FINANCIAL IMPACT OF IMPROVED DIABETES MANAGEMENT THROUGH BLOOD KETONE TESTING AND OPTIMIZED GLYCEMIC CONTROL
Luo MP1, Rao S2, Ashraf T1
1Abbott Laboratories, Abbott Park, IL, USA; 2Abbott Laboratories, Bedford, MA, USA

OBJECTIVES: With advances in blood ketone testing methodology, diabetic patients can now monitor the predominant ketone body (beta-hydroxybutyrate) at home in addition to their standard glucose monitoring. This ketone monitoring may permit early detection and treatment of ketosis and diabetic ketoacidosis (DKA). This study compares the cost consequences of blood vs. urine ketone testing and of optimal vs. normal glycemic control in diabetes management.

METHODS: First, a decision tree model was developed to estimate costs of testing ketone levels and managing acute metabolic complications for patients with insulin dependent diabetes mellitus (IDDM). Home blood ketone testing or urine ketone testing was utilized during patients’ sick-day management. Second, a Markov process was applied to project progression of diabetic complications based on HbA1c levels over 5 years using the published Diabetes Control and Complications Trial data. Cost analyses in 2001 U.S. dollars were performed from the payer’s perspective using data from published literature and applying a 3% discount rate. Assumptions were tested in one-way sensitivity analyses.

RESULTS: In the base case, the decision tree model showed that blood ketone testing could prevent 7.2 DKA events per 1,000 IDDM patients per year, yielding a net savings of $51,982 compared to urine ketone testing, mainly due to reduced medical care costs for treating DKA, ketosis and hypoglycemia. In addition, the Markov model predicted that over 5 years, improved glycemic control as shown by lowered HbA1c levels from 9% to 7% could save $253,322 per 1,000 IDDM patients for treating diabetic complications, including $69,116 for retinopathy, $122,762 for nephropathy, and $61,444 for neuropathy. The results were robust in sensitivity analyses.

CONCLUSIONS: Under a range of assumptions blood ketone testing could reduce ketosis and DKA events, thereby lowering medical expenditures. Potentially improved glycemic control through lowered HbA1c levels could decrease treatment costs for long-term diabetic complications.

ECONOMIC COMPARISON OF SIX FIRST-LINE DRUG STRATEGIES IN TYPE 2 DIABETES USING A MONTE CARLO SIMULATION MODEL
Stephens JM1, Ramsdell JW2, Braunstein S3, Bell CF1, Botteman MF1, Brandt S1, Devine ST4
1Abt Associates Clinical Trials, Bethesda, MD, USA; 2University of California San Diego Medical Center, San Diego, CA, USA; 3University of Pennsylvania Health System, Philadelphia, PA, USA; 4Pfizer Inc, New York, NY, USA

OBJECTIVE: To assess the direct medical cost of treatment, from a payer perspective, associated with the first three years of care for patients newly diagnosed with type 2 diabetes, and to contrast the costs and effectiveness associated with six commonly prescribed first-line oral antidiabetic medications.

METHODS: A literature-based, decision tree cohort model was developed to project the number of patients achieving hemoglobin A1c < 7% on oral therapies and the associated costs over a three-year timeframe. Drug naive patients could progress in a step-wise fashion to triple oral therapy prior to the introduction of insulin. The overall cost of treatment included office visits, laboratory tests, education, drug therapy, home glucose monitoring, and treatment of adverse events. To account for uncertainty in the model parameters, we conducted probabilistic sensitivity analysis via second order Monte Carlo simulation, assuming triangular distributions for the variables.

RESULTS: Mean per patient cost of treatment (range: 2.5–97.5 percentiles of all model runs) was $6,391 ($5,150–$7,736) for glipizide GITS (Glucotrol XL), $6,774 ($5,594–$7,978) for metformin extended release (Glucophage XR), $7,034 ($5,754–$8,295) for glyburide/metformin (Glucovance), $7,068 ($5,782–$8,312) for metformin immediate release (Glucophage), $7,924 ($6,688–$9,194) for rosiglitazone (Avandia), and $8,793 ($7,123–$10,464) for repaglinide (Prandin). Regardless of first-line therapy selected, patients progressed quickly to combination therapies to achieve glycemic control, with effectiveness among the strategies being similar. In 73–99% of the model simulations, the glipizide GITS first-line strategy was cost saving compared to the other first-line agents and should be considered when selecting an initial drug therapy in type 2 diabetes.

CONCLUSIONS: The short-term costs required to provide comprehensive diabetes care and achieve recommended glycemic goals can be substantial. Our model suggests that a glipizide GITS strategy may provide similar effectiveness with a high likelihood of cost savings versus five other first-line agents and should be considered when selecting an initial drug therapy in type 2 diabetes.