MENTAL HEALTH - Cost Studies

PMH20
THE IMPACT OF LONG ACTING INJECTABLE MEDICATIONS ON PATIENT OUTCOMES

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OBJECTIVES: Assess behavioral health care utilization and expenditures for patients receiving long acting injectable medications. **METHODS:** A long acting injectable psychotropic medication is a sustained-action drug formulation administered through intra-muscular injection that allows slow release and gradual absorption. This was a retrospective study using behavioral health and pharmacy claims data. Commercial patients from a large national health plan diagnosed with schizophrenia, substance-related disorders, or mood disorders who received a long acting injectable between January 1, 2012 and July 31, 2015 were identified. A second cohort was comprised of patients with the same conditions during the same timeframe who did not receive a long acting injectable. Patterns of utilization and expenditures were compared between patients with injectables and patients without. Outcomes were measured over a 90 day period starting from either their initial injection (for patients with injectables) or their initial encounter (for patients without). **RESULTS:** Patients receiving an injectable incurred lower expenditures overall ($3,002 vs. $5,064, p<.05) and had fewer intermediate stays (5.5 vs. 7.9, p<0.05) and outpatient visits (2.8 vs. 5.2, p<0.05) than patients who did not receive an injection. Similar patterns were also observed among patients who had 3 or more injectables ($1,959 vs. $3,223, p<0.05) and patients who were administered Naltrexone specifically ($3,130 vs. $5,474, p<0.05) than patients who did not receive any injections. Patients with a history of injectables incurred lower expenditures ($1,371 vs. $2,471, p<0.05) and had fewer intermediate behavioral health care stays (1.8 vs. 4.9, p<0.05) than patients who were new to the injectable treatment. **CONCLUSIONS:** Commercial patients incurred lower behavioral health care utilization and expenditures after receiving long acting injectables. Use of long acting injectable psychotropic medications to treat patients with select behavioral health conditions may be a more cost effective alternative to traditional drug therapies.

PMH21
USING PRIVATE CLAIMS DATA TO STUDY THE COST OF THE OPIOID CRISIS

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OBJECTIVES: Identify trends in healthcare costs and demand for services attributable to the opioid epidemic nationwide 2011-2015. **METHODS:** FAIR Health analyzed its dataset of billions of private healthcare claims records to identify claims with ICD-9-CM and ICD-10-CM diagnostic codes indicative of opioid abuse and dependence, then aggregated the data by key fields such as state, procedure code and year of service, and determined cost by both charges and imputed allowed amounts. **RESULTS:** From 2011 to 2015, the national aggregated dollar value of charges for opioid abuse and dependence and imputed allowed amounts for such diagnoses rose over 1,000 percent. In 2015, private payors' average costs for a patient diagnosed with opioid abuse or dependence were 556 percent higher—almost $16,000 more per patient—than the per-patient average cost based on all patients' claims. From 2011 to 2014, the greatest increase in services for patients diagnosed with opioid abuse and dependence was in alcohol and/or drug services/therapy, which increased 1,189 percent, followed by laboratory tests at 848 percent. States' average charges for services varied widely. In 2014, the states with the highest associated average per-service charges were Iowa ($263) and Washington, DC ($247). Those with the lowest were Rhode Island ($45) and South Carolina ($60). **CONCLUSIONS:** The opioid crisis is having a profound economic impact on the healthcare system. Both billed charges and allowed amounts for services associated with opioid abuse and opioid dependence have increased dramatically in recent years. Certain categories of care, including alcohol and/or drug services/therapy and laboratory tests, have increased in utilization more than others. Although states vary in the level of their average per-service charges, the overall pattern is one of increasing demand for treatment for opioid abuse and dependence, with correspondingly higher costs for payors.

PMH22
THE ECONOMIC BURDEN AMONG PATIENTS WITH TREATMENT RESISTANT DEPRESSION IN US CLAIMS DATA

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OBJECTIVES: Major depressive disorder (MDD) that does not respond to 2 or more adequate antidepressant (AD) medication treatments is classified as treatment resistant depression (TRD). This study compares the total healthcare cost and resource utilization between patients with TRD and those with non-TRD MDD, using OPTUM Clinformatics™. **METHODS:** This retrospective cohort study included patients of age ≥ 18 years old who received antidepressants (AD) between 01/01/2013-09/30/2014. The index date for the study was defined as the first dispensing of AD. All patients were required to have no AD pharmacy claims 6 months prior to the index date and have an MDD diagnosis within 30 days of the index date. TRD patients were matched with non-TRD MDD patients using the greedy approach at 1:4 ratio on the propensity score using baseline characteristics such as age, sex, anxiety and diagnosed comorbidities. The annual total healthcare costs included medical and pharmacy costs to payors and direct costs to patients. Cost outcomes were compared between TRD vs non-TRD MDD patients, using a generalized linear model on the matched patients. Results were obtained by averaging 1000 repetitions of the bootstrapping. **RESULTS:** The analysis included 2370 TRD and 9289 non-TRD

MDD patients. Patients in the TRD cohort had a higher total healthcare costs than non-TRD MDD in both years 1 and 2: with differences of (95% confidence intervals) US$3845 (2855, 4928) and US$2411 (1217, 3713) and higher costs to both payors and patients. The TRD patients were more likely to be hospitalized with odds ratio (95% CI) 1.73 (1.46, 2.05) in year 1 and 1.43 (1.19, 1.73) in year 2, and had a higher frequency for outpatient visit and emergency room visit. **CONCLUSIONS:** TRD is associated with significantly increased total healthcare cost and resource utilization compared to non-TRD MDD in this US commercially insured cohort.

PMH23
PREDICTORS OF ALL-CAUSE HEALTHCARE PAYMENTS AMONG PATIENTS WITH TREATMENT-RESISTANT MAJOR DEPRESSIVE DISORDER

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OBJECTIVES: Treatment-resistant depression (TRD), defined as episodes of major depressive disorder (MDD) that do not respond to at least 2 lines of adequate depression therapy, is associated with a high economic burden. Limited information exists concerning predictors of healthcare payments following TRD identification. **METHODS:** This retrospective cohort study used data from the Truven Health MarketScan Commercial and Medicare Supplemental Databases (10/1/2008-9/30/2016). Patients with TRD were ≥18 years old, newly-diagnosed with MDD (≥1 inpatient admission or ≥2 outpatient visits with a primary or secondary MDD diagnosis), and newly treated with at least 3 courses of depression therapy (initiation of third course served as the TRD index date). Cohort study patients were continuously enrolled from a 12-month baseline period prior to the first course of therapy through a 12-month follow-up period after their TRD index date. Study measures included annual total all-cause healthcare payments (2016 USD) during the follow-up period. Adjusted TRD follow-up payments were estimated using a generalized linear model, controlling for demographics, baseline comorbidities, baseline resource use, and first-line class of therapy. **RESULTS:** TRD patients (n=1,112) had a mean (SD) age of 38.8 (14.1) and 60.6% were female. Mean (SD) total annual all-cause healthcare payments were $10,161 ($34,275) per patient in the TRD follow-up period, of which 34% ($3,423 [$5,817]) were outpatient payments. In multivariate modeling, younger age (18-24, 25-34, 35-44, 45-54, 55-64 vs. 65+), baseline obesity and pain, higher Charlson comorbidity score (2, 3+ vs. 0), and baseline resource use (ED visit, other visit, outpatient visit) were associated with significant increases in annual all-cause healthcare payments during the follow-up period (all P<.05). **CONCLUSIONS:** Annual all-cause healthcare payments in the 12 months following third-line therapy initiation can be substantial, particularly for younger adult TRD patients with obesity or pain-related diagnoses. Efforts to reduce this economic burden are warranted.

PMH24
HEALTHCARE COSTS ASSOCIATED WITH HYPERPROLACTINEMIA IN THE UNITED STATES

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OBJECTIVES: To assess the incremental healthcare costs associated with hyperprolactinemia among patients receiving antipsychotics. **METHODS:** Commercially insured adults were identified from the Truven Commercial US claims database (2006Q1–2016Q3). For patients with hyperprolactinemia (hyperprolactinemia cohort), the index date was defined as 14 days before the first hyperprolactinemia indicator (hyperprolactinemia, amenorrhea, galactorrhea, gynaecomastia, hypogonadism, prolactin assay, mammary ductogram/galactogram). For patients without hyperprolactinemia (hyperprolactinemia-free cohort), the index date was selected so that patient characteristics at that date matched the characteristics of the matched patients in the hyperprolactinemia cohort (i.e., demographics, antipsychotic treatment history, comorbidities, and mental-health medical services). Both cohorts were treated with antipsychotics within 12 months before index date. Costs from a payers' perspective were compared between cohorts during the 6-month period following index date and were annualized. Analyses were replicated among Medicaid-insured patients. **RESULTS:** For each cohort, 499 patients were identified, mean age was 39 years, and 77% were female. Compared to the hyperprolactinemia-free cohort, the hyperprolactinemia cohort was associated with incremental total healthcare costs of $8,197 ($21,522 vs $13,325; p<0.01), and incremental medical costs of $6,124 ($14,549 vs $8,425; p<0.01), which were mainly driven by hyperprolactinemia-related ($3,933 vs $222; p<0.01) and mental health-related ($7,043 vs $3,495; p=0.01) costs, accounting for 61% and 58% (not mutually exclusive) of the medical costs difference, respectively. All-cause inpatient costs were an important contributor of the medical cost difference, representing 40% of difference between cohorts ($5,234 vs $2,807; p=0.03). Similar findings were observed in Medicaid-insured patients (N=257 in each cohort); the hyperprolactinemia cohort was associated with incremental total healthcare costs of $12,212 ($32,459 vs $20,246; p<0.01), and incremental medical costs of $10,782 ($22,757 vs $11,975; p<0.01) compared to the hyperprolactinemia-free cohort. **CONCLUSIONS:** Hyperprolactinemia is associated with important healthcare costs. Therapeutic options with low/no impact on prolactin levels may contribute to reduce the hyperprolactinemia burden.

PMH25
REDUCED RISK OF HYPERPROLACTINEMIA AMONG PATIENTS TREATED WITH ATYPICAL ANTIPSYCHOTICS THAT ARE ASSOCIATED WITH LOW OR NO PROLACTIN ELEVATION

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OBJECTIVES: To compare the risk of hyperprolactinemia among patients receiving atypical antipsychotics (AAs). METHODS Commercially insured adults aged 18 to 64 who received AAs (all AAs were considered) were identified from Truven Commercial US claims data (2006Q1–2016Q3). Two mutually exclusive cohorts were identified based on whether patients received AAs with a mechanism of action associated with no/low prolactin elevation (Low Prolactin Cohort) or moderate/high prolactin elevation (High Prolactin Cohort). For each AA treatment episode, patients were observed from start to end of treatment with the same AA. All AA treatment episodes (defined by gaps ≥180 days or AA change) were analyzed. Entropy balancing was used to reweight treatment episodes, so that the two cohorts have similar demographics, comorbidities, and mental health-related medical services. Risk of hyperprolactinemia was compared between cohorts using logistic-regression models. Analyses were replicated in Medicaid-insured patients. **RESULTS:** Among commercially insured patients, 446,673 and 77,532 AA treatment episodes were identified in the Low and High Prolactin cohorts. The mean treatment episode duration was 8 and 7 months in the Low and High Prolactin cohorts. The most commonly used AAs were quetiapine, aripiprazole, and olanzapine in the Low Prolactin Cohort, and risperidone, asenapine, and paliperidone in the High Prolactin Cohort. The prevalence of hyperprolactinemia while on treatment was 0.06% and 0.31% in the Low and High Prolactin cohorts. The odds of hyperprolactinemia in the Low Prolactin Cohort was 5 times lower than that in the High Prolactin Cohort (odds ratio=0.21; p<0.001). Similarly, the odds of hyperprolactinemia in the Low Prolactin Cohort (N=177,379) was 4 times lower than that in the High Prolactin Cohort (N=58,447) in Medicaid-insured patients (odds ratio=0.26; p<0.001). **CONCLUSIONS:** AAs associated with no/low prolactin elevation reduce the risk of hyperprolactinemia by up to 80% and may be considered in treatment decision-making to reduce the hyperprolactinemia burden in AA-treated patients.

PMH26
THE TOTAL DIRECT HEALTHCARE EXPENDITURES OF DIAGNOSED DRUG DEPENDENCE: EVIDENCE FROM UNITED STATES NATIONAL SURVEY DATA

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OBJECTIVES: The growing opioid epidemic has a large impact on the burden of overall illicit drug dependence. The use of cocaine, cannabis, amphetamines, and other illicit drugs has been on the rise as well. However, there is little research quantifying the associated health care expenditures of drug dependence overall. This study estimated the total direct healthcare expenditures, insurer and patient out-of-pocket (OOP), of diagnosed drug dependence in the United States (US). **METHODS:** This study used 2012-2015 data from the Medical Expenditure Panel Survey (MEPS), a large, nationally-representative database from the US. This study performed descriptive analyses of the total annual healthcare costs for diagnosed drug dependence. Insurer and patient OOP expenditures were reported at the individual and US aggregate levels. Patients were identified by the International Classification of Disease Codes 9th Revision (ICD-9) code 304.xx. US aggregated estimates were calculated using published prevalence rates of drug dependence. **RESULTS:** The MEPS database included 139 patients with diagnosed drug dependence. The average age was 37.6 (SD=21.38) and 53% were female. For those with diagnosed drug dependence, the total annual direct healthcare expenditures were $3,297. The annual insurer and patient OOP expenditures were $2,828 (86%) and $469 (14%) respectively. The US aggregated total direct healthcare burden of diagnosed drug dependence, adjusted to the 2017 US population, was $15.0 billion ($12.8 billion insurer and $2.1 billion patient OOP). **CONCLUSIONS:** These findings indicate that the total direct healthcare expenditures of drug dependence are considerable. Further, they are likely conservative estimates as the data set does not include information from those in the military, incarcerated, homeless, or other institutionalized groups. These excluded groups may be found to have increased prevalence of drug dependence. Further analysis is necessary to estimate the incremental direct healthcare expenditures of diagnosed drug dependence.

PMH27
INDIRECT COSTS OF A RELAPSE IN SCHIZOPHRENIA IN MEXICO

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OBJECTIVES: It is estimated that 861,886 people over 15 years of age would suffer from schizophrenia in Mexico, so this analysis aims to evaluate the indirect costs of relapse in schizophrenia. **METHODS:** We calculated the indirect costs including loss of productivity and death related to a relapse in schizophrenia. Prevalence, relapses and hospitalization rates were used from international references supported by Mexican psychiatrists. Data sources were also from studies of similar characteristics carried out in the region. A sample obtained from clinical records of patients in two public institutes was used to validate the rates applied. The sources to measure the loss of productivity we used the international mortality table GAM 71 and the death registry, published by Mexican Statistics Institute. The productivity losses associated with a relapse were calculated as the difference in the employment rate of people who have recently experienced a relapse and people who have not relapsed using the Mexico's minimum wage. Number of working people with schizophrenia that have suffered a relapse was obtained from the difference of employment rate of people with schizophrenia (assumed to be 29.9%) excluding the difference between the employment rates of people with and without relapse (5.5%); so, the percentage of working people who suffered at least one relapse resulted to be 21%. Costs were calculated in 2017 USD (1 USD = 19 MXN). **RESULTS:** In 2017, the value of productivity lost due to unemployment associated with a relapse in schizophrenia was estimated at 36.7 million. The cost of loss of productivity due to premature death among patients with relapse was 54.4 million in 2017. The costs for informal care were 24.9 million approximately in 2017. **CONCLUSIONS:** In Mexico, approximately 180,996 had at least one episode of relapse during 2015, thus increasing the levels of physical and cognitive deterioration implicating productivity losses.

PMH28
COST ANALYSIS MODEL FOR THE TREATMENT OF ACUTE AGITATION AMONG PATIENTS WITH SCHIZOPHRENIA IN CHINA

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OBJECTIVES: To assess the healthcare resource utilization and cost associated with the inpatient treatment of short-acting intramuscular (IM) ziprasidone, oral risperidone + oral benzodiazepine, oral olanzapine, short-acting IM haloperidol, and electroconvulsive therapy (ECT) for the management of acute agitation among patients with schizophrenia in China from a hospital's perspective. **METHODS:** Cost measures included hospital room and board, antipsychotics, ECT, and medications for the management of extrapyramidal symptoms (EPS). Input for standard antipsychotic regimens and unit cost were obtained from literature. Hospital length of stay (LOS), utilization of ECT, and incidence of EPS were derived from the literature and supplemented/validated with a survey of 9 psychiatrists in China. Cost was presented in 2017 RMB (¥). **RESULTS:** Based on the survey, the average (range) estimated LOS was 29 (14-42) days with ziprasidone, 33 (15-60) days with risperidone + benzodiazepine, 32 (15-50) days with olanzapine, 35 (25-50) days with haloperidol, and 29 (12-42) days with ECT. The cost of antipsychotics was ¥1,261 with ziprasidone, ¥137 with risperidone + benzodiazepine, ¥913 with olanzapine, ¥210 with haloperidol; ECT treatment cost ¥1,585. The base-case analysis suggested that higher antipsychotic cost with ziprasidone was offset by savings with shorter LOS. Total costs including all the cost measures during the inpatient stay was the lowest with ziprasidone among all regimens (¥11,157 with ziprasidone, ¥11,406 with ECT, ¥11,422 with risperidone plus benzodiazepine, ¥11,711 with olanzapine, and ¥11,923 with haloperidol). The cost of antipsychotics and ECT accounted for 1.2% to 13.9% of the total cost. Varying LOS between the lower and upper bounds of the 95% confidence interval, total cost was comparable between these regimens. **CONCLUSIONS:** Overall, the cost for the management of acute agitation was similar between IM ziprasidone and other antipsychotics. Compared to other antipsychotics, higher medication cost of IM ziprasidone can be offset by savings with shorter hospital stay.

PMH29
LONG-TERM COST-EFFECTIVENESS OF VALBENAZINE AND DEUTETRABENAZINE FOR TARDIVE DYSKINESIA

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OBJECTIVES: To conduct a cost-effectiveness analysis of two FDA-approved vesicular monoamine transporter 2 (VMAT2) inhibitors, valbenazine and deutetrabenazine, for treating the symptoms of moderate-to-severe tardive dyskinesia (TD) compared to placebo in adult patients with underlying schizophrenia/schizoaffective, bipolar, and major depressive disorders in the United States. **METHODS:** A new semi-Markov model with time-dependent mortality and TD medication discontinuation rates was developed, employing annual cycles over a lifetime horizon. The base-case model included four health states: improved TD, moderate to severe TD, discontinued therapy with improved TD, and death. Treatment outcomes, utility, and cost inputs were obtained through systematic literature reviews, grey literature, and when necessary, consensus-based assumptions, with input from clinical experts and manufacturers. The model base-case was built from a health system perspective. The primary model outcomes included total payer costs and quality-adjusted life years (QALYs) gained (each discounted at 3% per year), combined to generate incremental cost/QALY gained. One-way, two-way, and probabilistic sensitivity analyses were conducted to evaluate model uncertainty. **RESULTS:** Discounted lifetime costs for valbenazine and the placebo comparator were approximately $185,200 and $6,900 and discounted QALYs for valbenazine and placebo were 15.35 and 15.12, respectively. Deutetrabenazine and its placebo comparator had lifetime discounted costs of approximately $220,000 and $6,600 and lifetime discounted QALYs of 15.37 and 15.18, respectively. The incremental cost-effectiveness ratios over a lifetime horizon were approximately $750,000 per QALY for valbenazine and $1.1 million per QALY for deutetrabenazine. When model inputs were varied across reasonable ranges in one-way sensitivity analyses, none resulted in estimates approaching thresholds of $150,000 per QALY. Further, the probabilistic sensitivity analyses resulted in acceptability curves with an extremely low likelihood that the treatments will reach these thresholds. **CONCLUSIONS:** In base-case and sensitivity analyses, the incremental cost effectiveness ratios for valbenazine and deutetrabenazine versus placebo far exceeded commonly utilized cost-effectiveness thresholds.

PMH30
COST-EFFECTIVENESS AND BUDGET IMPACT OF INTRODUCING LONG ACTING ATYPICAL ANTIPSYCHOTICS IN THE UNITED STATES HEALTHCARE SYSTEM

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OBJECTIVES: To determine the cost-effectiveness of different long acting atypical anti-psychotic drugs namely paliperidone palmitate (PP-LAI), olanzapine pamoate (OLZ-LAI), and risperidone (RIS-LAI) to treat chronic schizophrenia from a payer's perspective and to assess the budget impact of using antipsychotic LAI's compared to oral antipsychotics using a payers' perspective. **METHODS:** We developed a Markov Model to estimate the cost and QALY's for different treatments for a cohort of patients with chronic schizophrenia. The model will be structured in terms of three health states: "stable", "relapse" and "death". Additionally, a budget impact analysis assessing the cost implications of using the three LAI's in the health plan compared to the oral