Diabetes Ten City Challenge: Final economic and clinical results

Toni Fera, Benjamin M. Bluml, and William M. Ellis

Abstract

Objective: To assess the economic and clinical outcomes for the Diabetes Ten City Challenge (DTCC), a multisite community pharmacy health management program for patients with diabetes.

Design: Quasiexperimental observational analysis, pre–post comparison.

Setting: Employers at 10 distinct geographic sites contracting with pharmacy providers in the community setting.

Participants: 573 patients with diabetes who had baseline and year 1 medical and pharmacy claims and two or more documented visits with pharmacists.

Interventions: Community-based pharmacists provided patient self-management care services via scheduled consultations within a collaborative care management model.

Main outcome measures: Changes in health care costs for employers and beneficiaries and key clinical measures.

Results: Average total health care costs per patient per year were reduced by $1,079 (7.2%) compared with projected costs. Statistically significant improvements were observed for key clinical measures, including a mean glycosylated hemoglobin decrease from 7.5% to 7.1% ($P = 0.002$), a mean low-density lipoprotein cholesterol decrease from 98 to 94 mg/dL ($P < 0.001$), and a mean systolic blood pressure decrease from 133 to 130 mm Hg ($P < 0.001$) over a mean of 14.8 months of participation in the program. Between the initial visit and the end of the evaluation period, influenza vaccination rate increased from 32% to 65%, eye examination rate increased from 57% to 81%, and foot examination rate increased from 34% to 74%.

Conclusion: DTCC successfully implemented an employer-funded, collaborative health management program using community-based pharmacist coaching, evidenced-based diabetes care guidelines, and self-management strategies. Positive clinical and economic outcomes were identified for 573 patients who participated in the program for at least 1 year, compared with baseline data.

Keywords: Diabetes Ten City Challenge, Patient Self-Management Program, pharmaceutical care, diabetes, disease management, chronic disease, quality of life, health outcomes, health benefits, collaborative practice, Asheville Project, HealthMapRx.

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According to the American Diabetes Association (ADA), approximately 17.9 million Americans or 7.8% of the U.S. population have been diagnosed with diabetes, with another 5.7 million people unaware that they have the disease. Additionally, the prevalence of the disease has increased 13.5% from 2005 to 2007.[1]

Diabetes also greatly affects the U.S. economy. In 2007, the direct cost of diabetes totaled $174 billion, which translates to $1 of every $5 spent on health care being attributed to the disease. Indirect costs associated with diabetes are also high, now at a level that threatens competitiveness of the U.S. workforce in a global economy. Diabetes accounts for 120 million workdays with reduced productivity with a cost impact estimated at $58 billion.[1] In 2007, diabetes-related absenteeism accounted for 15 million lost workdays.[2] Presenteeism—productivity lost when employees are at work but perform below their usual norm because of illness[3]—is an important emerging concept in our economy. U.S. businesses have studied the costs associat-ed with absenteeism for a number of years; however, the cost of suboptimal presenteeism is now being recognized as critical. A recent study by the Employers Health Coalition calculated that the costs of lost productivity from presenteeism are 7.5 times greater than costs resulting from absenteeism.[4] A study by the Milken Institute further estimates that seven chronic diseases, including diabetes, cost the United States $1.1 trillion in lost productivity each year, reinforcing the fact that chronic disease has far-reaching effects on the economy.[5]

Beckles et al.[6] noted that ADA recommendations for self-management, including core elements such as blood glucose monitoring, proper diet, exercise, and medication adherence, are followed by less than 2% of adults with diabetes. A controlled study conducted by Choe et al.[7] showed that pharmacists can have an impact on glycemic control and diabetes process-of-care measures. Pharmacists in all practice settings are in a key position to help patients with these issues.[8] At the same time, although pharmacists are well positioned to improve diabetes outcomes, patient care programs and the role of the pharmacist within those programs need to be expanded.[9] Previous research has documented the effect of pharmacist care services on patient clinical, humanistic, and economic outcomes.[10–15]

Given the abundance of challenges to improving care for those with diabetes, the American Pharmacists Association (APhA) Foundation set out to build on past research efforts and develop a program that would align incentives for all stakeholders. With support from GlaxoSmithKline, the APhA Foundation in 2005 began to further test the patient self-management/pharmacist coach model in 10 communities across the United States. An overarching goal of the Diabetes Ten City Challenge (DTCC) was to fundamentally change the way chronic disease is managed and paid for through a value-based benefit design model. The model used in the DTCC improved the benefit/incentive structure for participants related to obtaining antidiabetic medications and educational services of a pharmacist essential to managing the disease. The Milken Institute stated, "Employers, insurers, governments and communities need to work together to develop strong incentives for patients and health care providers to prevent and treat chronic disease effectively."[4] While initiated beforehand, DTCC was designed to test that directive.

At a Glance

Synopsis: Using community-based pharmacist coaching, evidenced-based diabetes care guidelines, and patient self-management strategies, the Diabetes Ten City Challenge (DTCC)—a multisite community pharmacy health management program for patients with diabetes—demonstrated positive clinical (e.g., glycosylated hemoglobin, low-density lipoprotein cholesterol, systolic blood pressure) and economic outcomes for 573 patients who participated in the program for at least 1 year compared with baseline data. Self-management training and an assessment credential equipped patients with the knowledge, skills, and performance-monitoring priorities needed to actively participate in managing their diabetes. Total health care costs per patient per year were reduced compared with projected costs in the absence of the program.

Analysis: DTCC and the process of care used provide a promising model that blends important elements of a "reformed" health care delivery process by integrating accessibility, patient centeredness, and value achieved by helping patients make clinical improvement while managing costs. The American Pharmacists Association Foundation has observed several factors driving successful program implementation, including employers who are willing to invest in incentives for patients and providers to improve health and lower costs. Successful networks have a robust infrastructure to handle administrative functions, operational processes, and clinical coaching; an effective system of performance-driven accountability; a wide-ranging geographic reach of its pharmacists; and an ability to lead in client service. Advances in health information technology are expected to aid in the expansion of the model used in DTCC.

Objectives

The objectives of DTCC, as noted in the previously published interim report,[10] are to (1) implement an employer-funded, collaborative health management program using community-based pharmacist coaching, evidenced-based diabetes care guidelines, and self-management strategies designed to keep patients with diabetes healthy and productive; (2) implement the patient self-management training and assessment credential that equips patients with the knowledge, skills, and performance-monitoring priorities needed to actively participate in managing their diabetes; and (3) assess participant satisfaction with overall diabetes care and pharmacist care provided in the program (reported previously).[10]

Methods

Setting

The sites selected and agreeing to participate in DTCC are listed in Table 1. The program was offered in community independent pharmacies, community chain pharmacies, and ambulatory care clinics, and at on-site workplace locations to allow sufficient flexibility in the delivery of care. Characteristics of these sites included the following:

- Private area for patient consultation
- Management support freeing pharmacists for patient care activities
- Access to Internet for recording and tracking patient care interventions
- Availability of one or more pharmacist coach with demonstrated communication skills and specialized training or certification in diabetes management
- Participation in a local and/or regional pharmacist service delivery network that contracted directly with the participating employer

Practice model

The DTCC was an implementation of the Patient Self-Management Program for diabetes. The program evolved from the previous decade of research by the APhA Foundation and others, including the Asheville Project, which is an extant community pharmacy–based program that began in 1996.[13–15] The process of care that illustrates the collaborative care process and interventions that define the practice model were published previously.[10]

Program implementation

Employers/payers. Employers participating in DTCC were self-insured and therefore at risk for medical and prescription costs for their employees and other beneficiaries under the established health plan. The employer/health plan agreed to invest in incentives for patients and pharmacist providers. At a minimum, these incentives included waived copayments for medications and certain supplies. Some employers add other incentives as a way to integrate the program into their existing plan offerings. Other incentives included counting participation toward wellness points and waiving copayments for education classes and/or laboratory tests. Pharmacist providers are compensated for their services through their network by the employer.

Employers worked closely with their third-party administrators (TPAs) and pharmacy benefit managers (PBMs) to implement incentives and provide basic claims data information on an annual basis to allow for program economic performance review. In some situations, the TPA or PBM assisted the employer with other aspects of program implementation, such as sending announcement letters to potential participants or managing enrollments.

Patients. All patients participating in DTCC enrolled voluntarily and were required to enter into a program participation agreement, which included information about how the program worked, their responsibility as a participant in the program, their right to confidentiality, how data were to be reported, and their right to withdraw from the program at any time. Partici-

pants also completed an enrollment form, including authorization to release medical information and for use of data collected in the usual course of the program for research and education purposes to develop deidentified aggregate reports.

Pharmacists. Patients were assigned to a pharmacist coach in their geographic area by a local network coordinator (Table 1). Services could be provided in a local pharmacy or at the participant's workplace. During regularly scheduled visits, pharmacists applied a prescribed process of care that focuses on clinical assessments and progress toward clinical goal and work with each patient to establish self-management goals. In addition, they worked with other health care providers and could recommend adjustments in the patients' treatment plans when appropriate.

Networks required that participating pharmacists had completed a training program in diabetes offered by a provider of continuing pharmacy education accredited by the Accreditation Council on Pharmacy Education (such as the APhA Diabetes Certification Program) or had otherwise been certified for diabetes care (e.g., Certified Diabetes Educator, certified in a specialty approved by the Board of Pharmaceutical Specialties). Pharmacists generally followed national treatment guidelines unless otherwise directed by the patient's physician. Pharmacists collected and recorded subjective and objective assessments via a Web-based documentation system (described below) for outcomes reporting.

Physicians and other providers. Physicians were informed of participant enrollment and were encouraged to share their care plan with the pharmacists, who reinforced that plan with the participants. Pharmacists communicated with physicians as necessary, usually via a written summary note after each visit, and referred patients to their physician for further assessment, laboratory tests, and other needs; other providers, such as a dietitian, for intensive nutrition education; or diabetes education centers for additional education support. Physicians remained responsible for overall care of the patient and changes in therapy.

Table 1. Sites, employers, networks, and patients in the Diabetes Ten City Challenge project

Site (no. employers[a])	No. pharmacist providers[a]	No. evaluable patients
Charleston, SC (4)	14	61
Chicago, IL (NA[b])	NA[b]	NA[b]
Colorado Springs, CO (1)	3	62
Cumberland, MD (1)	14	98
Honolulu, HI (1)	2	4
Milwaukee, WI (1)	7	20
Northwest Georgia (4)	11	65
Pittsburgh, PA (7)	37	129
Los Angeles, CA (NA[c])	NA[c]	NA[c]
Tampa Bay, FL (2)	14	134

[a]For patient population meeting inclusion criteria.
[b]No evaluable patients due to patient care start date.
[c]No evaluable patients due to incomplete claims data.

Knowledge, skills, and performance assessments

The APhA Foundation and HealthMapRx's psychometrically validated Patient Self-Management Credential for Diabetes is used by participating pharmacists to assess patient knowledge, skills, and performance.[10,12] The Patient Self-Management Credential for Diabetes is an externally validated, proprietary tool developed by the APhA Foundation. It includes a multidimensional multiple-choice questionnaire that is administered to determine the areas of knowledge requiring improvement through patient education. Results from six areas of skill assessments, which the pharmacist conducted through face-to-face observation, were used to guide patient skill development efforts. In addition, a checklist of 18 ongoing self-management performance and prevention measures was assessed for consistency with diabetes care standards.

Design, timeline, and inclusion criteria

This observational analysis was a quasiexperimental, longitudinal, pre–post comparison. Patient enrollment began in January 2006 and continued at each site dependent on employer-specific enrollment timetables. The data endpoint for this evaluation was December 31, 2007. Patients with baseline and year 1 medical and pharmacy claims and two or more documented visits with pharmacists were included in this economic and clinical data analysis.

Clinical laboratory data were obtained from the physician or laboratory or through point-of-care testing. Behavioral patient self-management goal-setting rates and achievement were based on patient self-reports and documented by the pharmacists during each patient visit.

Subjective and objective data were submitted via QARx, the Foundation's Web-based documentation system, which uses the electronic health data management principles outlined in *JAPhA* in 1999.[16]

Outcome definitions

Economic outcomes were measured in a manner consistent with previous employer-based cost analyses published by the APhA Foundation.[12] Each patient's program enrollment date served as time 0, with the resultant baseline period being the year leading up to that date and year 1 being the first full year of participation in the program. All available medical and pharmacy claims were included for each of these periods. Baseline period results were used to calculate year 1 projected amounts using a multiplier from Spring 2007 AON market-based medical (actives and retirees younger than 65 years without prescription benefits in a preferred provider organization) and pharmacy (general and specialty average) trend results added to January 2008 Federal Reserve inflation cost data.[17,18]

Clinical outcome measures mirrored those used in the State of Health Care Quality: 2008 Report from the National Committee for Quality Assurance (NCQA), specifically the Healthcare Effectiveness Data and Information Set (HEDIS) measures for commercial accredited plans.[19] The following clinical indicators were documented: glycosylated hemoglobin (A1C), low-density lipoprotein cholesterol (LDL-C), systolic blood pressure, diastolic blood pressure, body mass index (BMI), current

influenza vaccination, current foot examination, and current eye examination. When pharmacists, providers, and laboratories measured blood pressure, weight, and other patient variables, or processed blood samples, they were requested to be consistent from visit to visit in terms of the methods, devices, and techniques used, but no specific uniform method was required.

In addition to the traditional clinical measurements, DTCC included a composite clinical parameter (i.e., the Diabetes Triad Clinical Control score). This score included achievement of A1C, blood pressure, and LDL-C values of less than 7%, 130/80 mm Hg, and 100 mg/dL, respectively.

Knowledge, skills, and performance assessments were evaluated based on the Patient Self-Management Credential standards. Each patient was assigned a psychometrically validated achievement level of beginner, proficient, or advanced for each assessment domain.

Data sources and analysis

Aggregated, deidentified data were collated for general demographics and for economic, clinical, behavioral, and patient satisfaction (previously reported) data. The clinical data were recorded in QARx by the pharmacists after each patient visit. Economic data were obtained from respective health plans or other designated claims repositories, including employer and beneficiary paid amounts for both medical (including physician visits, hospitalizations, urgent care, emergency care) and pharmacy (medications plus professional services provided under the program) claims, processed, and imported into QARx.

Site-specific data were combined to create one aggregate cohort of patients that met inclusion criteria. The clinical and behavioral outcomes analysis compared initial and follow-up results that were collected during the course of patient care. Clinical analyses used the two-tailed t test for paired data from the beginning and ending measures within the evaluation period. The a priori level of significance was set at $P < 0.05$. The economic outcomes analysis compared baseline year actual and projected costs of care with costs for year 1 of the program.

Results

Patient population characteristics

A total of 832 patients had two or more documented visits, but 259 of these patients were excluded from the analysis because of lack of complete economic claims data. Separation of employees from employment, employees switching benefit plans, employers switching TPAs or PBMs, and lack of willingness of TPAs or PBMs to provide the minimum data set for economic claims analysis contributed to these exclusions. Thus, 573 patients from eight sites (Table 1) met the inclusion criteria and were included in this analysis. Age, ethnicity, and education demographics are presented in Figure 1. These 573 patients received pharmacist care for a mean (± SD) of 14.8 ± 2.5 months. A mean of six patient–pharmacist visits were reported during this period, with a mean of 51 minutes per visit.

Economic outcomes

As shown in Table 2, costs of medical claims decreased 8.5%, pharmacy claim costs increased 36.5%, and overall health care costs increased 5.32% from baseline to year 1 actual. When compared with projected costs, the mean total health care cost per patient per year was reduced by $1,079 (7.24%).[17,18] Both employers and patients experienced reductions compared with projected medical costs (18.84% and 21.61%, respectively). In the baseline year, medical costs represented 76% of costs compared with 24% for pharmacy claims; these proportions shifted to 69% and 31%, respectively, in year 1. Employers experienced a 31.9% increase in medication costs compared with projected figures, while patients had a 37.9% reduction. Using the employer and patient payment amounts from the economic analysis in this population of 573 patients, compared with projected, averted costs were estimated at $278,512 for employers and $339,875 for patients during the first year of the program's implementation.

Clinical outcomes

At year 1, statistically significant improvements in clinical outcome measures were found for enrolled patients in A1C, LDL-C, systolic blood pressure, diastolic blood pressure, and BMI measures (Table 3). The enrolled patients also moved closer to targeted HEDIS process measures after 1 year (Table 4) with improvements in those achieving targeted A1C, obtaining LDL measurements, achieving LDL-C and blood pressure goals for patients with diabetes. Table 4 summarizes the improvements in the diabetes process of care indicators as compared with the HEDIS Indicators for NCQA Commercial Accredited Health Plans. All diabetes process-of-care indicators and ending results in the Diabetes Ten City Challenge were better than the HEDIS measures achieved by current health plans.[19]

At baseline, 8% of participants met the criteria for the composite Diabetes Triad Clinical Control score defined for this project. This increased to 17% at year 1.

Patient Self-Management Credential assessment

The Patient Self-Management Credential knowledge and skills assessments were used so that members of the health care team could identify potential knowledge and diabetes management skills gaps.

At the end of the reporting period, aggregate knowledge achievement scores on the Patient Self-Management Credential were 11% beginner, 38% proficient, 47% advanced, and 4% not scored by the ending time of reporting period.

Skills assessments were used during the first several visits to evaluate patient skill levels in six different categories. Aggregate skill achievement scores at the end of the reporting period were 13% beginner, 38% proficient, and 34% advanced, with 15% not scored by the close of the reporting period. The
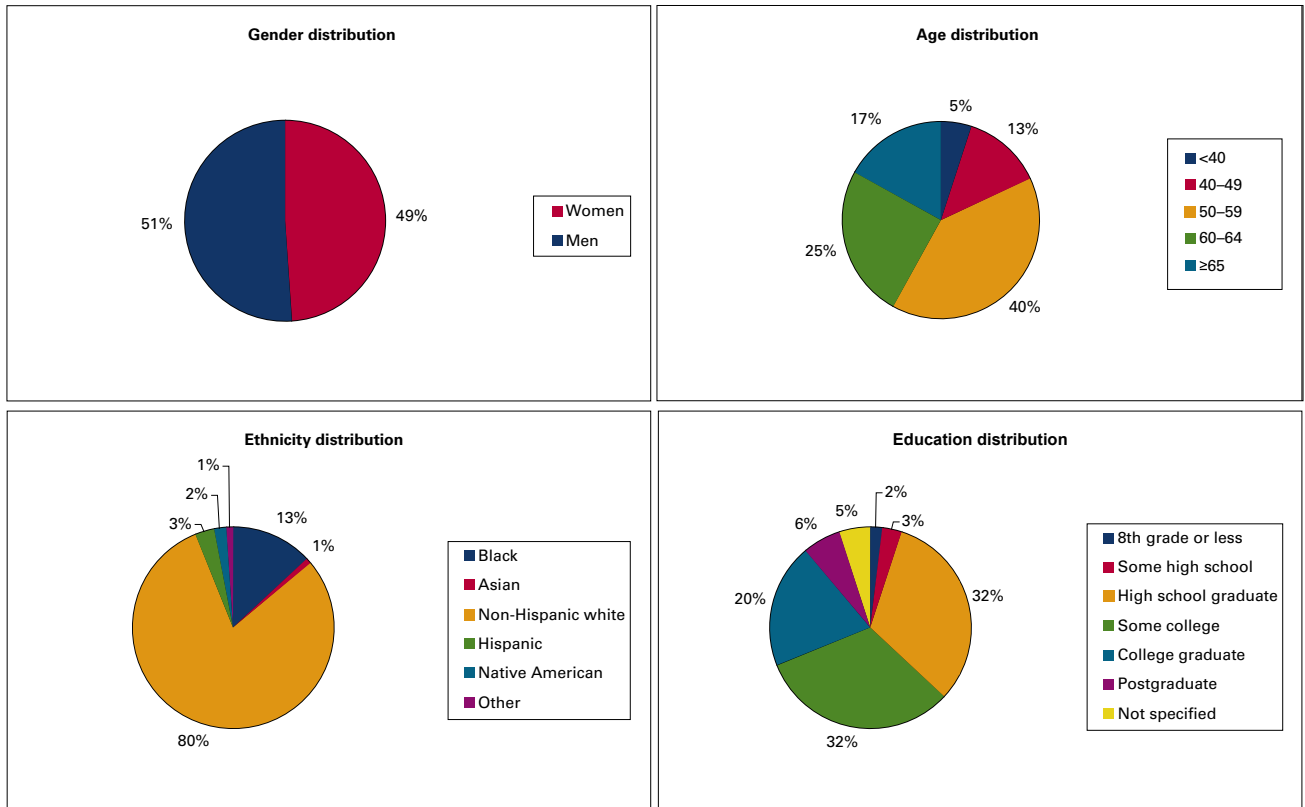

Figure 1. Demographics of Diabetes Ten City Challenge participants (n = 573)

Table 2. Economic evaluation of first-year data from the Diabetes Ten City Challenge (n = 573)

	Baseline $	Year 1 projected[b] $	Year 1 actual $	Year 1 change from baseline %	Year 1 change from projected %
Medical costs for enrolled patients[a]					
Employer payment for medical claims	4,895,532	5,546,638	4,501,480	−8.05	−18.84
Employee payment for medical claims	816,414	924,997	725,132	−11.18	−21.61
Total payments for medical claims	5,711,947	6,471,636	5,226,612	−8.50	−19.24
Average per patient for medical claims	9,968	11,294	9,121	−8.50	−19.24
Employer medical costs per patient	8,544	9,680	7,856	−8.05	−18.84
Medication costs for enrolled patients[a]					
Employer payment for medication claims	1,488,756	1,701,649	2,244,252	50.75	31.89
Employee copayment for medication claims	323,131	369,339	229,329	−29.03	−37.91
Total payments for medication claims	1,811,887	2,070,987	2,473,581	36.52	19.44
Average per patient for medication claims	3,162	3,614	4,317	36.52	19.44
Employer medication costs per patient	2,598	2,970	3,917	50.75	31.89
HealthMapRx subscription costs[c]					
Employer payment for HealthMapRx fees	0	0	0		
Employer HealthMapRx costs per patient	0	0	0		
Pharmacy network services costs[d]					
Employer payment for pharmacist services	0	0	224,043		
Employer pharmacist service costs per patient	0	0	391	100	100
Total health care costs	7,523,834	8,542,623	7,924,236	5.32	−7.24
Employer total costs per patient	11,142	12,650	12,164	9.17	−3.84
Mean total health care cost per patient	13,131	14,909	13,829	5.32	−7.24

[a]Claims received through December 2007; therefore, all patients enrolled before January 2007 with two or more visits and economic data included.

[b]Column represents projected costs for period calculated by applying mean market increases in health care costs for each type of expense (increases of 13% for medical costs and 14% for medication costs between 2006 and 2007).

[c]HealthMapRx program costs waived during year 1 of Diabetes Ten City Challenge participation.

[d]Known patient visits billed by networks to payers through December 2007 for included patient population.

performance assessment was used periodically after the other two; therefore, patients and providers could identify potential opportunities for ongoing performance improvement.

Aggregate performance achievement scores were 13% beginner, 31% proficient, and 24% advanced. In this group, because of the limited number of visits for some patients, 32% had not been scored for performance achievement by the close of the reporting period.

Discussion

While all HEDIS process and clinical measure results in DTCC were better than those recorded in 2007–2008 for the NCQA Commercial Accredited Plans, much opportunity remained for DTCC patients to improve after their initial year in the program. According to the Centers for Disease Control and Prevention (CDC) every 1% drop in A1C can reduce the risk of microvascular complications (eye, kidney, and nerve diseases) by 40%.[20] Correspondingly, for every 10 mm Hg reduction in systolic blood pressure, the risk for any complication (including death, microvascular, myocardial infarction) related to diabetes is reduced by 12%.[20] In addition, every 1% reduction in LDL-C corresponds to a 1.0% to 1.5% reduction in cardiovascular events. While more than twice as many patients achieved the perfect Diabetes Triad Clinical Control score after one year

in the program, the A1C, blood pressure, and LDL-C data above indicate that 83% of the enrolled population could still benefit from improved clinical control of one or more of these indicators.

The economic comparison model in our project used each patient as his or her own control. Despite the relatively modest improvements in clinical parameters for DTCC patients overall, actual medical costs dropped in year 1, compared with baseline, and year 1 actual total costs were just slightly elevated. The DTCC demonstrated overall savings compared with projected costs, with decreased medical costs, new spending going for compensation of pharmacist-based collaborative care services, and increased costs of medications as more patients received and took the agents prescribed for them. Additional efforts to analyze results in similar employer health plan populations not enrolled in the program could enhance future understanding of the program's comparative economic value.

Value in health care has been a topic of increasing discussion during the previous few years. Generally, value can be defined as the health outcomes achieved in relation to dollars spent in providing those services.[21] When considering management of chronic disease, outcomes may include short- and long-term measures, including mortality, complications, or other illness. According to a recent report by Porter and

Table 3. Clinical outcomes for participants in the Diabetes Ten City Challenge

Parameter	n	Baseline values Mean (95% CI)	Year 1 values Mean (95% CI)	Change from baseline to year 1 Mean (95% CI)	P
A1C (%)	554	7.5 (7.36, 7.64)	7.1 (7.03, 7.26)	−0.4 (−0.47, −0.24)	0.002
LDL-C (mg/dL)	528	97.5 (94.76, 100.18)	94.1 (91.36, 96.77)	−3.4 (−5.53, −1.28)	<0.001
SBP (mm Hg)	551	132.5 (131.12, 133.84)	130.1 (128.67, 131.47)	−2.4 (−3.79, −1.03)	<0.001
DBP (mm Hg)	550	80.8 (79.21, 80.85)	77.6 (76.78, 78.41)	−2.4 (−3.34, −1.53)	<0.001
BMI (kg/m²)	533	34 (33.33, 34.63)	33.6 (32.96, 34.20)	−0.4 (−0.61, −0.19)	<0.001

Abbreviations used: 95% CI, lower and upper limits of the 95% confidence interval; A1C, glycosylated hemoglobin; BMI, body mass index; DBP, diastolic blood pressure; LDL-C, low-density lipoprotein cholesterol; SBP, systolic blood pressure.
[a]P value determined by applying a two-tailed t test for paired data to the mean change data.

Table 4. HEDIS process measures for patients with diabetes

HEDIS commercial indicator[a]	HEDIS results, 2006 % patients[a]	DTCC baseline[b] % patients	HEDIS results, 2007 % patients[a]	DTCC year 1[c] % patients
A1C testing	87.5	54	88.1	97
Poor A1C control	29.6	13	29.4	9
Good A1C control (≤9%)	70.4	87.4	70.6	90.8
Good A1C control according to ADA (<7%)	—	43	—	53
Lipid profile	83.3	51	83.9	92
Lipid control, LDL-C <100 mg/dL	43.0	57	43.8	63
BP control <130/80 mm Hg	29.9	28	32.1	39
Eye examinations	54.7	57	55.1	81
Influenza vaccinations	45.6	32	48.6	65
Foot examinations	—	34	—	74

Abbreviations used: ADA, American Diabetes Association; A1C, glycosylated hemoglobin; BP, blood pressure; DTCC, Diabetes Ten City Challenge; HEDIS, Healthcare Effectiveness Data and Information Set; LDL-C, low-density lipoprotein cholesterol.
[a]The State of Health Care Quality 2007, 2008; National Committee for Quality Assurance commercially accredited plans.
[b]Data from baseline of Diabetes Ten City Challenge.
[c]Data from year 1 of Diabetes Ten City Challenge.

Teisberg,[21] "Value (outcomes and costs) can only be reliably measured over the full cycle of care, rather than for a discrete procedure or intervention (e.g., drugs, hospital stays, tests). Measuring and reporting outcomes and costs in a piecemeal fashion, as is the practice today, only encourages poorly coordinated care and cost shifting." This message has not been lost on the insurance industry or on employer groups who have sought ways to implement value in their benefit design. The emergence of the value-based insurance design (VBID) approach, which proposes to align incentives by developing copayment rate structures that drive the use of higher-value services while discouraging the use of lower-value services, was described by Chernow et al.[22]

In practice, two general approaches to VBID exist. One approach establishes more favorable copayments for high-value services (such as immunizations), while the other targets incentives for patients with a specific clinical diagnosis or chronic disease. An example of the second benefit design approach is waiving copayments for medications for patients with diabetes. The Asheville Project and subsequently the DTCC are examples of this latter approach.

A key element of implementing a value-based benefit design is the restructuring of financial incentives for key stakeholders, including patients, payers, and providers. This is consistent

with the message by the Commonwealth Fund Report titled Toward a High Performance Health System for the United States. The report states, "It is clear that the nation needs to shift from paying for units of services provided to paying for the best achievable outcomes and most effective care over the course of treatment."[23] The value-based benefit design as implemented in DTCC is also consistent with the qualities that define the chronic care model, the authors of which state, "High-quality chronic illness care is characterized by productive interactions between practice team and patients that consistently provide the assessments, support for self-management, optimization of therapy, and follow-up associated with good outcomes."[24]

Incentives are an important part of value-based benefits, and the incentives must be aligned for key stakeholders within a comprehensive and collaborative model of care. We believe that the patient self-management program used in DTCC, both in its process of care and in its business model, supports key elements of these recommendations for a value-based benefit that provides high-quality chronic illness care. The patient self-management program described in the current article creates a collaborative team approach that includes employers, patients, pharmacists, physicians, and diabetes educators; it also aligns incentives, with a focus on wellness, patient self-management, and workplace cost savings. Waived copayments

on medications provide incentive for participants to actively engage in self-care. Pharmacists meet face to face with participants to discuss their care, help patients to learn ways to monitor and control their disease, and reinforce their physician's care plan. Results include improved health outcomes and a savings in health care costs by investing in well care instead of sick care.

In assessing the lessons learned to date in DTCC, a number of important learning opportunities have been created, including determination of successful approaches and identification of areas needing improvement or broad changes in the health care system. We believe that one of the drivers of the positive results in this project has been its patient-centered model. Other research has shown that a program that meets the individual needs of patients, makes referrals to appropriate support services, and helps patients solve problems can lead to positive results.[25] In the DTCC model, the regular meetings between the pharmacist and the patient create opportunities to answer questions, identify problems, and teach self-management skills. In addition, the pharmacist can collaborate with other health care providers to resolve issues that may be identified by the patient and provider. The overall continuity in the relationship between the patient and pharmacist contributes to improved patient satisfaction as previously reported.[10] The continuity of that relationship and the collaboration with other health care providers coupled with employer incentives creates a unique health care experience. This experience is based on patient coaching and support; it breaks down many of the silos that are common in other patient experiences.

The APhA Foundation observed in a recent report[26] that several key qualities seem to drive successful program implementation, including the following:

- An employer that will invest in incentives for patients and providers to improve health and lower costs
- Employers who are more involved in program implementation and have an open culture with their employees tend to have faster and higher percentage of enrollment of eligible beneficiaries
- Receptiveness of health care providers who support community-based collaborative care
- A local network of pharmacists with the motivation, training, and time to help patients manage their care
- Accessibility to pharmacist services
- Willingness of health plan to provide claims data for analysis

Another change that is currently taking place in pharmacy practice and will need to continue is the reengineering of the pharmacy practice site to accommodate the delivery of these patient care services. In the future, more pharmacies will need private counseling areas to maintain privacy and confidentiality in patient sessions. Additional research is needed to optimize workflow to free pharmacists' time for the delivery of patient coaching services and develop viable business models that support adequate time for follow-up and documentation. Pharmacist providers also voice difficulty in some settings with obtaining laboratory test information for patients and estab-

lishing efficient mechanisms for communication with the patients' physician.

The profession of pharmacy also needs to develop network structures to facilitate the delivery of patient-centered services; most pharmacy networks today are based on product distribution. Payers want to contract with one network entity as opposed to contracting with individual pharmacist providers for the delivery of services. Employers are looking for networks with dedicated, credentialed, and insured pharmacists to meet employee needs. Successful networks should have a robust infrastructure to handle administrative functions, operational processes, and clinical coaching; an effective system of performance-driven accountability; a wide-ranging geographic reach of its pharmacists; and an ability to lead in client service. As with individual providers, network business models also must be viable.

The health care system is replete with challenges; challenges also occurred in this project. For example, an employer "champion" usually drives the initial approval and implementation of the program. If a staff changes or a true champion is lacking, program approval and implementation can be challenging. Without strong employer support and a plan for consistent and clear communication about the program benefit design for participants, the full enrollment potential (and therefore results) may not be realized.[26]

Another challenge is developing the capability for collecting economic and claims data efficiently. The variability in reporting formats and the ability of third parties to provide a standard format in a timely manner were challenges in this project. For the health care system to improve, enhancements must facilitate the secure exchange of health information between patients and providers. The U.S. Department of Health and Human Services reports that interoperable health information technology will improve individual patient care, including overall health care quality, the management of chronic disease, access to care, and efficiency in administrative procedures.[27] Advances in health information technology will aid in the expansion of the model used in DTCC. The pharmacy profession needs to be actively involved in setting standards for the seamless flow of information between and among patients and providers, including efforts such as the health information technology summit held in October 2008 by APhA and reported in this issue of *JAPhA*.[28]

Limitations

This project used an observational review design, limiting the conclusions that can be drawn based on its findings as well as its generalizability. The number of participants meeting inclusion criteria for this year 1 report, 573, was limited by varying starting dates for participating employers and the rolling enrollment process for participants, and reduced from 832 by lack of receipt of complete medical and pharmacy claims. In addition, the program was offered to health plan participants as a new, voluntary health benefit through local promotion by employers. Initial enrollment may have included healthier and more motivated beneficiaries, and those with greater morbidi-

ties and lack of motivation might not have been included in the population analyzed.

Economic outcomes were evaluated both as actual numbers and as amounts adjusted using national inflation figures for health care costs in 2007 and 2008. To the degree that these values differ from those in local settings, our figures can be recalculated using other adjustments and comparisons made on that basis.

Conclusion

DTCC successfully implemented an employer-funded, collaborative health management program using community-based pharmacist coaching, evidenced-based diabetes care guidelines, and self-management strategies. Positive clinical and economic outcomes were identified for 573 patients who participated in the program for at least 1 year, compared with baseline data. The patient self-management training and assessment credential equipped patients with the knowledge, skills, and performance-monitoring priorities needed to actively participate in managing their diabetes. DTCC and the process of care used provide a promising model that blends important elements of a "reformed" health care delivery process by integrating accessibility, patient centeredness, and value achieved by helping patients to make clinical improvement while managing costs.

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