



# IMPACT OF PHARMACIST INTERVENTIONS ON IMPROVING CARE AND DECREASING COSTS

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## INTRODUCTION

- 133 million people in America live with a chronic illness.<sup>1</sup> Almost half of all of these people have multiple chronic illnesses.
- The current prevalence of chronic illnesses including diabetes, hypertension, and hyperlipidemia provides an opportunity for a pharmacist to intervene to improve care.
- Medication Therapy Management (MTM) enables pharmacists to provide disease state care for patients with multiple chronic illnesses.
- Ohio pharmacists are currently providing an MTM program in Northwest Ohio entitled the Lucas County MTM program.
- Pharmacists are proving that they can be a valuable asset to employer groups by improving health of employees and decreasing costs of healthcare to maintain a productive workforce.
- Programs like these showcase that pharmacists are in an optimal position to provide high-quality, cost-effective care for Ohioans.

## OBJECTIVE

To measure the impact of an employer-sponsored, pharmacist-conducted Medication Therapy Management Program on clinical, process, and social measures.

## METHODS

### Study Design:

The study is a prospective, pre-post longitudinal design.

### Program Setting:

The MTM program is provided at one of seven independent pharmacy sites in Toledo, OH. These include The Pharmacy Counter Pharmacy (three locations), Glenbyrne Pharmacy, Kahler Pharmacy, Erie Drugs, and Ryan Pharmacy.

**Key Players:** Lucas County employees and their dependents are the target audience this MTM program. Lucas County sponsors the program. MTM services are provided by pharmacists from the PharmacistCare™ coalition. The Pharmaceutical Care and Outcomes Research (PCOR) laboratory at The University of Toledo assists with program development and implementation and conducts all statistical evaluations.

**Inclusion/Exclusion Criteria:**  
Patients are eligible for the study if Lucas County is their primary provider for medical insurance and prescription coverage. Study participants must be currently taking medications for diabetes, hypertension, or hyperlipidemia. Participants must understand English and have transportation to a PharmacistCare™ coalition pharmacy.

**Sample Size:**  
Currently 476 patients have been enrolled.

**Study Duration:**  
Data is analyzed for a one-year study duration.

## DATA COLLECTION

Data for various clinical, process, and social measures are collected every three months. Preliminary results are shown in Table 1.

The data analysis was conducted to measure the differences in various clinical, social, and process measure outcomes of patients within one year of enrollment into the program. A Monte-Carlo simulation model was conducted using our data for 2000 patients.

A decision tree was constructed to determine the average cost savings per patient, per year, for each of the pharmacist interventions for patients with diabetes mellitus. Interventions are shown in Table 2.

The cost savings in the tree are calculated according to published literature,<sup>2-8</sup> expert opinions, and determined at the average of \$1560 per patient per year when A1c decreased by 1%.

## STATISTICAL ANALYSIS

The Wilcoxon-Signed rank test was used to compare variables at two time points.

The patients considered for analysis had at least 2 documented visits at one of the coalition pharmacies within one year of their enrollment.

## RESULTS

Table 1: Patient Outcomes (Baseline vs. 1 year): Wilcoxon Signed Rank Test

| Outcome/Measures | Variables                    | Number of Patients (N) | Baseline Mean | One Year Mean | Increasing (↑) / Decreasing (↓) | Increasing (↑) / Decreasing (↓) (Monte-Carlo Simulation) |
|------------------|------------------------------|------------------------|---------------|---------------|---------------------------------|--|
| Clinical         | A1c (ITT)                    | 50                     | 8.21          | 7.41          | ↓*                              | ↓*   |
|                  | Systolic B.P. (mmHg)         | 319                    | 130.71        | 127.84        | ↓*                              | ↓*   |
|                  | Diastolic B.P. (mmHg)        | 319                    | 81.75         | 80.03         | ↓*                              | ↓*   |
|                  | Body Mass Index              | 306                    | 34.55         | 33.82         | ↓                               | ↓*   |
| Process          | SMBG (tests per day)         | 82                     | 1.23          | 1.51          | ↑*                              | ↑*   |
|                  | Sick Days (within 1 year)    | 70                     | 0.87          | 1.12          | ↑                               | ↑*   |
| Social           | Caffeine (beverages per day) | 143                    | 2.58          | 2.12          | ↓*                              | ↓*   |
|                  | Alcohol (beverages per day)  | 87                     | 0.39          | 0.39          | No Change                       | ↓*   |
|                  | Exercise (hours per week)    | 96                     | 1.90          | 2.13          | ↑                               | ↑*   |
|                  | Smoking (packs per day)      | 92                     | 0.22          | 0.17          | ↓                               | ↓*   |

\*Statistically significant, p=0.05  
ITT= Intent - To- Treat Model

Table 2: Pharmacist's Interventions and Cost Savings from Each Intervention

| Interventions   | Cost Savings |
|---|--------------|
| Advised the patient to use daily aspirin therapy  | \$1560       |
| Alerted the physician that the patient may be a candidate for statin therapy according to guidelines        | \$1560       |
| Glucometer training/troubleshooting   | \$1560       |
| Advised the patient on best way to correct hypoglycemic/hyperglycemic episodes                              | \$1560       |
| Advised the patient to see a specialty physician (i.e. Podiatrist, Ophthalmologist, Dentist)                | \$1396       |
| Alerted the physician that the patient may be a candidate for ACE-inhibitor therapy according to guidelines | \$1248       |
| Instructed the patient on the proper use of his/her injectable  | \$1248       |
| Alerted the physician of an abnormal HgbA1c and/or blood sugar profile                                      | \$946        |
| Explained and advised the use of pattern management   | \$983        |

## DISCUSSION

- Within one year of starting the MTM program, patients' mean HgbA1c values have decreased significantly (p=0.000).
- A decrease in HgbA1c correlates with a decreased risk of developing microvascular and macrovascular complications, such as heart attack and stroke.
- Published literature has shown that a 1% reduction in HgbA1c results in an average cost avoidance of \$1560 /patient/year.<sup>2-8</sup> Fifty patients had HgbA1c levels decrease by 1% from baseline to one year. This change could potentially save \$78,000 per year for Lucas County.
- There has been a significant decrease in both systolic blood pressure (p=0.006) and diastolic blood pressure (p=0.004). Studies have shown that gaining blood pressure control (≤130/80) among diabetic patients could potentially save \$500 on healthcare costs per patient per year.<sup>9</sup>
- There has been a significant increase in SMBG per day, which correlates to a higher awareness of disease state control for diabetes patients, thus reducing future complications.
- A reduction in caffeine intake, alcohol intake, and smoking has been seen. Poor habits such as smoking, increase risk of cardiovascular complications. Exercise has increased, helping patients lose weight and maintain disease control.

## CONCLUSION

- Pharmacists have demonstrated their capability to improve health care for Lucas County employees with diabetes, hypertension, and hyperlipidemia.
- As the program is continued, projected cost savings for the County will increase and the workforce will be healthier and more productive.

**Pharmacists should be considered as key health care providers capable of transforming Ohio's health care system into a high quality, cost-effective, high performing system that optimizes the health of Ohioans by 2013.**

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