Costs were determined to be predictors of medical costs: drug costs included insulin costs and oral diabetes drug costs. The medical costs included all paid services for primary and secondary diagnosis of type 1 diabetes identified by ICD-9-CM codes. The data were analyzed using SPSS 10.0. The association between drug and medical costs was determined using Pearson correlation. The significance level was set at the 95% confidence interval. Linear regression analysis was conducted to predict medical costs from drug costs. The dependent variable was the logarithm of medical costs. The independent variables were drug costs, length of service, additional therapy, age and gender. RESULTS: There was a statistically significant inverse correlation between drug costs and medical costs ($r_1 = -0.229, CI: -0.33 -0.13$). In the regression model the following independent variables were determined to be predictors of medical costs: drug costs ($b_1 = 0.00, CI: -0.03 -0.002$), additional therapy ($b_2 = -0.362, CI: -0.51 -0.21$) and length of service ($b_3 = 0.002, CI: 0.001 -0.002$). Age and gender were not found to be significant predictors of medical costs. CONCLUSIONS: The inverse correlation implies that if type 1 diabetes is managed appropriately with drugs, the medical costs may be reduced. This may reduce the overall health care expenditures. The regression model also showed that as drug costs increased medical costs decreased. The regression model can be used to predict the future medical costs if the drug costs are known.

**DIABETES—Economic Outcomes**

### PDB 2

**A COMPARISON OF TWO METHODS FOR ESTIMATING HEALTH CARE COSTS OF DIABETES**

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Cost of illness estimates for chronic diseases can be underestimated if only costs related to diagnosis and treatment of that disease are measured. This underestimation results from overlooking costs associated with secondary consequences of the disease such as complications and co-morbid conditions associated with the disease. **OBJECTIVE:** Two methods for estimating medical care costs of diabetes were compared: an “attributable” method and a “case-control” method. **METHODS:** The study population was all diabetic patients in the 1999 Medical Expenditure Panel Survey, a nationally representative series of probability surveys on the use and cost of medical care in the United States. “Attributable” costs were estimated by summing costs specifically associated with diabetes. “Case-control” costs were estimated by subtracting costs between diabetic cases and non-diabetic controls which were matched on age, gender, race, and number of comorbid conditions not related to diabetes. Costs were summarized for pharmacy, hospital inpatient, outpatient, and emergency room care and reported in 1999 dollars. **RESULTS:** The total cost of illness was $3046 per patient using case-control method compared to $1151 per patient using the attributable method. The case-control method found costs to be higher for all categories of care, with the largest being hospital inpatient costs. Cost differences were statistically significant for all categories except for emergency room care. **CONCLUSIONS:** Diabetic “attributed” costs accounted for only 39% of the total difference in health care costs between diabetics and matched controls. Patients with diabetes use more medical services than controls, but a large portion of this care is not specifically attributed to diabetes.

### PDB 13

**USING LINEAR REGRESSION TO APPROXIMATE RESULTS OF DECISION ANALYSIS: AN APPLICATION TO A COST COMPARISON ACROSS THREE FIRST-LINE DRUG STRATEGIES IN TYPE 2 DIABETES**

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**OBJECTIVES:** Few studies have compared the short-term costs to achieve recommended glycemic goals in Type-2 diabetes. We developed a decision analysis to project costs of treating patients to glycemic goals from a managed care perspective and evaluated feasibility of summarizing this model in an aggregate linear regression (LR) form. **METHODS:** A literature-based decision model simulated the 3-year treatment costs (medical, pharmacy, adverse events) to achieve an HbA1c < 7% for three cohorts of patients newly diagnosed with Type-2 diabetes and failing lifestyle changes. Each cohort was assigned to a different first-line therapy: glipizide GITS, generic metformin, or rosiglitazone. Add-on treatments occurred as necessary to achieve glycemic control. To summarize the model in an LR form, we first conducted Monte Carlo simulations (MCS) of the model for each therapy. The costs (dependent variables) estimated via 1000 MCS runs were then summarized through OLS regressions, using the most sensitive and/or relevant variables from the decision model as predictors. We then compared the results generated via each method. **RESULTS:** The projected cost differences between agents with the decision analysis and the aggregate LR form were identical: $\$558$ (glipizide GITS vs. metformin), $\$1557$ (glipizide GITS vs. rosiglitazone), and $\$998$ (metformin vs. rosiglitazone). The $R^2$ of the LR ranged between .49 and .53. Both methods led to identical conclusions regarding which agent was least/most expensive in >97% of cases. The accordance
RESOURCE UTILIZATION USING INNOLET VS. VIAL/SYRINGE FOR DAILY INSULIN INJECTION IN A SUBGROUP OF ELDERLY DIABETIC PATIENTS

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OBJECTIVE: The goal of this study was to compare resource utilization for two insulin delivery devices: InnoLet® and vial/syringe. METHODS: Diabetic patients requiring assistance with insulin injections (vision and/or motor impairments) were followed over two 6-week periods in a randomized crossover study to estimate the resource utilization associated with different insulin delivery systems: the InnoLet® insulin doser or the vial and syringe. A total of 79 patients were enrolled in the study. Resource utilization was measured as the number of visits per day which the nurse/caregivers needed to have with the patient in order to assist (if required) with an injection, times the costs for such a visit ($80/hour; minimum visit 1 hour based on local visiting nursing rate) plus the daily cost for insulin. RESULTS: The mean age of patients was 68.2 ± 8.6 years, with a mean A1c level of 7.5 ± 1.4 at baseline. Patients were previously treated with vial/syringe and required assistance with making injections. Reported major hypoglycemic events occurred as frequently with both treatments. The mean daily costs for home visits associated with the injections were $99 and $179 for the InnoLet and vials/syringe patients, respectively (p < 0.001). Fifty-three percent of the patients became independent of nursing/caregiver assistance for the injections when using InnoLet®. Furthermore, the mean time spent by nurses or caregivers for assisting in injection preparation was lower for patients using the InnoLet doser than for the vial and syringe. CONCLUSIONS: Patients using the InnoLet® doser required significantly fewer visits from nurses/caregivers, resulting in less resource utilization, and use of InnoLet® fostered independence in patients who had difficulty with self-injection using vial and syringe.