively, mean age was 49.6 and 50.4 years; 38% were female in both cohorts. Relative to the discontinued therapy cohort, the complete therapy cohort had significantly fewer hospitalizations (RR [95% CI]: 0.74 [0.68;0.81], P<.001) and outpatient visits (RR [95% CI]: 0.92 [0.91;0.93], P<.001), which translated into significantly lower total healthcare costs PPPY (cost difference [95% CI]: -$4,540 [-7,680; -1,570], P=0.004). The majority, 61%, of the all-cause cost differences between cohorts was not related to CHC.

**Conclusions:** CHC patients who have completed an interferon therapy and presumably have a higher rate of achieving SVR have lower costs post therapy. Interestingly, both non-CHC and CHC-related costs were found to be reduced.

**Psy40**

**Indirect Comparison of the Efficacy of Recombinant Factor VIII FC Fusion Protein and Other Factor VIII Products for Prophylaxis: Modeling the Effect of Compliance**

**Objectives:** For people with hemophilia A, factor VIII (FVIII) prophylaxis is burdensome, potentially leading to poor compliance. Treatment adherence and outcomes may be improved with drugs requiring less frequent infusions. In the absence of head-to-head direct comparative evidence from clinical trials, this analysis indirectly compared the prophylactic efficacy of recombinant FVIII Fc fusion protein (rFVIIIFc) with the published results of current rFVIII products and simulated effects of potential differences in real-world compliance between regimens.

**Methods:** rFVIIIFc and rFVIII were indirectly compared using data from previously treated subjects in the A-LONG phase 3 study (rFVIIIFc; individualized arm) and published clinical
studies of routine prophylaxis (rFVIII; identified by literature search). Efficacy was compared using reported differences in mean annualized bleed rates (ABRs) for individual and pooled results using meta-analysis with random effects. Unreported standard deviations of ABR were estimated assuming a Poisson distribution and adjusted for over-dispersion. A model was developed to assess the effect of compliance changes on ABR.

**Results:** This analysis included published results from the A-LONG study (severe hemophilia; rFVIIIFc; Mahlangu 2013) and 4 studies of rFVIII (moderate/severe hemophilia; Advate®; Tarantino 2004, Shapiro 2003, and Valentino 2012; Xyntha®; Recht 2009). Infusion frequencies were 1.4-2.4 (median 2.0) times/week for rFVIIIFc and 2.3-4 times/week for rFVIII. Mean ABR for rFVIIIFc was 2.9; the pooled mean ABR estimate for rFVIII was 4.8 (I² =44.2%, ΔABR=1.8; P=0.003). Simulations showed that statistically significant improvements in mean ABR would result from improving compliance with rFVIIIFc by ≥6-12 percentage points.

**Conclusions:** Results of this unadjusted indirect comparison of clinical studies suggest that routine prophylaxis with rFVIIIFc may result in a lower mean ABR than that of other rFVIII products examined. Moreover, potential improvements in compliance associated with less burdensome dosing requirements, as suggested by studies in other chronic diseases, may result in better effectiveness with rFVIIIFc.

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**PDB131 UNITS AND COSTS PER DAY PER CLAIM OF COMPARABLE INSULINS SUPPLIED TO MEDICAID PATIENTS**

**Objectives:** To compare units per day per claim (units) and costs per day per claim (costs) of comparable insulin products by Eli Lilly and Company (LLY) and Novo Nordisk (NN), adjusting for baseline patient differences, in state Medicaid claims data.

**Methods:** Claims for comparable LLY or NN insulin for patients with continuous coverage for >6 months before their first observed insulin claim (baseline) were identified from Missouri (MO: 1/1/2011-3/31/2012) and New Jersey (NJ: 1/1/2011-3/31/2013) de-identified Medicaid claims data. Units were calculated by multiplying total quantity per claim (in mL) by strength (1 mL=100 units) and dividing by total days supplied. Costs were calculated (for patients aged <65 years only, because drug costs for those aged ≥65 years are often covered by Medicare rather than Medicaid) by dividing the cost of a claim to insurers by total days supplied. Costs were calculated using generalized estimating equation models, accounting for baseline demographics, select comorbidities, and antidiabetic medication use.

**Results:** Claims for 23,325 MO and 9,749 NJ Medicaid patients were analyzed. Compared with NN insulin users, LLY insulin users were significantly younger, had lower rates of comorbidities, and higher rate of baseline insulin use. The regression-adjusted units for all comparable LLY and NN insulins were similar, with the exception of significantly lower units for insulin lispro (MO only:

**PDB131 INDIRECT COMPARISON OF THE EFFICACY OF RECOMBINANT FACTOR IX FC FUSION PROTEIN AND OTHER FACTOR IX PRODUCTS FOR PROPHYLAXIS: SIMULATING THE EFFECT OF COMPLIANCE ON REAL-WORLD EFFECTIVENESS**

**Objectives:** Hemophilia B prophylaxis with factor IX (FIX) requires frequent infusions, potentially leading to poor compliance and reduced therapeutic effectiveness. In the absence of head-to-head direct comparative evidence from clinical trials, this analysis indirectly compared the prophylactic efficacy of recombinant FIXFc fusion protein (rFIXFc) and other rFIX products, which require more frequent infusions. Additionally, we simulated the effects of potential differences in real-world compliance between regimens.

**Methods:** rFIXFc and rFIX were indirectly compared using data from clinical trials of previously treated subjects administered rFIXFc (B-LONG phase 3 study, weekly dosing arm) or rFIX (published clinical studies of routine prophylaxis identified by literature search). Efficacy was compared using reported differences in mean annualized bleed rates (ABRs) for individual and pooled results using meta-analysis with random effects. Unreported standard deviations of ABR were estimated assuming a Poisson distribution and adjusted for over-dispersion. A model simulating the effect of improved compliance on ABR was developed.

**Results:** This analysis included results from the published B-LONG study (severe hemophilia; rFIXFc; Powell 2013) and 4 published studies of rFIX (moderate/severe hemophilia; BeneFIX®; Roth 2001, Lambert 2007, and Korth-Bradley 2011; Rixubis®; Windyga 2012). Infusion frequencies were once weekly for rFIXFc, and 1 to >3 times/week (Roth 2001, Lambert 2007) or 1-2 times/week (Korth-Bradley 2011, Windyga 2012) for rFIX. Mean ABR for rFIXFc was 3.07; the pooled mean ABR estimate for rFIX was 3.84 based on these clinical studies (I²=57.5%, ΔABR=0.77; P=0.23). Simulations showed that statistically significant improvements in mean ABR would result from improving compliance with rFIXFc by ≥9-14 percentage points.

**Conclusions:** Based on unadjusted indirect comparison of rFIXFc and other rFIX products, and simulations of potential differences in real-world compliance, less burdensome dosing with rFIXFc may lead to improved real-world effectiveness, consistent with findings in other chronic diseases.
strategy compared with initiation with MTRs, due to greater
model illustrated that initiation with STRs is a cost-effective
settings. Incorporating this evidence into a cost-effectiveness
and economic outcomes compared to MTRs in real-world
STRs have demonstrated superior clinical
Conclusions: In both MO and NJ Medicaid, the units of
similar for patients with similar characteristics; however, the
overall cost was significantly lower for comparable LLY vs.

PIN54
COST-EFFECTIVENESS OF SINGLE VERSUS MULTIPLE TABLET REGIMENS FOR TREATMENT OF HIV-1 INFECTION

Objectives: Favorable clinical outcomes in HIV-1 infection require optimal adherence to multi-drug antiretroviral (ARV) regimens. Single-tablet regimens (STRs) simplify treatment compared with multiple-tablet regimens (MTRs) and are associated with improved adherence, improved virologic outcomes and reduced hospitalizations. To date, models assessing the economic value of STRs have been based only on clinical trial evidence from idealized settings with close follow-up. Economic models have not yet incorporated real-world evidence comparing adherence and effectiveness between STRs and MTRs.

Methods: A patient-level simulation model was used to compare health and economic outcomes between STRs and MTRs in the US. STRs included EVG/CObI/FTC/TDF, EFV/FTC/TDF and RPV/FTC/TDF. MTRs included a 3rd agent plus 3TC+TDF backbone. Before incorporating real-world evidence, the model was validated against published economic projections based on clinical trial results. Real-world evidence identified via systematic literature review was then incorporated for differences in adherence, resistance, and hospitalization risk between STRs and MTRs. Upcoming generic drug scenarios included 25-75% cost reductions and are associated with improved adherence, improved virologic outcomes and reduced hospitalizations. To date, models assessing the economic value of STRs have been based only on clinical trial evidence from idealized settings with close follow-up. Economic models have not yet incorporated real-world evidence comparing adherence and effectiveness between STRs and MTRs.

Results: After incorporating real-world evidence, the virologic suppression rates at 24 weeks were 72.7% and 63.2% for STRs and MTRs, respectively. When initiating with STRs vs. MTRs, short-term inpatient costs (at 2 years) were reduced by 29% ($7,660 vs. $10,819) and an additional 2 life years (20.6 vs. 18.6) were gained. The discounted life-time incremental cost-effectiveness ratios ranged from $26,000 to $52,000 per QALY, depending on assumed generic discounts.

Conclusions: STRs have demonstrated superior clinical and economic outcomes compared to MTRs in real-world settings. Incorporating this evidence into a cost-effectiveness model illustrated that initiation with STRs is a cost-effective strategy compared with initiation with MTRs, due to greater

PIN79
REAL-WORLD PERSISTENCE WITH SINGLE VERSUS MULTIPLE TABLET REGIMENS FOR HIV-1 TREATMENT

Objectives: Non-persistent use of any component of an antiretroviral (ARV) regimen can lead to viral replication and treatment resistance. We compared real-world persistence between HIV-1 infected patients receiving once-daily single tablet regimens (STRs) versus multiple-tablet regimens (MTRs) using 7-year history in a claims database. In addition, we assessed whether initial MTR persistence predicted long-term persistence comparable to an STR.

Methods: HIV-1 infected patients filling ARV prescriptions after a 90-day washout were identified in a large claims database (07/2006-03/2013). Index regimens were classified as STRs (1 pill daily) or MTRs (≥2 pills daily). Persistence was measured as the time from starting the index regimen to the first 90-day prescription gap for any ARV in the index regimen, or to the first prescription for an ARV not in the index regimen. Persistence was compared between STRs and MTRs with a logrank test. Additionally, the subgroup persistent on MTRs for the first 6 months was compared to the full group receiving STRs and the subgroup persistent on STRs for the first 6 months.

Results: Among 3,590 patients who initiated ART, 1,909 (53%) patients initiated STRs; 1,681 (47%) initiated MTRs. Median persistence (95% confidence interval) was 36.5 (31.3, 38.9) months on STRs and 13.2 (11.9, 15.0) months on MTRs (Difference 23.3; P<0.001). Within the subgroups persistent for the first 6 months, median persistence on MTRs was 26.1 (24.2, 28.3) and on STRs was 47.6 (41.2, 54.3) months. Limiting the MTR analysis to those patients who had persistence ≥6 months still fell short of the overall STR persistence (P<0.001).

Conclusions: Patients receiving an STR regimen had significantly longer median persistence, by almost two years, compared to those receiving MTRs. Even those patients who persisted on an MTR for the first 6 months experienced shorter overall persistence than those receiving an STR.

PSS15
HEALTHCARE COSTS IN PSORIASIS PATIENTS NEWLY INITIATED ON A BIOLOGIC THERAPY OR METHOTREXATE

Objectives: The objective of this study was to describe healthcare costs associated with the management of psoriasis in patients newly initiated on a biologic or methotrexate (MTX).

Methods: Continuously enrolled adult patients with ≥2

67.6 vs. 73.2, P=0.0009) and LLY human insulin regular
vials (MO: 65.4 vs. 78.3, P<0.0001; NJ: 45.3 vs. 50.3,
P=0.0365). The regression-adjusted overall cost was
significantly lower for comparable LLY vs. NN insulin (MO:
$5.7 vs. $6.1, P=0.0046; NJ: $4.6 vs. $5.5, P<0.0001).
inpatient or outpatient psoriasis diagnoses were selected from the MarketScan Commercial Claims database (2005-2009). The first biologic or MTX prescription date was defined as the index date. “MTX initiators” had not used biologics, non-biologic conventional systemic therapies, or phototherapy 6 months before the index date. “Biologic initiators” were required to be biologic-naïve only before the index date. Healthcare costs were estimated from a US payer perspective (2011 US dollars) over the 12-month period following the index date, based on payments for all medical services and psoriasis related diagnosis as a subset. Physician office visits, monitoring, inpatient hospitalizations, and emergency department visits were also captured.

**Results:** A total of 2,642 MTX initiators and 6,702 biologic initiators met the eligibility criteria. MTX initiators had a mean annual total healthcare cost of $12,548, of which 30.7% was psoriasis-related. Pharmacy costs accounted for $3,182 of the psoriasis-related costs, office care and monitoring costs accounted for $501, and urgent care costs accounted for $166. Biologic initiators had an average annual total healthcare cost of $28,752, of which 72.0% was psoriasis-related. Pharmacy costs accounted for $19,997 of the psoriasis-related total costs, office care and monitoring cost for $538, and urgent care costs for $166.

**Conclusions:** Psoriasis patients initiating on MTX or a biologic incurred substantial healthcare costs. Pharmacy costs account for the majority of the psoriasis-related costs.

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**PUK13**

**HEALTHCARE COSTS AMONG PATIENTS WHO CONTINUE THERAPY OR SWITCH ANTIMUSCARINIC AGENTS FOR OVERACTIVE BLADDER**

**Objectives:** To compare healthcare costs among patients who continued therapy or switched antimuscarinic agents for overactive bladder (OAB).

**Methods:** Patients initiating antimuscarinic therapy from 1/1/2007-3/31/2012 diagnosed with OAB were identified from a large claims database of privately insured patients. Patients were required to have no antimuscarinic claims in the 12 months before their antimuscarinic initiation (baseline period), continuous coverage for ≥12 months before and after antimuscarinic initiation, and age 18-64 years. Based on claims in the 6 months after antimuscarinic initiation, patients who continued index antimuscarinic therapy were categorized as persisters (n=3,197), and patients with a claim for a non-index antimuscarinic agent (without a gap >60 days after the end of index antimuscarinic treatment) were categorized as switchers (n=828). The study index date was defined as the date of switching from index antimuscarinic for switchers and a randomly assigned date (matching the distribution of time from initiation to switching) for persisters. All-cause and OAB-related costs (i.e., reimbursements to providers for medical and pharmacy claims) in the month prior to and 6 months after the index date were compared using generalized linear models controlling for baseline characteristics and baseline costs.

**Results:** Persisters compared with switchers were older and had lower baseline costs. After controlling for baseline characteristics and costs, all-cause and OAB-related costs in both the month before and 6 months after the index date were significantly lower among persisters than switchers (1 month before: all-cause $1,222 vs. $1,759, OAB-related $142 vs. $170; 6 months after: all-cause $7,017 vs. $8,806, OAB-related $642 vs. $797; all p<0.0001).

**Conclusions:** All-cause and OAB-related costs in the period immediately before and after switching were higher among patients who switched antimuscarinic therapies compared with patients who persisted on their index antimuscarinic therapy.
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