

**Outcomes of a Provider-Based Diabetes Disease Management Pilot
Program**

Category Three: Enhancing Provider Relationships

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Abstract

Significance and Program Objectives: Blue Cross Blue Shield of North Dakota (BCBSND), along with a provider network, introduced a collaborative, provider-based diabetes disease management pilot program that began February 2005. The program was designed to enhance provider and BCBSND relationships to develop a collaborative care management program and to demonstrate the benefits of improved health care with the potential to reduce costs.

Intervention: Two clinics, a study clinic and a comparison clinic, were used for analysis. BCBSND provided the study clinic with a grant to begin the program and also agreed to share half of the average cost savings found in the first year of the program. The program consisted of patient evaluation, care plan and need development, self-management skills, and meetings with an on-site Disease Management Nurse (DMN).

Measures: Several BCBSND claims-based measures were evaluated including: global health care expenditures; financial risk scores; service utilization rates; and several care management measures (based on ADA recommendations). Network-provided ambulatory measure rates were also examined.

Results and Findings: The number of members receiving complete care (i.e. five claim-based measures) significantly increased by 18.40% post-program for the study clinic while no significant differences were found in these measures for the comparison clinic. In addition, it was also found that the comparison clinic's average risk adjusted expenditures increased significantly from \$5,868 to

\$10,108 in average costs per member while the study clinic's expenditures did not increase significantly post-program.

Conclusions and Implications: There appears to be a positive impact of the study clinic's program on expenditures, service utilization rates for emergency room visits and inpatient admissions, adherence to certain preventative measures, and most network-provided ambulatory measure rates.

Portability: With adequate provider/network relations and resources, this network-based program would be uncomplicated to implement within other health plans and could be applied to other chronic diseases as well.

Program Description

Scope of the Problem

Members with diabetes are estimated to have almost two and a half times the health care expenditures of non-diabetics.¹ These medical costs in the United States (U.S.) were calculated to be a total of \$92 billion in 2002.² Like U.S. rates, North Dakota's (ND) prevalence of diabetes is estimated to be six percent of the population.³ When these prevalence rates are compounded to medical costs of diabetes, it is easy to comprehend how diabetes can present additional challenges to an already strained health care system.

Several studies have examined the relationship between adequate diabetes care and the reduction of health care expenditures and greater adherence to diabetic clinical recommendations.^{1,4} For example, researchers who examined the economic and clinical impact of a diabetes management program found "substantial improvement in all of the clinical measures collected."⁴ Other studies have also examined the impact of specific preventative screenings on health care utilization. For example, a reduction in inpatient admissions were found for members with higher rates of Hemoglobin A1C (A1C) testing and Lipid testing.⁵ In addition, research has also found a decrease in hospital admissions, number of bed days, hospital costs, as well as an estimated total gross savings of approximately \$600,000 per 1,000 members with diabetes in the first year (with economic adjustment) of a disease management program.⁴

Intervention

The current study examines a collaborative effort between Blue Cross Blue Shield of North Dakota (BCBSND) and a provider network's development of a diabetes disease management pilot program that began in 2005. This joint effort initiated the pilot program within an Internal Medicine clinic located in ND. The program was designed to enhance provider and BCBSND relationships to develop a collaborative care management program and to demonstrate the benefits of improved health care with the potential to reduce unnecessary health care costs through strengthened patient self-management.

Two clinics, a study clinic and a comparison clinic, were selected from a participating network available to BCBSND members and were similar in their setting. The study clinic members received disease management program services, while the comparison clinic was examined as a baseline and did not receive any additional services. The program consisted of a patient history review, development of a care plan, tracking of care needs, teaching self-management skills, meetings with a Disease Management Nurse (DMN) to assist in medication comprehension, encouragement of appropriate preventative testing, and responding to member needs and questions. The role of the DMN was shared between a Registered Nurse (RN) Lead and RN Clinical Coordinator. Frequency of these contacts was determined by individual need.

BCBSND provided the network a \$20,000 up-front grant to assist in start-up expenditures. In addition, BCBSND arranged to share half of any average dollar savings per member post-program with the network for the first year of the

program. It was proposed that, if successful, this intervention could reduce inpatient admissions, emergency room visits, and future health care costs, as well as increase diabetes guideline rates and patient self-management skills.

Several recommendations have been developed by the American Diabetes Association (ADA) for the prevention and management of diabetic complications.⁶ Table 1 (below) identifies selected ADA medical care guidelines to be used in diabetes care. The guideline and corresponding targeted goal or treatment are listed, along with the recommended frequency of the screening and were used as measures in the current analysis.

Table 1. Selected ADA⁶ Medical Care Guidelines

Recommended Guideline:	Targeted Goal/Treatment	Screening Frequency
Cardiovascular Disease Management		
<i>Hypertension/ Blood Pressure</i>	≤130/80 mmHg	≥1 per year
<i>Dislipidemia/Lipid Management</i>	<100 mg/dl LDL	≥1 per year
<i>Antiplatelet Agents (with Aspirin Therapy)</i>	100% Age 40-75	≥1 per year
<i>Smoking Cessation</i>	Discontinue smoking	≥1 per year
<i>Coronary Heart Disease Screening</i>	ACEi/ARB Treatment	≥1 per year
Nephropathy Screening and Treatment		
<i>Microalbumin Test (or known Neuropathy)</i>	ACEi/ARB Treatment	≥1 per year
Retinopathy Screening and Treatment		
<i>Comprehensive Eye Exam</i>	Optimal glycemic and blood pressure control	≥1 per year

Members were obtained by merging patient lists supplied by the network with BCBSND databases. After members were identified in 2003, the program began in February 2005 and has continued to date. The current study examines members before (2003) and after (2005) the program began. Since members

were established before the program began, two additional exclusion criteria were used for the current analysis to ensure valid outcomes for the current analysis: exclusion of members if less than 31.5 months of continuous enrollment with BCBSND (an average of 10.5 months per year) for members between 2003 through 2005 (to ensure complete claim histories); and if considered a high financial outlier (i.e. total expenditures for a member of greater than \$100,000 for at least one year between 2003 and 2005). After excluding members for these reasons, a total of 331 members were included in the present analysis: 195 in study clinic and 136 in comparison clinic.

Several Bivariate analyses were conducted to determine if significant differences existed between clinics as well as changes pre-program (2003) and post-program (2005). In addition, three levels of significance were used. Due to the exploratory nature of the study, a p-value of less than 0.10 was used to classify statistical significance. P-values of less than 0.05 and 0.01 were also used and are noted herein.

Financial risk scores are used to assist in identification “at risk” members to assist with case-management and other care programs. The current study examines prospective Episode Risk Group (ERG) scores (developed by Symmetry) to examine predicted (future) financial risk. ERGs use underlying medical conditions to calculate a risk score for an individual member. These ERGs serve as a marker of member risk and is used to compute an individual’s risk score by summing pre-defined weights assigned to each ERG. In addition to conditions, this model uses gender and age in the calculation of the scores. A

risk score of one is the norm and any scores above this indicate the “risk” above or below the norm.

Assessment of the Intervention

Preliminary examinations were conducted to determine if demographic variables and current conditions in 2003 were similar between the clinics and other ND members with diabetes to determine if results could be generalizable. As seen in Table 2 (below) no significant differences were found between the clinics and age ($t=-0.552$; $p=0.582$); the average age for the clinics was approximately 52 years. In addition, the study clinic had a significantly higher percentage of males compared to the comparison clinic ($\chi^2=2.355$; $p=0.083$).

Table 2. 2003 Demographics and Conditions: Study, Comparison and Other North Dakota Members with Diabetes

2003	Study Clinic	Comparison Clinic	Other ND Mems with Diabetes
N	187	128	5,848
% Male	56.77% [†]	42.45%	55.63%
Avg Age	52.21	52.9	51.73
Avg Prospective Risk Score	3.94	4.17	4.32
Percent of Members with:			
Type II Diabetes	75.79%	87.01%	76.13%
Coronary Artery Disease	9.90%	12.20%	13.29%
Congestive Heart Failure	3.96%	1.22%	3.64%
Hyperlipidemia	41.58%	41.46%	37.55%
Hypertension	50.50%	62.20%	51.62%
Known Nephropathy	7.92% *	21.95%	23.19%

* $p<0.01$
 ** $p<0.05$
 † $p<0.10$

Next, prospective (future) financial risk scores were examined for differences between the two clinics (Table 2, p.8). No significant differences were found concerning 2003 risk scores for the study clinic ($t=-0.703$; $p=0.483$), indicating that neither clinic was more “at risk” in terms of costs. *These results would, hypothetically, suggest that no significant differences in cost would be seen if the intervention was not in place.*

Finally, the percent of all members with common co-morbidities were also examined. Overall, the only significant difference between the study clinic and the comparison clinic was the “known nephropathy” variable (those currently with nephropathy) ($\chi^2=11.798$; $p=0.003$). It was found that 7.92% of all study clinic members have known nephropathy; while the comparison clinic was more comparable (21.95%) with the other ND members with diabetes (23.19%).

To examine the selected care management measures, claims data from BCBSND were explored. As seen in Table 3 (p. 10) overall changes in the measures can be found in the study clinic. The number of members receiving complete care (all five measures) significantly increased 18.40% ($\chi^2=2.135$; $p=0.091$) between 2003 and 2005. No significant changes were seen in the comparison clinic ($\chi^2=0.274$; $p=0.351$) with a 6.35% reduction in the percent of members with complete care.

Although average costs increased from \$5,561 per member to \$7,433 per member between 2003 and 2005 for the study clinic, no significant differences

Table 3. 2003 and 2005 Study and Comparison Clinic Expenditures and Selected Care Management ADA Recommendations

		Study Clinic (N=192)			Comparison Clinic (N=136)		
		2003	2005	% Change	2003 <small>(with significant difference from Study Clinic)</small>	2005	% Change
Costs	Actual Expenditures (Average Per Member)	\$5,561	\$7,433	33.66%	\$6,219	\$9,723.49 †	56.35% †
	Risk Adjusted Expenditures				\$5,868	\$10,107.67 **	72.25% **
Selected ADA Care Management Measures	% with Office Visits	100.00%	97.95%	-2.05%	100.00%	99.26%	-0.74%
	% with A1C Tests	90.10%	93.85%	4.16%	95.12%	95.59%	0.49%
	% with Eye Exams	74.26%	75.38%	1.51%	75.61%	68.38%	-9.56%
	% with Lipid Tests	85.15%	92.31%	8.41% **	93.9% **	91.18%	-2.90%
	% with Microalbumin Tests (or Known Nephropathy)	66.34%	77.44%	16.73% †	79.27%	79.41% †	0.18%
	% with "Complete" Care (All Five of the Above)	48.51%	57.44%	18.40% †	57.32% **	53.68%	-6.35%

Note: Risk Adjusted Expenditures were calculated by dividing the study clinic prospective ERG score by the comparison clinic scores; the result was then multiplied by "Actual Expenditures" for comparison clinic members.

* p<0.01

** p<0.05

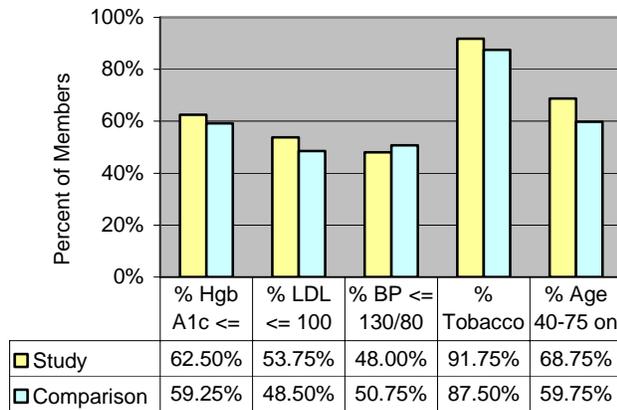
† p<0.10

were found in these changes in overall expenditures (t=-.885; p=0.377). These findings differ from the comparison clinic's changes between 2003 through 2005. The average risk adjusted expenditures increased significantly from \$5,868 to \$10,108 in average costs per member (t=-2.271;p=0.024) between 2003 and 2005. The average savings between the two clinics was calculated and multiplied by the number of participants in the study clinic (N=192). The total mean savings between the two clinics was \$307,769.76; half of this (\$153,884.88) was shared between BCBSND and the network.

Figure 1 (page 11) presents additional ambulatory measures that are not available through BCBSND claims data and was provided by the network of the two clinics. The data provided to BCBSND were for 2005 only; data for previous years were not yet available. The five measures that were tracked by the network

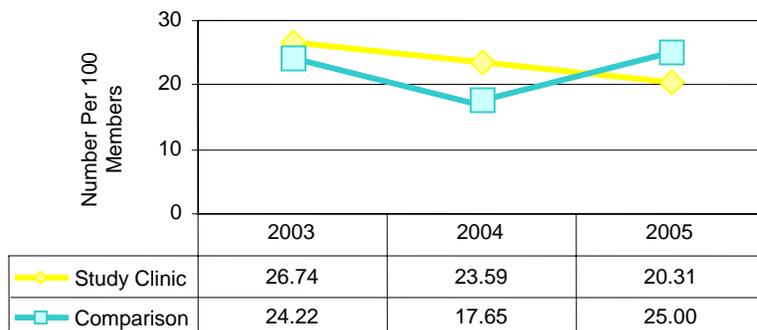
the percentage of members with: A1C (≤ 7.0); LDL levels ($<100\text{mg/dl}$); blood pressure ($\leq 130/80\text{mmHg}$); tobacco free; and those aged 40-75 on aspirin therapy. Overall, the study clinic appeared to present more positive results than the comparison clinic in five out of the six measures. The blood pressure measure showed no improvement with the comparison clinic and was, thus far, inconclusive.

Figure 1. 2005 Network Ambulatory Measures



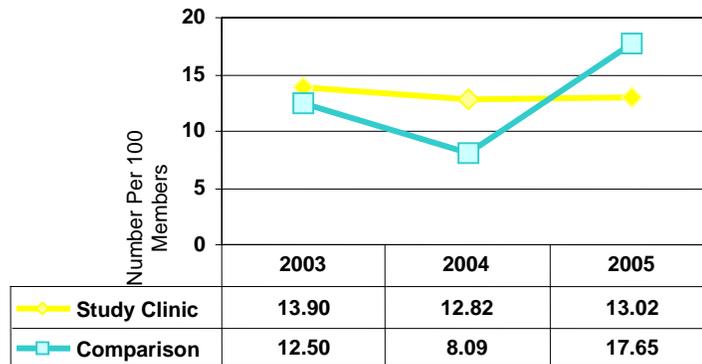
Additional analysis was conducted to compare the rate of hospital admissions and Emergency Room (ER) visits per 100 members for the two clinics. As seen in Figure 2 (below) ER visit rates for study clinic members, a slight increase in the rate was seen in 2005 for the study clinic, but the increase was not as dramatic as seen in comparison clinic.

Figure 2. 2003-2005 Emergency Room Visits Per 100 Members



Hospital admission rates (Figure 3, below) for the study clinic followed a similar pattern of utilization until 2005 (the first intervention year), whereby, the utilization rate of hospital admissions dropped for the study clinic, while it increased for the comparison clinic.

Figure 3. 2003-2005 Inpatient Admissions Per 100 Members



Before the current analysis was conducted, high cost outlier members were excluded. Even so, it is important to examine how *additional* high cost members' claims (those between \$50,000 to \$100,000 per year) could impact overall costs and utilization. As seen in Table 4 (p. 13), even after the initial catastrophic member claims were removed from analysis (those over \$100,000), high cost member claims (claims between \$50,000 and \$100,000) still impacted overall cost. For example, from 2003 to 2004, similar patterns of increase were seen in the percent of members and percent of total expenditures for both clinics. In 2005, both the percent of members and percent of total expenditures increased for the comparison clinic (3.68% of members consuming 24.38% of total costs), while these same variables decreased dramatically for the study clinic (0.52% of members consuming 4.63% of all expenditures). Therefore, a

reduction of high-cost member claims is also another potential impact from the intervention of study clinic members.

Table 3. 2003-2005 Impact of Additional High Cost Cases (\$50,000 to \$100,000)

	Study Clinic		Comparison Clinic	
	% of all mems	%of Total Costs	% of all mems	%of Total Costs
2003	0.53%	5.57%	0.78%	6.69%
2004	2.05%	18.45%	2.21%	19.58%
2005	0.52%	4.63%	3.68%	24.83%

Implications

This paper has examined a network and BCBSND collaborative intervention that created a diabetes disease management pilot program that began February 2005. The program consisted of a patient history review, development of a care plan, tracking of care needs, teaching self-management skills, meetings with a DMN to assist in medication comprehension, encouragement of appropriate preventative testing, and responding to member questions. The program intended to reduce inpatient admissions, reduce emergency room visits, reduce future health care costs, as well as an increase in care management measure rates and diabetes self-management skills.

Overall, there appears to be a positive impact of the diabetes disease management pilot program in the areas of: adherence to certain preventative measures; health care expenditures; service utilization rates for emergency room visits and inpatient admissions; and most network-provided ambulatory measures. For example, the number of members with diabetes receiving complete care significantly increased by 18.40% between 2003 and 2005 for the

study clinic members while a decrease of 6.35% was found for the comparison clinic members. In addition, it was also found that the comparison clinic's average risk adjusted expenditures increased significantly from \$5,868 to \$10,108 in average costs per member; the study clinic's expenditures increased post-intervention, but increases were not significant.

Further analysis was conducted to compare the rate of hospital admissions and ER visits per 100 members for the two clinics. Both of these measures followed similar rates between 2003 and 2004. Rates for the study clinic followed a similar pattern of utilization until after 2005 (the first intervention year) when the utilization rate of hospital admissions and ER rates dropped for the study clinic while the comparison clinic rates increased.

Finally, the study clinic appeared to be performing better than the comparison clinic in five out of the six ambulatory measures in the network-provided rates (LDL, A1C, blood pressure, tobacco-free, aspirin therapy). The blood pressure measure showed no consistent improvement for the study clinic and was, thus far, inconclusive.

Although positive findings were found for the program, limitations to this study should be noted: lack of random assignment of members between the two clinics; lack of a larger number of members in each clinic for each year; and lack of lab data. It should be noted that an additional agreement between the network participating in this study and BCBSND has generated lab data to be compiled and sent to BCBSND. This data will be used to assist with diabetic disease management program outcomes and will be available in 2007.

With adequate provider/network relations and resources, this network-based program would be uncomplicated to implement within other health plans and could be applied to other chronic diseases as well.

References

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