

therapy ($p = 0.003$) as compared to non-depressed patients. Results of an extended-Cox proportional hazard model indicated that the hazard to switch/augment therapy was 2.4 times more for depressed patients as compared to non-depressed patients in the latter six-months of the follow-up period ($p = 0.0005$). Depression was consistently found to be a significant predictor of adherence, with depressed patients being 3–6% less adherent to their OHAs than non-depressed patients. **CONCLUSION:** Depression significantly impacts utilization patterns and adherence to OHAs in patients with type-2 diabetes. This lack of adherence may affect glycemic control and consequently incidence of diabetes related complications. The study results imply that depression screening and treatment may be included in the protocol for management of type-2 diabetes patients.

PDB26**BURDEN OF NON-ADHERENCE TO ORAL ANTIDIABETICS**

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OBJECTIVE: Measure the effect of non-adherence to oral antidiabetic medications on total and diabetes-attributable health care costs in a managed care population. **METHODS:** Using a large managed care administrative claims database, all patients with a prescription for an oral antidiabetic from January, 2000 through June, 2001 were selected ($n = 54,505$) from among continuously eligible patients age 18 years and older. Total and diabetes-attributable costs were computed during one year of follow-up. A non-adherence variable, the total number of days that each patient was without antidiabetic medication, was computed. The computation allowed for stashing of antidiabetics within classes but not across classes (alpha-glucosidase, metformin, other secretagogues, sulfonylureas, thiazolidinediones). Multivariate log-linear regressions were estimated for costs using adherence, diabetes severity, overall comorbidity burden, hospitalization in prior six-months, concomitant insulin use, patient initiating antidiabetic therapy, insurance plan, and demographic variables. **RESULTS:** Overall, total and diabetes-attributable costs decreased with worsened adherence to oral antidiabetics. However, for the most costly patients (top 40%, median annual costs of \$9391), there was a 1.66% increase in total costs for each 30 additional days without oral medication. Only patients with the top 10% of attributable costs had increased diabetes-attributable costs with worsening adherence. After excluding the cost of prescription antidiabetic medications, non-adherence increased costs in all but the lowest-cost patients (bottom 30%). The top 40%, with median non-drug attributable costs of \$1339, realized a 6.38% cost increase with each 30 days without medication and the middle 30%, with median of \$741, realized a 3.76% increase. **CONCLUSIONS:** During one year of follow-up, non-adherence to oral antidiabetics increased total and diabetes-attributable costs for the most resource-intensive patients but did not increase average costs for the population overall. For the 70% of patients with the highest diabetes-attributable costs, worsening adherence increased the medical services portion of diabetes-attributable costs.

PDB27**IMPACT OF A DIABETES CARE PROJECT ON MEDICATION UTILIZATION AND ADHERENCE**

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OBJECTIVES: This study aims to evaluate medication adherence, utilization and costs associated with American Pharmacist Association's (AphA) Diabetes Care Project. **METHODS:**

Patients with diabetes were assigned to an intervention or control cohort based on enrollment in AphA's Diabetes Care Project. Individual patients were included if they had at least two claims for diabetes medications and were continuously enrolled from April 1, 2002 to March 31, 2004. Retrospective pre-post cohort design, descriptive and multivariate modeling analyses were conducted to compare medication utilization between the two cohorts. **RESULTS:** A total of 118 patients (37 in the intervention and 81 in the comparison) were identified. There were no significant differences between the two cohorts in medication possession ratio (MPR), pharmacy costs, and the number of prescriptions of diabetes drugs, ACE inhibitors, and needles at baseline. During the 12-month post period, patients in the intervention were more likely to have a prescription for test strips ($OR = 144.9$, $p < 0.0001$) and needles ($OR = 11.7$, $p < 0.0001$). Compared to the baseline period, patients with pharmacist intervention had significantly more prescriptions for test strips (0.68 vs. 5.32), diabetes medications (6.24 vs. 11.41), needles (1.27 vs. 4.24) and ACE inhibitors (1.68 vs. 3.03), a higher MPR with diabetes drugs (0.67 vs. 0.96) and higher pharmacy costs (\$689.9 vs. \$1617.8), whereas patients in the comparison had no significant differences. **CONCLUSIONS:** AphA Diabetes Care Project significantly increased patients' adherence to therapy and utilization for test strips, needles, diabetes medications and ACE inhibitors. The increased adherence to therapy may offer both clinical and cost benefits to patients. (Acknowledgments: American Pharmacists Association; The Manitowoc Health Care Coalition; Don F. Jabas Associates.)

PDB28**AN EVALUATION OF A DISEASE MANAGEMENT PROGRAM FOR ADULT DIABETICS IN A MEDICAID POPULATION**

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OBJECTIVE: To investigate the effects of a disease management program on diabetic adults in a Medicaid population. **METHODS:** This study was a retrospective database analysis of diabetes-related costs and utilization and of overall costs. A pre-post design with a concurrent control group was employed. To ensure appropriate comparability, the study group and control group were matched using propensity scoring techniques. Data available for analysis spanned from July, 2000 to May, 2004, while rolling enrollment period for the disease management program occurred between October, 2002 and July, 2003. **RESULTS:** From a potential pool of 2921 diabetics that were identified within a Medicaid program, a study population of 388 was initially assessed for eligibility within counties that were targeted to implement the disease management program. After applying exclusion criteria, 122 diabetics began enrollment within the program. Ultimately, 32 diabetics completed the 12 month disease management program. Results indicated that mean monthly diabetes-related medical costs per patient were \$190 in the pre-period and \$225 in the post-period. Mean monthly total medical costs per patient were \$930 in the pre-period and \$939 in the post-period. Mean monthly pharmacy costs per patient were \$378 in the pre-period and \$473 in the post-period. Further multivariate analysis adjusted for demographic characteristics, initial utilization, and chronic disease score. **CONCLUSIONS:** Higher costs in the post-period may be associated with increased levels of care motivated by participation in the program. For a disease such as diabetes, the positive long-term effects due to better care may not be apparent in the short period of time during which the study data was gathered. A longer-term analysis is warranted. In addition, a small proportion of patients (8.2%) completed the full 12-month diabetes

disease management program. As such, future efforts should be developed to increase retention in disease management programs designed for Medicaid recipients.

PDB29

THE EFFECT OF INSULIN TREATMENT ON HEALTH CARE UTILIZATION IN TYPE-II DIABETES

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OBJECTIVE: To evaluate the effect of insulin treatment on health care utilization among type-II diabetics. More aggressive glucose control treatment, particularly with insulin, is known to slow diabetic patients' disease progression. Does it also reduce health care utilization and cost in the short run? **METHODS:** Medical, pharmacy, and laboratory claims for 369 type-II diabetes patients enrolled in a single managed care plan were evaluated. Patients were continuously eligible for at least two years between June, 2001 and June, 2004. Separate variables were computed for each year. The propensity score (PS) calculated with classification and regression trees (C&RT) was used to calculate the probability of receiving insulin treatment, using year one health status, demographics, and HgA1c laboratory values. These probabilities were then used as weights in the regression of total health care costs and ambulatory costs in year two on an array of variables including insulin use. **RESULTS:** Insulin treatment does not benefit all groups of patients equally. Patients over the age of 60 benefit significantly from insulin treatment with a reduction in total health care cost of 60.5% ($p = 0.0007$) and a reduction in ambulatory cost of 60.9% ($p = 0.0008$) compared to younger diabetic patients (age < 60). **CONCLUSION:** Diabetic patients age 60 or above and the health care payers would greatly benefit from better glucose control through insulin treatment.

PDB30

TREATMENT PATTERNS AMONG PATIENTS WITH DIABETES ON METFORMIN AND SULFONYLUREA COMBINATION THERAPY

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OBJECTIVES: Diabetes is a progressive disease that often requires periodic intensification of treatment to control hyperglycemia. The objective of this study is to evaluate therapy changes after initiation of metformin and sulfonylurea combination therapy. **METHODS:** This was a retrospective analysis of data derived from the IMS Mediplus UK primary care database. Patients were selected using the following criteria: type-2 diabetes diagnosis, age ≥ 30 years at diagnosis, initiation of OHA combination with MF and SU between January 1, 1997 and March 31, 2003. Patients with prior insulin prescription were excluded. **RESULTS:** A total of 6616 patients were included, with a mean age of 62.82 years (± 12.12) and 56.3% of male; 2603 patients (39.39%) had a history of macrovascular events and 647 (9.79%) had microvascular events. Hypertension (78.39%) and dyslipidemia (59.89%) were also common among these patients. The average follow-up was about 36.7 months. After three years of initiating metformin and sulfonylurea combination therapy, 54.8% had changed their therapy, either by discontinuing one or both initial agents, adding a third oral agent or receiving insulin. No patient remained on the initial combination after 6.5 years. Approximately 8–11% of patients changed therapy every six-months during the first five-years. By the end of two years, about 14.1% have required insulin therapy and

10% had switched to another OHA combination therapy. Approximately 46.9% of patients were prescribed insulin therapy after seven-years. **CONCLUSION:** In this cohort of diabetic patients managed by GPs in the UK, a large number of patients require additional oral anti-hyperglycemic agents or insulin to manage their hyperglycemia. More effective therapies are needed in order to better manage these patients.

PDB31

FACTORS ASSOCIATED WITH HEALTH CARE COST SAVING IN PATIENTS WITH DIABETES TO THE CALIFORNIA MEDICAID POPULATIONS (MEDI-CAL)

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OBJECTIVE: To investigate factors associated with health care cost saving in patients with diabetes to the California Medicaid Populations (Medi-Cal). **METHODS:** A retrospective study was conducted by using claims data from January, 1995 to December, 2000. Dependent variable was total health care cost. Historical data including demographic factors, health care cost and utilization, diabetes drug treatment, follow-up services based on diabetic guidelines, medication compliance, complications, and comorbidities were used as independent variables. The generalized estimating equation method was used to analyze the panel data. **RESULTS:** Various factors have a significant association with health care cost savings to MediCal. Patients taking both insulin and oral hypoglycemic drugs or patients having drug dose increased had health care costs higher by \$1210 and \$141, respectively. Patients having oral hypoglycemic or insulin, anti-hypertensive, or lipid lowering drugs added also had health care costs higher by \$264, \$528, or \$199, respectively. In addition, patients having drugs changed to different classes or to insulin had health care costs higher by \$1018. However, patients having one percent of medication compliance increased had health care costs lower by \$7 in next six-month period. Moreover, patients having office visits based on diabetic guidelines or patients having glucose monitoring strip had health care costs lower by \$730 or \$258 in next six-month period, respectively. In addition, patients having lab tests [e.g., HbA1C test every six-months (\$121), cholesterol check up every year (\$472), or dilated eye check-up every year (\$260)] could lower costs in the future. **CONCLUSIONS:** Medi-Cal policy makers may implement some disease management programs or health policy on patients who have drug treatment problems and patients without follow-up services based on diabetic guidelines in order to improve patient outcomes and decrease health care costs in the future.

PDB32

THE RELATIONSHIP BETWEEN PATIENT'S TYPE OF PAYMENT AND PRESCRIPTION DRUG COSTS FOR DIABETIC PATIENTS

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OBJECTIVE: To examine the relationship between patient's payment type and prescription drug costs for diabetic outpatients at a regional hospital in southern Thailand. **METHODS:** Patient's profile and prescription for 1454 outpatients who used anti-diabetic drugs between August and September 2002 were collected. The patient's type of payment was divided into two groups, which were patients who paid out-of-pocket and patients who did not pay for their prescriptions. Descriptive and linear regression analyses were used to examine the relationship. **RESULTS:** Results showed that average drug costs per prescription between patients who paid out-of-pocket and patients who