

by the price reduction ("targeted") or not ("non-targeted"). We used an interrupted time series design and segmented regression models to estimate changes in monthly per capita volume (DDD) and expenditures following the policy. **RESULTS:** A total of 72.6% (130/179) of products were targeted by the policy. Biguanides, sulfonylureas, alpha-glucosidase inhibitors, and thiazolidinediones accounted for 96.8% of oral antidiabetic volume and 93.3% of expenditures. After the policy, there were reductions in the volume trend (-3.04 DDD/patient/month; 95%CI, [-4.98, -1.10]) and expenditure trend (-61.76 NT\$/patient/month; [-75.00, -48.51]) of targeted medications. Growths in the market volume and expenditures for non-targeted products were stable with no notable changes following the policy. Effects differed by drug group: use of targeted biguanides remained stable, but expenditures fell by 167 NT\$/patient immediately after the policy; use of targeted sulfonylureas and expenditures also reduced (-2.39 DDD/patient/month [-3.00, -1.78]; 204 NT\$/patient immediately after the policy); and use of targeted thiazolidinediones decreased (-0.58 DDD/patient/month [-0.81, -0.35]). In contrast, use and expenditures for non-targeted biguanides and alpha-glucosidase inhibitors increased, while non-targeted sulfonylureas remained stable. **CONCLUSIONS:** Overall, the price reduction policy resulted in lower use and expenditures for targeted oral antidiabetic medications, but reductions in market growth for several classes of targeted products and increases in use of non-targeted products. Our results suggest that the price reduction impacts may differ among specific anti-diabetic drug groups.

PDB94

THE TREND OF INFLUENZA AND PNEUMOCOCCAL VACCINATION AMONG ADULTS WITH DIABETES IN THE UNITED STATES, 2006-2010

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OBJECTIVES: Individuals with diabetes are particularly susceptible to influenza and pneumonia infection. They are recommended to receive annual influenza vaccination during flu season and at least one pneumonia shot during lifetime. The Healthy People 2010 Initiative set a goal of vaccinating 90% of those diabetic adults over 65 years old and 60% among diabetic patients less than 65 years of age. Vaccination coverage among diabetic adults in the United States, however, is understudied. **METHODS:** We analyzed the 2006-2010 National Health Interview Survey (NHIS) data to 1) estimate the influenza and pneumococcal vaccine coverage rates among adults with diabetes over the 5-year study period adjusting for weights, and 2) identify factors that are potentially associated with both vaccinations among this population using multiple logistic regression. **RESULTS:** Among diabetic adults aged 18 to 64 years old, both influenza and pneumonia vaccination coverage decreased in 2007 and increased steadily from 2008 (weighted estimates: 47.5% for influenza and 32.2% for pneumonia) to 2010 (weighted estimates: 53.4% for influenza and 38.2% for pneumonia). For those aged 65 years or older, influenza vaccination coverage was relatively stable from 2006 to 2009 but reduced in 2010. Pneumonia vaccination rates did not vary much from 2006 to 2010. Overall, both coverage levels were substantially higher among the aged group. Factors that positively associated with vaccination were 65 years or older, high school education or above, being married, having a health insurance, formal smoking, longer duration of being diabetic, having at least one comorbid chronic condition, having more than 2 physician encounters in last 12 months. **CONCLUSIONS:** The influenza and pneumonia vaccination coverage increased marginally among adults with diabetes from 2006 to 2010 but the objective of Health People 2010 had not achieved yet. Special efforts could be implemented to enhance both vaccine coverage among diabetic adults.

PDB95

A DESCRIPTIVE STUDY OF OPIOID USE IN THE MANAGEMENT OF DIABETIC PERIPHERAL NEUROPATHY (DPN) IN A LARGE COMMERCIALY INSURED POPULATION

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OBJECTIVES: Opioid use has grown over the last decade and neuropathy and diabetic peripheral neuropathy (DPN) guidelines do not recommend opioids as first line treatment. This study sought to examine the proportion of DPN patients who are prescribed opioids and to determine the proportion of DPN patients who are prescribed opioids as first line treatment. **METHODS:** A 10% sample of IMS-LifeLink claims data from 1998 through 2008 were used. The study population consisted of patients with ≥ 1 diagnosis for diabetes and/or ≥ 1 claim for an antidiabetic prescription. DPN patients were identified with a validated DPN identification algorithm; and the first date of a DPN diagnosis served as the index date. All patients were required to have continuous 12 month pre- and post index date plan enrollment and be >17 years of age. Patients with cancer, non-cancer pain conditions, surgery in the pre- and post- 12 month index period, and with opioid use in the pre-index period were excluded. Descriptive statistics including demographic Charlson-comorbidities, with first line use of DPN related medications were calculated. **RESULTS:** A total of 984 DPN patients met inclusion exclusion criteria with a mean age of 60.08 years. 37.40% were female and 29.88% used insulin. 428 DPN patients (43.49%) received DPN pharmacologic treatment. Of those with DPN pharmacologic treatments, 91 (21.26%) received opioid as first line treatment. Antidepressants, anticonvulsants and NSAIDs were initially used by 28.97%, 23.60%, and 21.96% respectively. The most commonly used opioids were hydrocodone combinations (8.03%), followed by codeine combinations (2.64%) and oxycodone CR (2.44%). Factors associated with opioid use will be reported. **CONCLUSIONS:** Over 50% of DPN patients remained untreated with pharmacologic therapy after a DPN

diagnosis, which may reflect under-treatment. Despite DPN treatment guidelines that do not recommend opioids as first line treatment, opioids were among the most common first line agents used.

PDB96

RACIAL VARIATIONS IN THE USE OF THIAZOLIDINEDIONES IN A MEDICAID POPULATION

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OBJECTIVES: To explore the association between race and the use of Thiazolidinediones (TZDs) and metformin among patients with Type II diabetes in the Maryland Medicaid population. **METHODS:** Medical/prescription/enrollment records from the Maryland State Medicaid Managed Care Organization/Fee-for-service, ages 18 or older, initiating use of either metformin or TZDs between 7-1-05 and 12-31-09, followed for > 6 months. Variations in race over TZDs and metformin use are described. Logistic regressions assess the likelihood of 1) starting on TZDs over metformin, and 2) switching to a TZD given initial use of metformin. Models adjust for other anti-diabetic agents, demographics, and comorbidities: hypertension (HTN), hyperlipidemia (HLD), liver disease (LD), renal dysfunction (RD). **RESULTS:** A total of 25,758 started on metformin (N=19910) or TZDs (N=5848). 20% of patients started on metformin used TZDs later, and 47% of patients started on TZDs used metformin later. 24% of Caucasians (N=8570), 21.5% of African-Americans (N=14094), 22% of Hispanics (N=987), and 28.6% of other races (N=1,201) were started on TZDs. 20% of Caucasians started on metformin switched to TZDs; as did 18% of African-Americans, 22% of Hispanics, and 24% of other races. Logistic regression shows that African-Americans (OR=0.88, 95%CI: 0.82-0.95) and Hispanics (OR=0.80, CI: 0.68-0.95) were less likely than Caucasians to be started on TZDs. Males (OR=0.92, CI: 0.86-0.98) were less likely than women, likelihood of initiation on TZD increases with age or RD (OR=1.91, CI: 1.62-2.25), and decreases if HTN (OR=0.64, CI: 0.59-0.69), HLD (OR=0.68, CI: 0.62-0.74), or LD (OR=0.48, CI: 0.37-0.63) are present. There was no association between race and the likelihood of switching to TZD once started on metformin. There was no evidence of sample selection bias in the latter model. **CONCLUSIONS:** Minority diabetic patients were less likely than Caucasians to be started on TZDs rather than metformin.

PDB97

TREATMENT PATTERNS AND OUTCOMES FOR PATIENTS WITH TYPE 2 DIABETES TREATED WITH ORAL FIXED COMBINATION OR DUAL ORAL MEDICATIONS

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OBJECTIVES: Compare patient characteristics, medication use, diabetes-related charges, and resource utilization between patients with Type 2 diabetes (T2DM) who initiated therapy with an oral fixed combination (OFC) therapy and those treated with two medications which are available in OFC formulation (dual). **METHODS:** Data for this study were obtained from the i3inVision™ databases over the time period from January 1, 2006 through June 30, 2010. The analyses compares patients who initiated therapy on an OFC (N=4271) to those who initiated on two classes of oral medications which are available in an OFC combination (N=1780). Patients were followed for 2 years post initiation and all analyses are descriptive in nature. **RESULTS:** Patients who initiated on an OFC, compared to those treated with dual oral medications, were less likely to be diagnosed with a microvascular (14.17% vs. 17.02%; p=0.0046) or macrovascular (10.68% vs. 14.21%; P<0.0001) complication in the pre-period, although they were more likely to be prescribed an ACE (11.59 vs. 7.64%; P<0.0001), ARB (9.58% vs. 4.44%; P<0.0001), or statin (13.28% vs. 10.67%; P<0.0001) in the pre-period. Use of OFC, compared to use of dual therapies, was associated with a significant reduction in post-period hospitalization rates (15.83% vs. 21.80%; P<0.0001) as well as a lower likelihood of an ER visit (2.39% vs. 3.48%; P=0.0168) and lower diabetes-related inpatient (\$2174 vs \$3034; P=0.0020), outpatient (\$2490 vs. \$2,870; P=0.0042), drug (\$1576 vs. \$2084; P<0.0001) and total charges (\$6,250 vs \$8,019; P<0.0001). Use of an OFC was associated with a significantly higher medication possession ratio (0.58 vs. 0.51; P<0.0001) and such patients were less likely to have a gap in the medication therapy of 60 days or more (32.76% vs. 37.81%; P=0.0002). **CONCLUSIONS:** The use of an OFC was associated with improved patient adherence and lower diabetes-related charges compared the dual cohort.

PDB98

TREATMENT PATTERNS AND TREATMENT RESTRICTIONS OF PATIENTS WITH TYPE II DIABETES RECEIVING CARE FROM HOME HEALTH CARE AGENCIES, SKILLED NURSING FACILITIES, AND VETERANS AFFAIRS SETTINGS IN THE UNITED STATES

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OBJECTIVES: To investigate insulin injection treatment patterns and treatment restrictions, in particular nurse administered insulin injections, on Type 2 Diabetes (T2D) patients receiving care from home healthcare agencies (HHAs), skilled nursing facilities (SNFs), and veterans affairs (VA) facilities in the United States. **METHODS:** Medical directors and other knowledgeable clinical personnel from 67 HHAs, 60 SNFs, and 49 VA facilities completed online surveys in December 2008 to January 2009 and in December 2010 to January 2011. The VA surveys covered three VA settings: medical/surgical inpatient (VA-MS), mental health/substance abuse inpatient (VA-MH/SA), and adult day rehabilitation (VA-ADR). **RESULTS:** A majority (67%) of HHA respondents reported that patients received one injection per day, while two injections per day was the most commonly reported number among SNF

(34%) and VA respondents (VA-MS 34%, MH/SA 27%, VA-ADR 40%). HHA and SNF respondents reported a similar average maximum number of daily injections per patient (2.7 and 2.9, respectively). Whereas, almost half of the HHA respondents reported restrictions on the number of daily nurse-administered injections that can be delivered (14% also reported that their agencies restricted the types of insulin that nurses can administer), only 10% of the VA-ADR and none of the SNF respondents reported any restrictions on the number of injections (about 18% of VA-MS and VA-ADR respondents reported restrictions on the type of insulin). **CONCLUSIONS:** Insulin treatment patterns and restrictions on T2D patients vary across settings, sometime substantially. There is evidence that care, as measured by nurse administered insulin injections, may be more restricted in home health-care than in institutional settings such as SNFs and VA facilities.

PDB99

UNDERUSED DIABETES MONITORING SERVICES AND OUT-OF-POCKET HEALTH CARE EXPENSES SHARE AMONG AMERICANS WITH DIABETES MELLITUS

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OBJECTIVES: Out-of-pocket (OOP) cost as a component of insurance benefit design has been found to be a barrier to medication adherence or use of preventive care. This study aimed to assess the association of OOP share of total healthcare expenditure (THE) with diabetes monitoring in the United States. **METHODS:** This cross-sectional study analyzed the household component data from the 2009 Medical Expenditure Panel Survey (MEPS). According to the American Diabetes Association guidelines, proper monitoring was defined as at least two A1c tests along with one eye or foot examination annually. The OOP share was measured by the percentage of annual self-paid healthcare expenses out of THE. Insurance coverage was categorized into any private, public only and uninsured. Logistic regression models were employed to control for social-demographics, health status, and treatments among subpopulations with different insurance coverage. Estimates were weighted to the total population (WTP). **RESULTS:** Among 2,445 (WTP: 19,780,759) individuals with diabetes, 66.07% received proper monitoring. Well-monitored individuals had a lower OOP share (20.10% vs. 26.69%) than those that did not receive services. Individuals with private insurance, public insurance, and no insurance reported different OOP share: 21.79%, 15.65%, and 53.30%, respectively. The logistic regressions indicated that individuals bearing high OOP share were less likely to receive proper monitoring among individuals with private insurance and no insurance [odds ratio (OR)=0.99, 95% confidence interval (95%CI)= 0.981-0.999, OR=0.98, 95%CI=0.975-0.987, respectively]. OOP share was not a significant factor in public insurance beneficiaries. Other risk factors included older age, race/ethnic minorities, use of oral antihyperglycemic medications and insulin, and worse health status. **CONCLUSIONS:** Nearly one-third Americans with diabetes did not receive proper diabetes monitoring in 2009. The OOP share was inversely associated with receiving proper monitoring, suggesting the OOP share should be considered in the benefit design for preventive care, particularly among the privately insured.

PDB100

HEALTH CARE UTILIZATION AND COST PATTERNS AMONG DIABETES PATIENTS PRIOR TO INITIATION WITH SAXAGLIPTIN AND OTHER (NON-INSULIN) ANTIDIABETIC MEDICATIONS IN A US HEALTH PLAN

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OBJECTIVES: Health care resource utilization and costs may be indicators of disease severity and overall health status. In observational studies, these factors could influence patients' probability of receiving or benefiting from a particular treatment. We compared pre-index utilization and costs in diabetes patients initiating saxagliptin versus other non-insulin anti-diabetic regimens. **METHODS:** Individuals age ≥ 18 years and with evidence of T2DM (ICD-9-CM 250.x0 or 250.x2) were identified from a US health plan database. Patients with ≥ 1 pharmacy claim for saxagliptin (SAXA) between August 1, 2009 and December 31, 2010 were assigned to the SAXA cohort, and patients with ≥ 1 pharmacy claim (August 1, 2009-December 31, 2010) for other oral anti-diabetic medications or GLP-1 analogs were assigned to the Other cohort. Patients were required to be naive to SAXA or the Other regimen for 12 months prior to the index pharmacy claim. Utilization and costs were measured during a 12 month (pre-index) period before treatment initiation. **RESULTS:** Pre-index, the SAXA cohort (N=4763) had higher rates of all-cause ambulatory visits (14.7 vs. 13.9; $p < 0.001$) and diabetes-related ambulatory visits (5.1 vs. 3.5; $p < 0.001$) versus the Other cohort (N=75,943). SAXA patients had higher pre-index all-cause pharmacy costs (\$2808 vs. \$1660; $p < 0.001$) and diabetes-related total costs than Other patients (\$3683 vs. \$2854; $p < 0.001$), driven by higher diabetes-related ambulatory and pharmacy costs (both $p < 0.001$). SAXA patients, however, had lower counts of pre-index all-cause and diabetes-related inpatient visits, all-cause ED visits, and lower all-cause inpatient and ED costs than the Other cohort. **CONCLUSIONS:** In a managed health care setting, pre-index resource utilization and costs of patients initiating SAXA were higher for ambulatory services and pharmacy, but ED visits and inpatient stays were lower, compared with patients initiating other anti-diabetic regimens. These findings suggest SAXA prescribing patterns could be influenced by differences in patients' pre-index clinical characteristics and risk profiles, such as difficulty achieving glycemic control in the pre-index period.

PDB101

DIAPS 79: ESTIMATED HOSPITALIZATIONS ATTRIBUTABLE TO DIABETES MELLITUS IN BRAZILIAN PUBLIC HEALTH CARE SYSTEM (SUS) BETWEEN 2008-2010

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OBJECTIVES: To estimate the hospitalizations and its costs that can be attributed to diabetes mellitus (DM) among hospitalizations occurred in Brazilian Public Health-care System (SUS) between 2008-2010. **METHODS:** Number of hospitalization and associated costs for study period was obtained through a review of government administrative claims database (DATASUS). Hospitalizations with a first-listed diagnosis of diabetes were added to hospitalizations estimated to be due to diabetes by attributable risk methodology (ARM). ARM is based on the formula: $RAP_i = [P \times (R_{Ri} - 1)] / [P \times (R_{Ri} - 1) + 1]$, where RAP_i is the fraction of population attributable risk for medical condition "i" due to diabetes, P represents prevalence rate of diabetes, and R_{Ri} is the relative risk of medical condition "i" for people with diabetes compared to those without it (ADA, 2003). Diabetes prevalence was obtained from VIGITEL-2006, a nationwide random telephonic sample (54,369 individuals). Self-reported and expanded estimates according to diagnosis rate were used. Relative risks of hospitalization for chronic complications and general medical conditions for diabetic subjects were obtained from literature. Results were given for entire population and per 10,000 inhabitants according to national census bureau. **RESULTS:** According to self-reported data, a total of 896,727 hospitalizations were estimated to be related to DM per year in SUS. This corresponds to 47 hospitalizations per 10,000 inhabitants annually in the whole population and can reach up to 318,2 per 10,000 when considering the group aged 75+. Annual hospitalization costs were estimated to be Brz\$1,167,386,000 or Brz\$61,197,90 per 10,000 inhabitants (and Brz\$398,058.61/10,000 for 75+ population). When considering the expansion of self-reported cases according to diagnosis rate, it was estimate 1,353,161 hospitalizations (70,8 per 10,000) and a total annual cost of Brz\$1,778,992 (Brz\$ 93,140.65/10,000). **CONCLUSIONS:** DM and its complications are associated with a relevant economic burden to SUS, especially when considering the elderly population.

PDB102

USE OF HEALTH CARE ADMINISTRATIVE DATABASES TO ESTIMATE THE BURDEN OF DIABETES MELLITUS: A POPULATION-BASED STUDY

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OBJECTIVES: To assess the epidemiologic and economic burden of diabetes mellitus (DM) from a large population-based study. **METHODS:** Lombardy Region includes 9.9 million individuals. Its DM population was identified through a data warehouse (DENALI), which matches with a probabilistic linkage demographic, clinical and economic data of different Healthcare Administrative databases. All individuals who during the year 2000 had an hospital discharge with a IDC-9 CM code 250.XX, and/or two consecutive prescriptions of drugs for diabetes (ATC code A10XXXX) within one year, and/or an exemption from co-payment health care costs specific for DM, were selected and followed up to 9 years. We calculated prevalence, mortality and health care costs (hospitalizations, drugs and outpatient examinations/visits) from the National Health Service's perspective. **RESULTS:** A total of 312,223 eligible subjects were identified. The study population (51% male) had a mean age of 66 (from 0.03 - 105.12) years at the index date. Prevalence was 0.4% among subjects aged < 45 years, 3.0% (46-55 years), 7.2% (56-65 years), 11.1% (66-75 years), 12.2% (76-85 years) and 10.1% (> 85 years). Overall 43.4 deaths/1,000 patients/year were estimated, significantly ($p < 0.001$) higher in men than women. Overall, 3,315€/patient-year were spent on average: hospitalizations were the cost driver (54.2% of total cost). Drugs contributed to 31.5%, outpatient claims represented 14.3% of total costs. As regards hospital costs, 35.6% was attributable to admissions for cerebro/cardiovascular reasons, 4.3% to admission for DM reasons, and 60.1% to any other reason. Class C drugs contributed to 33.5% of total drug costs, 21.8% was attributable to class A (16.7% to class A10) and 4.3% to class B (2.4% to class B01) drugs. **CONCLUSIONS:** Merging different administrative databases can provide with many data from large populations observed for long time periods. DENALI shows to be an efficient instrument to obtain accurate estimates of burden of diseases such as diabetes mellitus.

PDB103

PREDICTORS OF HOSPITAL READMISSIONS IN PATIENTS WITH DIABETES: RESULTS FROM THE 1999-2009 MEDICAL EXPENDITURE PANEL SURVEY

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OBJECTIVES: Hospital readmissions are a major concern for patients with diabetes in terms of reduced quality of life and increased economic burden. The objective of the study was to identify predictors of readmissions among patients with diabetes. **METHODS:** A retrospective analysis was conducted using the longitudinal data from the Medical Expenditure Panel Survey (1999-2009), a set of nationally representative surveys of individuals and their health-care providers across the United States. Patients with a diabetes-related hospital admission during the survey period were identified using the International Classification of Disease (ICD)-9 diagnosis code, '250'. These patients were followed for 12 months to determine if another diabetes-related hospital admission occurred. A logistic regression to predict readmission was developed and estimated. Covariates included age, gender, race,