Clinical and economic outcomes of a pilot project examining pharmacist-focused collaborative care treatment for depression

Patrick R. Finley, Benjamin M. Bluml, Barry A. Bunting, and Stephanie N. Kiser

Abstract

Objective: To assess the clinical and economic impact of a pharmacist-focused health management program for patients with depression.

Design: Prospective, nonrandomized, proof-of-concept investigation.

Setting: Asheville, NC, from July 2006 through December 2007.

Participants: Employees or adult dependents with depressive symptoms who agreed to enroll in an employer-sponsored treatment program conducted at two ambulatory clinics where consultative services were provided. Participants were included in the analysis if they participated in the program for at least 1 year and had two or more documented visits with a pharmacist.

Intervention: Outpatient-based pharmacists provided assessment, self-management services follow-up, and treatment recommendations to primary care providers within a collaborative care management model.

Main outcome measures: Changes in severity of depressive symptoms and impact on overall health care costs for employers and beneficiaries.

Results: Of the 151 beneficiaries referred to the program, 130 (82%) remained under pharmacist care for a minimum of 1 year and were included in the aggregate analysis. Statistically significant improvements were observed for Patient Health Questionnaire (PHQ)-9 scores from baseline to endpoint (11.5 ± 6.6 to 5.3 ± 4.7 [mean ± SD], $P < 0.0001$). The clinical response rate was 68% with a 56% remission rate. In economic subgroup analysis (n = 48), annual medical costs decreased from an average of $6,351 per enrollee to $5,876, which was lower than the projected value ($7,195). Total health care costs to the employer increased from $7,935 per enrollee to $8,040, which was lower than the projected value ($9,023).

Conclusion: Patients in the first year of the program had significant improvement in the PHQ-9 clinical indicator of depression severity. Total health care costs per patient per year were reduced compared with projected costs without the program. Employers expressed their appreciation for this collaborative care program and continued to offer this voluntary health benefit after the study's conclusion.

Keywords: Project ImPACT: Depression, Patient Self-Management Program, depression, chronic care model, health outcomes, pharmacy benefit design, collaborative care, Asheville Project.

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Depression is now widely recognized as one of the most common and disabling chronic diseases affecting industrialized nations.[1] In the United States, about one in six adults will experience an acute episode of major depressive disorder during their lifetime and more than 10% will suffer from a depressive illness during the next 12 months.[2] Depression is associated with high rates of morbidity and mortality as a result of direct effects of the illness on physical functioning (e.g., poor sleep, low energy, changes in appetite), as well as high rates of suicidal thinking triggered by deteriorations in mood and cognition. Further, depression also has been shown to be closely associated with many other medical conditions, such as heart disease, cancer, Parkinson's disease, and Alzheimer's dementia.[3,4]

The social impact of mood disorders is often overlooked and can be quite profound, leading to emotional withdrawal and subsequent isolation. The functional status of families often is compromised as relationships suffer and responsibilities are neglected.[5] The economic consequences of depression in adults also are evident, particularly in the workplace. Depressed adults are 20% to 40% more likely to be unemployed compared with euthymic counterparts.[6] Among those who are employed, mood disorders have been shown to be a leading cause of work absenteeism, and reports indicate that employees with depression will have an average of 9.9 sick days annually.[7] The costs of presenteeism with depression are probably even higher, with decrements of job productivity ranging from 10% to 20%.[8]

Although depression is certainly a treatable condition, most cases will go undetected. Even when treatments are prescribed, less than 50% of patients will complete a recommended therapeutic course.[9–11] As most depressed patients will present initially in nonspecialty settings (e.g., primary care), many health policy experts view these treatment deficiencies largely as a "systems" problem.[12,13] Researchers and institutions have attempted to redesign health care delivery systems accordingly, emphasizing a collaborative, multidisciplinary approach spearheaded by a committed case manager.[13–15] Randomized controlled studies have demonstrated significant improvements in clinical outcomes with this strategy.[16–18] However, most of this research has been conducted in managed care environments, and the applicability of these approaches to other care settings remains somewhat unclear.[19] Further, the role of the employer in these treatment models has rarely been considered.[20]

Previously, the American Pharmacists Association (APhA) Foundation conducted several investigations that demonstrated the value of clinical pharmacist interventions for chronic diseases such as diabetes, asthma, hypertension, and dyslipidemia.[21–24] In the prospective study described below, investigators chose to emphasize the role of clinical pharmacists in improving the outcomes of depressed patients, primarily through a structured program featuring enhanced employee outreach, patient education, and systematic follow-up. By partnering with employer groups, investigators hoped to create financial incentives for patients (and their covered beneficiaries) that encouraged participation in depression management programs and empowered them to share responsibility for treatment outcomes. Investigators hypothesized that improvements in treatment adherence and lifestyle changes would result in quantifiable benefits apparent in clinical and economic domains.

At a Glance

Synopsis: Changes in severity of depressive symptoms and impact on overall health care costs for employers and beneficiaries were assessed among employees or adult dependents who agreed to enroll in a depression treatment program that was conducted at two ambulatory clinics and led by pharmacists. Nine-item Patient Health Questionnaire scores improved significantly from baseline to endpoint, and the clinical response rate was 68% with a 56% remission rate. Annual medical costs decreased from an average of $6,351 to $5,876 per patient, and total health care costs to the employer were $983 lower than projected per patient. Employers were satisfied with the program and continued to offer this voluntary health benefit after the study's conclusion.

Analysis: *The current work reflects the findings of previous reports of collaborative care models: that pharmacist interventions among patients with chronic illness result in increased prescription costs but decreased medical costs and net health plan savings. The care model described here features core elements required of a collaborative care model, as it emphasizes the role of clinical pharmacists in managing care, working collaboratively with primary care providers and other mental health professionals to ensure frequent follow-up, monitor treatment adherence, and provide patient education. The authors believe that this process of care blends important elements of "reformed" health care delivery, integrating provider accessibility, patient centeredness, and lifestyle considerations into the model.*

Objectives

The primary objective of this prospective proof-of-concept investigation was to quantify and compare the clinical and economic outcomes of depressed patients before and after receiving an experimental model of care that emphasized the role of clinical pharmacists as care managers. The model was designed specifically to align the financial incentives of employees, employers, and health care systems. Investigators sought to explore the feasibility and sustainability of this collaborative care model in a nonacademic real-world setting.

Methods

This investigation was conducted in a community setting in Asheville, NC. Two employers participating in the Asheville Project, the City of Asheville and Mission Hospitals, agreed to offer a care management program for covered health plan members with depression. Researchers received approval from

the institutional review board of the Mission Hospital System to conduct this prospective study before commencement of participant recruitment.

Project ImPACT: Depression was a quasi-experimental, prospective, naturalistic study. All eligible participants were older than 18 years and employees of Mission Hospitals or the City of Asheville or covered spouses or dependents. Eligible participants were identified by their medical providers as suffering from depressive symptoms and prescribed antidepressant treatment. To replicate a real-world setting, the study did not include a structured diagnostic interview to confirm depression diagnosis and did not feature an a priori cutoff for depression severity on a symptom rating scale. Participants volunteered to participate in this care management program, and all services and incentives were paid by the employers' health plans.

Employers participating in Project ImPACT: Depression were self-insured and therefore at risk for medical and prescription costs for their employees and other beneficiaries under the established plan. The employer/health plan agreed to invest in incentives for patients and reimburse pharmacist providers for services. These incentives included waived copayments for antidepressant medications and free pharmacist consultations. Employers worked closely with their third-party administrators (TPAs) and pharmacy benefits managers (PBMs) to implement incentives and provide basic claims data information on an annual basis to allow for program economic performance review.

The two pharmacist care managers in this collaborative treatment model were community and outpatient hospital pharmacists who had previously obtained a doctor of pharmacy degree, had been in practice for a minimum of 3 years, and completed a postdoctoral residency program. One of the pharmacists had completed a 12-month psychiatric residency, and the other had completed a 12-month ambulatory care residency. Immediately before the investigation, participating pharmacists received approximately 16 hours of depression management training (8 hours self-study and 8 hours live) provided by the APhA Foundation that was based on national treatment guidelines.[25] The live training consisted of didactic presentations, patient cases, and role playing among participants. The training was delivered by a multidisciplinary team that included a primary care provider, psychiatrist, behavioral health counselor, and psychiatric pharmacist. Pharmacists met with patients at the Mission Hospital's Pharmacotherapy Clinic and Mission Hospital's Education Center.

Recruitment

The majority of participants were identified through self-referral (>90%) as a consequence of staff meetings and circulating flyers that coincided with the program's launch. Other participants were referred through their employer's employee assistance program (EAP), through existing relationships with local pharmacists, or by referral of other health care providers such as physicians, physician's assistants, or nurse practitioners.

Patient enrollment began in July 2006 and continued at each site dependent on employer-specific enrollment timetables. The data collection 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 ultimately included in both the clinical and economic subgroup analyses.

Intervention

All patients in the study agreed to meet with a pharmacist care manager on a regular, long-term basis. Patients were assigned to their care manager based on the pharmacists' availability and location. All pharmacist–patient encounters were face to face, scheduled, and conducted in a private area, with access to the Internet for documenting and tracking of patient care interventions (Figure 1). Patients agreed to meet with their pharmacist care manager as frequently as once a month. However, the frequency of encounters was at least quarterly and ultimately at the discretion of the pharmacist care manager. Patients could withdraw at any time. The settings for the patient–pharmacist interactions were two Mission Hospital outpatient sites. One of these was an outpatient pharmacotherapy clinic staffed by pharmacists, and the other was an outpatient education center that employed three pharmacists for disease management programs.

Upon enrollment into the program, participants scheduled an intake interview with participating pharmacists for the purpose of obtaining patient-specific information related to current mental status, ongoing stressors, past psychiatric history, social and family histories, and medical history (including allergies and comorbid conditions). Participants also completed a validated, self-rated depression scale (the nine-item Patient Health Questionnaire [PHQ-9] instrument)[25] at baseline. Pharmacist care managers worked closely with patients to achieve consensus on treatment goals and subsequently formulated a treatment plan primarily consisting of medication recommendations, patient education, and lifestyle changes. Pharmacist care managers used the national depression guidelines published by the American Psychiatric Association and resources from the MacArthur Foundation for evidence-based treatment decision making and recommendations.[26,27] At each subsequent visit, treatment goals were revisited, medication assessments were repeated, treatment adherence was evaluated by patient self-report, and participants completed a follow-up PHQ-9 assessment. Education was tailored to specific patient needs and placed strong emphasis on anticipated benefits and risks of treatment modalities, as well as lifestyle changes needed to reduce stress and improve overall health (e.g., exercise, yoga, dietary modifications).

Pharmacists' communication with physicians was most often via faxes that summarized the patient–pharmacist encounter. These included patient comments, PHQ-9 scores, and suggestions for therapy changes when indicated. The prescriber continued to have ultimate treatment decision-making authority in the process. If urgent needs were identified, the pharmacist would call the office to collaborate on an action plan. Any communication that requested information from the physician office was accompanied by a protected health information release form signed by the patient.

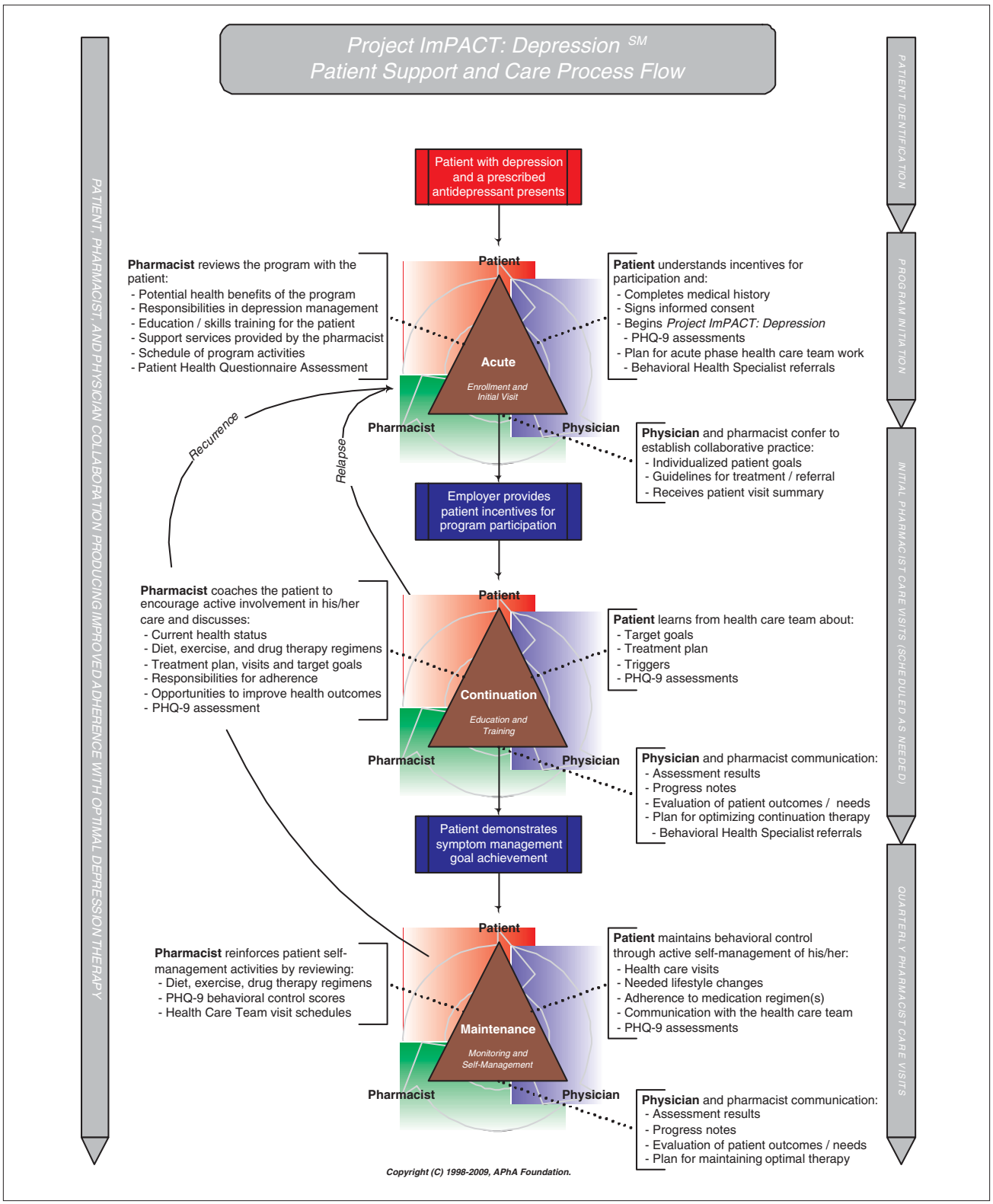

Figure 1. Project ImPACT: Depression patient support and care process flow
Abbreviation used: PHQ, Patient Health Questionnaire.

Pharmacist care managers also had the option of referring patients to EAP counselors, which was already a covered benefit of both participating employers' health plans. Before pilot program implementation, meetings were held with employer representatives and representatives from their EAP service providers. A collaborative relationship was established that provided for two-way referral options. EAP could refer eligible individuals to the program, and pharmacists could refer individuals to EAP. The program developers were concerned about pharmacists' comfort level and scope of practice with regard to the risk for suicide. This primarily was addressed through routine use of a validated depression rating scale (i.e., PHQ-9) that assessed the overall severity of symptoms and featured a specific item addressing suicidal ideation. Pharmacists explored the relative risk for suicidality further (e.g., plan, history of impulsivity, active substance abuse) whenever patients confirmed the presence of this symptom on the scale (i.e., score of ≥1 on item 9 of PHQ). Pharmacists had the option to refer patients to professional counselors (EAP) and/or their primary care providers when further follow-up was indicated. Both employers already had EAP contracts and commented that these services were underused historically. Upon the suggestion of the EAP provider, the pharmacists were asked to ensure that plan members who entered the program were educated on the EAP services available to them, the EAP counselors' role, and how to access their services. In turn, the EAP providers offered to inform the employers' plan members of the pharmacist program when they thought an individual they were meeting with might benefit from enrolling. The pharmacist, EAP, and the physician collaborated closely in this process, and three-way communication occurred.

Data sources and analysis

Aggregated, deidentified data were collected for general demographics, economic outcomes, and clinical outcomes. The pharmacists documented the clinical data after each patient visit in QARx, which is the APhA Foundation's Web-based documentation system.[28] Economic data were obtained from respective health plans or other designated claims repositories, including employer and beneficiary paid amounts for both medical and pharmacy claims. Then, data were processed and imported into QARx.

Clinical data were combined from the two study sites to create one major aggregate cohort. A subgroup of participants for whom complete economic (and clinical) data were available also was identified and analyzed. The clinical 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.

Outcome definitions

The primary clinical outcome measure was PHQ-9, a validated depression assessment tool that was administered at baseline and during each subsequent visit with pharmacist care managers.[25] PHQ-9 is a self-administered survey that addresses the presence and severity of each of the nine symptoms included in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, diagnostic criteria for major depression. PHQ-9 usually can be completed and interpreted in less than 10 minutes, and it has been widely advocated as a convenient and accurate clinical assessment tool for diagnosing and monitoring depression in the primary care setting. A total score of less than 5 suggests the patient probably does not require treatment. Scores ranging from 5 to 14 imply that the provider should use clinical judgment in considering the necessity of treatment. Scores greater than 14 strongly suggest that some form of evidence-based treatment is warranted. Regarding clinical outcomes, treatment response is defined as a decrease of 50% or more from the baseline PHQ-9 score. Treatment remission is defined as a PHQ-9 score of less than 5.

Economic outcomes were measured in a manner consistent with previous employer-based cost analyses published by the APhA Foundation.[29] Each patient's enrollment date in the program serves as time 0 (i.e., the index date), with the resultant baseline period being the 12 months immediately preceding that date and year 1 being the 12 months immediately following. Medical claims were obtained from health plan TPAs, and pharmacy claims were obtained from PBMs. All available medical and pharmacy claims were included for each of these periods. Fees for pharmacist care services were included in medical care claims data. Projected costs were calculated from baseline period values using a multiplier from spring 2007 AON market-based medical [i.e., "Actives & Retirees <65 (without Rx)" preferred provider option] and pharmacy (i.e., "General and Specialty" average) trend results, as well as January 2008 federal reserve inflation cost data.[30,31]

Results

A total of 159 patients were enrolled in the program during the study period. Of those, 15 did not have any documented visits and 14 attended only one visit. Thus, 130 patients (82%) from two employers were included in the aggregate cohort. A total of 685 patient–pharmacist visits were reported during this period, for a mean (±SD) of 5.3 ± 2.3 visits per patient and 37 ± 17 minutes per visit. The time from initial intake interview until the last follow-up clinic visit was 11 ± 4.2 months.

Of the 130 patients in the aggregate cohort, 48 had complete economic data for both baseline and follow-up study periods, and these patients constituted the subgroup in our fiscal analysis. These 48 patients received pharmacist care for a mean of 13.8 ± 2.6 months. A total of 299 patient–pharmacist visits were reported during this period (6.2 ± 2.3 visits/patient and 38 ± 15 minutes/visit).

Study participants were primarily white, middle-aged, and well-educated women (Table 1). No significant differences were found in the demographic descriptions obtained for the aggregate and subgroup populations.

Table 1. Demographics of participants enrolled in Project ImPACT: Depression

Demographic characteristic	Aggregate cohort[a] %	Economic subgroup[b] %
Gender		
Women	85	87
Men	15	13
Age (years)		
≤34	12	10
35–44	21	25
45–54	42	42
55–64	25	23
Ethnicity		
Black	7	10
White	87	84
Hispanic	2	2
Native American	2	4
Not specified	2	
Education		
Eighth grade or less	2	2
Some high school	4	2
High school graduate	7	4
Some college	35	33
College graduate	37	42
Postgraduate education	14	17
Not available	1	

[a]Aggregate cohort: n = 130.
[b]Economic subgroup: n = 48.

Clinical outcomes

Among the 130 participants included in the aggregate cohort, 104 (80%) exhibited a decrease in PHQ-9 scores between the baseline visit and the latest follow-up. A total of 10 patients (8%) had no change in depression severity, and depression severity worsened in 16 patients (12%). Mean PHQ-9 scores were 11.5 ± 6.6 (i.e., moderate depression severity) at baseline and 5.3 ± 4.7 (i.e., mild severity depression) at latest follow-up ($P < 0.0001$; see Table 2 for clinical interpretation of survey scores). In general, clinical improvements and outcomes were superior for patients with severe depression at baseline (PHQ-9 >14; 83% achieved remission) compared with those with mild or moderate symptoms (PHQ-9 ≤14; 20% achieved remission). Suicide attempts were not reported or confirmed for any enrolled participants during the study period. For the subgroup with complete economic data, mean PHQ-9 scores decreased (from 11.4 ± 6.1 at baseline to 4.7 ± 4.1 at endpoint) in a manner similar to the aggregate cohort. Overall, a total of 88 patients (68%) were considered responders (≥50% reduction of PHQ-9 from baseline) and 73 patients (56%) were remitters (PHQ-9 <5 at latest follow-up). PHQ-9 clinical results for the aggregate cohort and the economic subgroup populations are summarized in Table 2.

Economic outcomes

The mean total health care cost to the employer per patient per year increased from $7,935 at baseline to an actual value of $8,040 1 year later, but this total was less than the projection of $9,023 for the 48 evaluable participants (calculated as described above; Figure 2 and Table 3). This value for actual total health care costs (per patient) represents an 11% decline from projected values or a total savings of $41,881 per year for these 48 enrollees. The majority of this savings can be attributed to a decline in medical costs, which were projected to amount to $5,353 per patient annually, but actual mean values were $3,600 (33% lower than projected). Annual employer costs for prescription medications increased by 21% compared with the projected costs ($3,670 vs. $4,440/patient). In the baseline year, employer health plan medical costs represented 60% of total health care costs compared with 40% for pharmacy claims; these proportions shifted to 45% medical and 55% pharmacy in year 1 of the program. Individual out-of-pocket costs for prescriptions decreased by 41% ($323/patient) compared with projected estimates. However, enrollee out-of-pocket medical costs increased by 24% ($434/patient) above projected values. Therefore, participants' overall costs increased by 4.2% above projected estimates, representing a

Table 2. Clinical results of participants enrolled in Project ImPACT: Depression

PHQ-9 assessment	Aggregate cohort: initial[a] n	Aggregate cohort: most recent[a] n	*P*[c]	Economic subgroup: initial[b] n	Economic subgroup: most recent[b] n	*P*[c]
PHQ-9 score, mean ± SD	11.5 ± 6.6	5.3 ± 4.7	<0.0001	11.4 ± 6.1	4.7 ± 4.1	<0.0001
Minimal depression (1–4)	25	73		7	32	
Mild depression (5–9)	28	35		16	7	
Moderate depression (10–14)	33	14		9	8	
Moderately severe depression (15–19)	29	5		10	1	
Severe depression (20–27)	15	3		6	0	

Abbreviation used: PHQ, Patient Health Questionnaire.
[a]Aggregate cohort: n = 130.
[b]Economic subgroup: n = 48.
[c]*P* value determined by applying a two-tailed *t* test for paired data to the mean change data.

Table 3. Economic analysis of participants enrolled in Project ImPACT: Depression

	Baseline year	Year 1 projected[a]	Year 1 actual	Difference between baseline and actual	Difference between projected and actual
Medical costs (n = 48 patients)[b]					
Employer payments (total)	$226,798	$256,962	$172,790	–23.81%	–32.76%
Employer (per patient)	$4,725	$5,353	$3,600	–$1,125	–$1,754
Enrollee payments (total)	$78,040	$88,419	$109,245	39.99%	23.55%
Enrollee (per patient)	$1,626	$1,842	$2,276	$650	$434
Total payments	$304,838	$345,381	$282,035	–7.48%	–18.34%
Total (per patient)	$6,351	$7,195	$5,876	–$475	–$1,320
Medication costs (n = 48 patients)					
Employer payments (total)	$154,102	$176,139	$213,122	38.30%	21.00%
Employer (per patient)	$3,210	$3,670	$4,440	$1,230	$770
Enrollee payments (total)	$32,792	$37,481	$21,964	–33.02%	–41.40%
Enrollee (per patient)	$683	$781	$458	–$226	–$323
Total payments	$186,894	$213,620	$235,086	25.79%	10.05%
Total (per patient)	$3,894	$4,450	$4,898	$1,004	$447
Total health care costs (n = 48 patients)					
Employer payments (total)	$380,900	$433,101	$385,912	1.32%	–10.90%
Employer (per patient)	$7,935	$9,023	$8,040	$104	–$983
Enrollee payments (total)	$110,832	$125,901	$131,208	18.38%	4.22%
Enrollee (per patient)	$2,309	$2,623	$2,734	$425	$111
Total payments	$491,732	$559,002	$517,121	5.16%	–7.49%
Total (per patient)	$10,244	$11,646	$10,773	$529	–$873

[a]Represents projected costs for period if no plan changes had been made and average market and inflation increases were applied.[30,31]
[b]Known patient visits amounts billed by providers to employers through December 2007 were a mean of $331.15 per patient.

mean increase of $111 compared with their baseline year. It is important to reemphasize that the economic analysis includes the additional costs incurred by the two health plans resulting from the program: pharmacist care manager services and reduced prescription copayments.

Discussion

Studies using collaborative care models consistently have found that when pharmacists intervene among patients with chronic illnesses (e.g., diabetes, asthma, hypertension, dyslipidemia), prescription costs increase but medical costs decrease and a net health plan savings is evident.[21–24] This economic pattern also was found in the present investigation among depressed patients; medical costs were 33% lower and medication costs were 21% higher compared with projected estimates, resulting in actual total health care expenditures by the employer that were 10.9% lower than expected ($983 lower per patient, inclusive of program costs).

This investigation also found significant improvements in clinical outcomes, as 68% of the patients exhibited a treatment response and 56% achieved remission. This compares favorably with previous multidisciplinary collaborative care studies for depression, for which response rates have averaged 54% (vs. 41% in control patients) and remission rates were 42% (vs. 29% in control patients) using a variety of depression rating scales.[19] Of note, however, these investigations were methodologically more rigorous than this pilot project, featuring randomized controlled study designs.

An additional outcome worthy of mention is the study's retention rate; 82% of the participants remained enrolled in the program for 1 year or more, suggesting that the program was well received by depressed employees and their dependents. Whether this high retention rate was a result of financial incentives, quality of care, pharmacist care manager accessibility, or other factors is unclear; however, from the payer perspective, practical benefit of this overall approach appears to exist. This impression is further supported by the fact that both employer groups have offered this program to their beneficiaries for more than 3 years now and continue to maintain it as a standard health benefit.

One interesting and unexpected result of the study was that individual enrollee's overall out-of-pocket costs increased. This increase was exclusively on the medical side. Out-of-pocket costs for prescriptions decreased by more than 41%, but out-of-pocket medical expenses increased by 24%. Given the reduced actual medical costs compared with those projected, this increase in prescription medication costs likely was not a result of declining health. Our assertion is that patients in this program took advantage of available health services more frequently compared with before the program was instituted.

One critical outcome that we had hoped to quantify with this project was that of worker productivity. As other research-

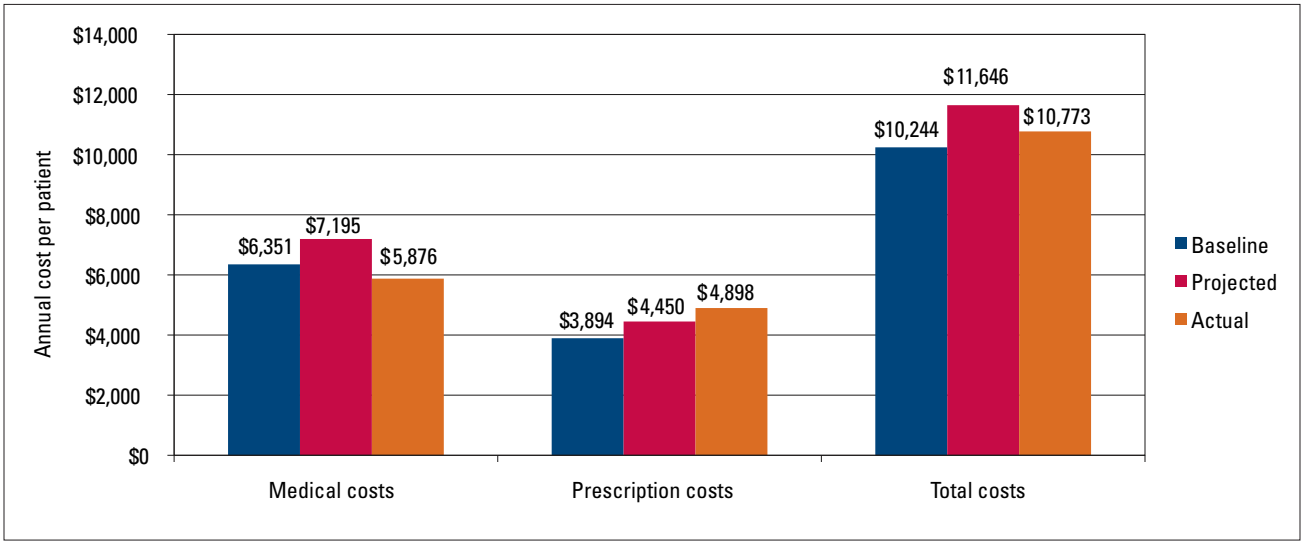

Figure 2. Project ImPACT: Depression economic analysis
n = 48 participants

ers have concluded, improvements in absenteeism and presenteeism may be the biggest cost drivers justifying the pursuit of quality depression care, particularly from the employers' perspective.[8,32,33] Unfortunately, the employers involved in this investigation ultimately were unable to provide absenteeism data. It would be reasonable to assume that significant improvements in these indirect costs occurred, particularly considering that 36 of 44 patients recovered from moderate to severe depressive illness (PHQ-9 >14) and achieved disease remission, but we were unable to quantify these productivity measures. In all likelihood, these clinical improvements suggest that the true savings inherent with this program were underestimated, but this can only be verified with further study.

This care model emphasized the role of clinical pharmacists as care managers, working collaboratively with primary care providers and other mental health professionals to ensure frequent follow-up, monitor treatment adherence, and provide patient education. As such, this intervention features the core elements required of a collaborative care model.[34] However, given the preliminary nature of this pilot project, we were unable to quantify which of the program's features are uniquely responsible for the positive clinical and economic outcomes. Financial incentives were presumably influential, but we also believe that the process of care blends important elements of "reformed" health care delivery, integrating provider accessibility, patient centeredness, and lifestyle considerations into the model. Much emphasis has been placed on the flexibility and exportability of collaborative care models, but whether incorporating other health professionals into the model (e.g., nurse specialists, physician assistants, social workers) would have a similar favorable impact on clinical and economic outcomes remains to determined. However, we believe the current work supports the growing conclusion that properly trained pharmacists have skills that can contribute to the management of chronic medical conditions for which medication is a hallmark of management and that these skills go well beyond dispensing functions.

Limitations

This investigation was designed as a proof-of-concept project, examining the preliminary impact of a uniquely incentivized model of care for depression. As such, several study limitations should be considered. The lack of a control group and randomization procedures are notable limitations. For example, clinical improvements may have been influenced by regression-to-the-mean phenomenon, which is supported to some extent by the superior clinical outcomes found among the severely depressed. Similarly, the natural course of depression is episodic and highly variable, and patients may experience spontaneous remissions independent of any study intervention. The incorporation of an appropriate control group may have minimized this potential bias considerably. A Hawthorne effect also may have influenced the intervention's success. Participating pharmacist care managers were aware of the investigation from the outset, but the optimization of patient care that may have transpired during the study would be expected to be incorporated into any viable program that an employer group chose to implement in practice.

The variable length of follow-up in this study also may be questioned, but we are in agreement with previous researchers in this field who have contended that this flexible approach is more consistent with the needs of patients in real-world practice and less contrived than fixed-treatment protocols found in previous trials.[35,36] Other potential limitations include the small number of pharmacists and treatment facilities providing the intervention and that complete financial data were not available for the majority of participants (primarily because of unwillingness or inability of TPAs and PBMs to provide requested claims data). Finally, a potential selection bias also

may have influenced our findings, as patients were often identified through self-referral and therefore may be more motivated to pursue treatment success.

The results of this preliminary investigation suggest that a depression care model that emphasizes the role of pharmacists and realigns treatment incentives is worthy of further study. Ultimately, this collaborative care model should be subjected to the rigors of a controlled investigation with randomization of patients or clinics to respective study arms. Complete economic data also should be collected and analyzed, including health care use data and productivity measures (i.e., monetary values for changes in absenteeism and presenteeism rates). A larger scale study could stratify and analyze patients based on disease severity to determine whether the economic outcomes are affected by disease severity similar to the clinical outcomes in this study.

Future investigations also may choose to consider the value of pharmacists directly providing medication management services. From the medical literature, depressed patients clearly require close follow-up and medication adjustment to achieve a therapeutic response or disease remission.[37] The pilot study was not designed to assess medication recommendations of pharmacists. However, in a randomized controlled trial published in 2003, pharmacists at a staff model health maintenance organization served not only as care managers but also provided medication management with prescriptive authority to adjust treatment regimens, augment antidepressants (with other pharmacological agents), or switch to alternative agents.[38] Considerable benefits were reported with this approach, and the authors speculated that the higher frequency of antidepressant switch rates found with the experimental group may have provided indirect evidence that closer follow-up and appropriate medication adjustments by clinical pharmacists were influential factors in achieving superior outcomes.

Conclusion

Project ImPACT: Depression explored the preliminary impact and feasibility of an employer-funded collaborative care program for depression that emphasized the role of pharmacist care managers in the ambulatory care setting. Significant improvements in depression scores were observed in the 130 patients included in the analysis, and positive economic outcomes were evident (from the health plans' perspective) among the 48 patients with complete economic data. Although this pilot project may be regarded as an initial evolutionary step toward improving depression outcomes, the preliminary success of this promising and exportable model may serve to inspire future investigations.

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