Economic Impact of a Medicaid Population Health Management Program

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Abstract

A population health management program was implemented to assess growth in health care expenditures for the disabled segment of Georgia's Medicaid population before and during the first year of a population health outcomes management program, and to compare those expenditures with projected costs based on various cost inflation trend assumptions. A retrospective, nonexperimental approach was used to analyze claims data from Georgia Medicaid claims files for all program-eligible persons for each relevant time period (intent-to-treat basis). These included all non-Medicare, noninstitutionalized Medicaid aged-blind-disabled adults older than 18 years of age. Comparisons of health care expenditures and utilization were made between base year (2003–2004) and performance year one (2006–2007), and of the difference between actual expenditures incurred in the performance year vs. projected expenditures based on various cost inflation assumptions. Demographic characteristics and clinical complexity of the population (as measured by the Chronic Illness and Disability Payment System risk score) actually increased from baseline to implementation. Actual expenditures were less than projected expenditures using any relevant medical inflation assumption. Actual expenditures were less than projected expenditures by \$9.82 million when using a conservative US general medical inflation rate, by \$43.6 million using national Medicaid cost trends, and by \$106 million using Georgia Medicaid's own cost projections for the non-dually eligible disabled segment of Medicaid enrollees. Quadratic growth curve modeling also demonstrated a lower rate of increase in total expenditures. The rate of increase in expenditures was lower over the first year of program implementation compared with baseline. Weighted utilization rates were also lower in high-cost categories, such as inpatient days, despite increases in the risk profile of the population. Varying levels of cost avoidance could be inferred from differences between actual and projected expenditures using each of the health-related inflation assumptions. (*Population Health Management* 2011;14:215–222)

Introduction

MEDICAID SPENDING REPRESENTS 15% of all US health care spending. In fiscal year 2007, national Medicaid program expenditures were \$332.2 billion, with 43% (\$142.6 billion) borne by states. Total Medicaid program expenditures are projected to increase to \$673.7 billion by 2017 at the rate of 7.9% per year.¹ Medicaid spending ranks second among all costs in many state budgets, accounting for 17% of state budgets on average.²

Facing severe budget deficits and continued growth in Medicaid spending, states have adopted cost-saving/cutting

initiatives, such as reduction in provider payments, coverage limitations, increased cost sharing with the enrollees, preferred prescription drug lists, and reduced Medicaid benefits.³ Some states have also sought budget predictability by outsourcing Medicaid reimbursement to managed care organizations (MCOs), negotiating a global capitation rate per member per month (PMPM).

One strategy used increasingly over the past decade (especially targeting the high-cost chronically ill or disabled subset of the Medicaid population) is implementation of a disease management (DM) program to improve health outcomes while containing costs.⁴ More than 20 states had

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Medicaid DM programs as of fiscal year 2003.⁵ The performance indicators of DM programs typically include: (1) overall cost savings (usually based on the amount spent PMPM as compared to some baseline trend); (2) component cost savings (eg, reductions in emergency room visits or hospital admissions, as compared to the baseline); and (3) return on investment (which accounts for program costs as well as medical savings). However, evidence of the effectiveness of these programs within either Medicare or Medicaid populations is mixed.^{6,7}

While many DM programs target individuals with specific diseases, studies of more global population health management (PHM) programs targeting the clinically and socially complex disabled segment of Medicaid populations are sparse. Nationally, this segment constitutes only 30% of Medicaid enrollees but disproportionately accounts for two thirds (67%) of total Medicaid expenditures.¹ In contrast to the younger, healthier segments of the Medicaid population, there is little evidence of improved care for the aged-blind-disabled segment under fully capitated managed care or primary care case management programs.⁸ In addition, many programs are implemented without randomized study designs or control groups, and must be evaluated as rigorously as possible with available data. Therefore, we undertook this study of a specific population health outcomes management program by analyzing actual vs. projected expenditures among Georgia's non-Medicare (non-dually-eligible) Medicaid enrollees.

Methods

Description of Georgia Medicaid Disease Management Program

The Georgia Department of Community Health contracts with 2 private-sector DM vendors to coordinate and deliver population health outcomes management services (previously known as DM).⁶ These programs serve the aged, blind, and disabled populations of Medicaid (approximately 100,000 people) in different regions of the state. This study focuses on the program covering Atlanta and North Georgia. Although 7 diseases are nominally targeted for management (ie, asthma, chronic obstructive pulmonary disease, congestive heart failure, coronary artery disease, diabetes, hemophilia, and schizophrenia), the program outcomes and financial incentives are tied to overall cost and quality outcomes for all eligible enrollees, regardless of disease or comorbidity.

The state paid the North Georgia vendor a \$13.94 PMPM capitation payment. Medicaid members enrolled in the program received a broad array of care coordination services, a 24/7 nurse advice line, educational services, and member/provider analysis using utilization and claims data. The core of the intervention team is the registered nurse (RN) "health coach," but the team also includes social workers, pharmacists, mental health professionals, and provider engagement staff.

RN health coaches were placed not only in a centralized call center, but also in high-volume practice sites such as hospital emergency departments and federally qualified health centers, where they could influence not only patients but practitioners. The involvement of an academic team focused on the interface between data analytics and clinical opportunities led not only to enhanced training of RN health

coaches, but also to Medicaid program changes (eg, reimbursement for clinically-indicated influenza and pneumococcal vaccines). These distinctive elements may be relevant, because less effective programs may overly rely on traditional patient education mailings or limited telephonic contact rather than active coaching, self-management training, provider engagement, or population-based approaches.⁹

Study design

Not having the luxury of a prospective randomized trial design, we compared actual expenditures in the first year of program implementation to projected expenditures using various inflation or cost-trend assumptions applied to the baseline year's actual expenditures.⁵ There was no control group because the program was implemented statewide for everyone who was eligible for the program. We also compared weighted PMPM utilization rates and unit costs per inpatient day, per hospital admission, and per prescription to assess alternative explanations for any change in cost trends. Our baseline year was fiscal year 2004 (July 1, 2003–June 30, 2004) because that was the time frame used by the Medicaid actuarial vendor to calculate base rates for the program. Performance year 1 was May 1, 2006–April 30, 2007. (An extended period of program contract bidding and negotiations occurred during the interim.)

Data

Data for this study came from a Georgia Medicaid eligibility extract file and 3 paid claims extract files (medical, institutional, and drug) for enrollees covered by this PHM program. We excluded individuals younger than age 18 and those not eligible for the program (eg, enrollees in Medicaid managed care plans or Medicare, those residing in a nursing home, receiving hospice care, receiving special services under a waiver category, or receiving retroactive Medicaid). Thus, in our study all eligible enrollees for the PHM program were aged, blind, or disabled and were served in a fee-for-service environment. After these exclusion criteria, our study population consisted of 46,654 enrollees in the base year and 41,131 enrollees in the performance year (all who were eligible were included regardless of their level of contact with the DM program; this is a conservative intent-to-treat approach, given that the goal of the initiative was to reduce population-wide Medicaid expenditures regardless of whether individual enrollees migrated into or out of the program).

The private DM vendors contracted directly with the state Medicaid division of the Georgia Department of Community Health, and obtained monthly claims data through a HIPAA (Health Insurance Portability and Accountability Act)-compliant business affiliates agreement. The academic team was contracted to provide technical consultation at the interface between data analytics and clinical opportunities to improve health and economic outcomes for aged, blind, and disabled Medicaid enrollees. The academic Institutional Review Board determined this study of program outcomes to be exempt from further human subjects review.

Measures

Aggregate program expenditures. Program expenditures were calculated for the baseline year and performance year 1

across service categories (inpatient, outpatient, physician, other, drug, and total) for each enrollee and these were aggregated to total program payments. A \$150,000 stop-loss threshold was applied in each evaluation period to reduce the influence of high-cost outliers. Two different methods of calculating average PMPM expenditures were used—simple average (ie, ratio of the means) and weighted average (mean ratio).¹⁰

PMPM: Simple average or ratio of the means. Average PMPM expenditures were calculated by simply dividing the total expenditures by the total number of enrolled months across all individuals. We calculated PMPM costs for both baseline year and performance year by dividing total expenditures for each period by the respective total number of member months.⁵ For the base year, the total number of member months was 442,052; for the performance year, the total number of member months was 426,285.

PMPM: Weighted average method or mean ratio. We also calculated PMPM expenditures by dividing the individual's expenditures by the number of months that the person was enrolled. We call this a weighted average because the denominator (ie, months of enrollment) varied from person to person; persons enrolled for more months had a greater impact on the PMPM calculations.

PMPM health care utilization. Health care utilization rates were also calculated as weighted averages of the individual's number of events (inpatient admissions, inpatient days, emergency room visits, outpatient visits, and filled prescriptions) per month enrolled. Average length of stay was calculated by dividing total number of hospital days by total number of admissions for each individual. These measures were calculated for both the baseline and performance year.

Health status. We used the Chronic Illness and Disability Payment System (CDPS) risk score (both unadjusted/unweighted and weighted/adjusted scores) to describe health status in the baseline and performance years because it was originally developed for states to use to adjust capitated payments for Medicaid beneficiaries. A CDPS score of 2.0 corresponds to a Medicaid enrollee likely to generate twice the Medicaid expenditures of an average Medicaid enrollee. The comparative advantages of using CDPS over other risk scores have been published previously.¹¹

Analytic and statistical methods

To evaluate changes in expenditures from baseline year to program year 1, we adopted several approaches.

Rate of Growth: Difference between projected and actual expenditures. We used a simple approach of differences between projected and actual expenditures during the performance year as this study's primary outcome variable.¹² Alternative values for projected expenditures were calculated using 4 alternative inflation or cost-trend assumptions (other factors remaining constant). The most locally relevant analysis used Georgia's own cost-trend assumptions for their non-dually-eligible disabled Medicaid population. Alter-

native (and better-documented) assumptions used the US Medicaid inflation rate,^{13,14} US overall medical inflation rate, and the general (not specifically medical) consumer price index inflation rate.¹⁵ The projected estimates were calculated for 34 months and converted to 12 months (annualized) change. To minimize the impact of a small number of outliers, we also calculated the actual vs. projected costs both with and without exclusion of costs exceeding the stop-loss cap (\$150,000 in annual costs for 1 member).

Independent populations approach. As a second approach, we examined changes in PMPM expenditures between baseline and program year 1 using *t* tests under the assumption of independent populations with equal variances. In these analyses, we indicate significance at the level of $P < 0.05$. Some of the same individuals remain in both study periods (16,711 persons representing 35.8% of those eligible in the base year and 40.1% of those eligible in program year 1), but because the time period is 34 months apart and not a majority of the population, the assumption of independence is satisfied. We also ran the analyses with an assumption of unequal variance and found no impact on statistical significance of our results or any change in our conclusions.

Changes in expenditures over time: Quadratic growth curve model. For the third approach, we relaxed the assumption of independent populations because repeated observations of the same individuals occur in both years. We used growth models to examine whether total health care expenditures increased, decreased, or remained stable over the 46-month period (interrupted time series with health care expenditures measured monthly from July 2003 through June 2004 and May 2006 through April 2007). The growth curve model with random intercepts allows us to control for the nonindependence of observations in the same individual over time. To accommodate the possibility that growth in expenditures can be nonlinear in relation to time, we built a quadratic growth curve model. Using this model, we tested the assumption that the growth in expenditures may become slower over time by including time-squared term in the model. This was accomplished with a random coefficient growth modeling, with time and time-squared as the independent variables and monthly total expenditures as the dependent variable. In the random coefficient growth modeling, the intercept was fit as random effects which varied across individuals.

Results

Table 1 compares the study population characteristics in terms of sex, race/ethnicity, age, geographic region, health status as measured by CDPS risk score, and number of eligible months in the base year and performance year. The sex, racial/ethnic, and rural/urban composition remained virtually the same across both periods. Raw CDPS risk scores (unadjusted for age and sex) increased by 24%, while adjusted, weighted CDPS scores increased 21%. Because CDPS scores are used in part to predict a Medicaid population's future expenditures, these changes from baseline to program year indicate a population that actually increased its Medicaid expenditure risk by 21%–24%.

TABLE 1. CHARACTERISTICS OF THE STUDY POPULATION BY BASELINE AND PROGRAM YEAR 1

	Baseline Year		Program Year 1	
	N	%	N	%
ALL	46,654	100.0	41,131	100.0
Sex				
Female	26,982	57.8	23,473	57.1
Male	19,672	42.2	17,658	42.9
Race/Ethnicity				
White	19,556	41.9	16,039	39.0
African American	19,749	42.3	18,756	45.6
Latino	550	1.2	620	1.5
Other race	1,651	3.5	1,063	2.6
Unknown	5,148	11.0	4,653	11.3
Age (years)				
19–20	2,021	4.3	1,886	4.6
21–44	19,380	41.5	16,336	39.7
45–64	23,046	49.4	21,764	52.9
65 and older	2,207	4.7	1,145	2.8
Eligible months				
1–3 months	6,467	14.0	6,071	13.0
4–6 months	4,098	9.0	3,763	8.0
7–9 months	3,959	8.0	3,786	8.1
10–12 months	32,130	69.0	33,307	71.0
Geographic region				
Rural	5,761	12.3	4,727	11.5
Urban	40,893	87.7	36,403	88.5
Unknown	0	0.0	1	0.0
CDPS Risk Index				
Unweighted score	5.10		6.34	
Weighted score	2.71		3.29	

CDPS, Chronic Illness and Disability Payment System.

Medicaid patients with a CDPS score of 1 are expected to incur the average overall Medicaid costs; patients with a score of 2 are expected to incur costs that are twice the average.

Note: Base year represents individuals enrolled in fiscal year 2004 (July 1, 2003 through June 30, 2004) and performance year includes individuals enrolled between May 1, 2006 and April 30, 2007. Other race values included Asian, Native American, and Pacific Islander.

Utilization rates

Table 2 compares weighted utilization in several service categories for baseline and program year 1. Using a weighted PMPM average utilization, 4 of 6 measures of utilization decreased between baseline and program year 1 including significant cost drivers such as hospital admissions (2.2% decrease, $P = 0.005$) and inpatient bed days (1.9% decrease, $P = 0.095$). Average length of stay did not change significantly. There was also a significant and unexplained increase in emergency department visits (3.1% increase, $P < 0.001$).

Costs per unit of service

In order to rule out decreases in payment rates or paid amounts per unit of service, we analyzed the average costs per unit of care (eg, dollars expended per inpatient bed day, per inpatient admission, and per prescription drug fill), each of which increased in a narrow range from 5.3% to 5.8% (Table 3).

Rate of growth

Difference between projected and actual expenditures: Simple average. Table 4 shows the average PMPM spending (\$) and total payments by type of service for program enrollees at baseline and in program year 1, calculated with and without stop-loss. The aggregate total payments increased from \$349.1 million during the baseline year to \$360.7 million during performance year 1.

The average PMPM expenditures increased from \$789.7 to \$846.2, an annualized 2.5% increase. Reanalyzed with stop-loss, the average PMPM expenditures increased from \$774.9 in the base year to \$808.8 in performance year 1, a 1.5% annualized rate of increase. Within specific spending categories, average PMPM expenditures increased for every category of service except for outpatient care, which decreased from \$132.8 to \$104.7. Weighted expenditures showed similar trends.

Difference between projected and actual weighted average expenditures. Table 5 illustrates the potential savings of the program (ie, the gap between actual Medicaid expenditures and projected expenditures for this population based on various cost inflation assumptions). Using the general consumer price index as an inflation rate, the program experiences a negative actual vs. projected expenditure variance of approximately \$4.6 million. However, using US general medical inflation rates and national Medicaid cost trends, the gap between actual and projected expenditures indicated a potential cost avoidance for the Medicaid program ranging from \$9.8 million to \$43.6 million. Using the cost trends most specific to this Georgia Medicaid disabled population (as determined by the state's certified actuarial report), actual vs. projected expenditures suggest a high-range estimate of cost avoidance of \$106 million.

We tested for statistical significance of actual vs. projected expenditures using each of the inflation models, but, for simplicity, we present here the results of the most relevant model (ie, comparing actual expenditures to those using the national Medicaid cost growth rates). Projections based on a Medicaid inflation rate provided by the state-contracted actuarial firm produced much more dramatic results, but the rate was substantially higher than national averages in the same time period.

The national Medicaid cost inflation rate provides a more conservative projection that is still directly relevant to the population at hand (more so than the general medical inflation rate and certainly more relevant than a nonmedical consumer price index). The difference between actual and projected expenditures was significant and negative for total expenditures. Differences in subcategories of expenditure are much more subject to minor year-to-year fluctuation and, therefore, are not the major focus of this study.

Quadratic growth curve model with repeated observations. In the random coefficient growth modeling of PMPM total expenditures, both time in months and time-squared were significant ($P < 0.0001$). The parameter estimate for time was positive and time-squared was negative ($\beta = -0.1204$; $P < 0.0001$). Together, these findings suggest that, over time, the health care expenditures increased but the rate of growth

TABLE 2. MONTHLY WEIGHTED AVERAGE UTILIZATION PER MEMBER MONTHS (MM) (RECIPIENTS > 18 YEARS OF AGE)

Service Type	Baseline Year (BYR)	Program Year 1 (PY1)	BYR - PY1 % Change (34 Months)	BYR-PY1 Annualized % Change	P value
Admissions per 1000 MM†	36.4	34.2	-6.2%	-2.2%	0.0054
Inpatient days (IPD) per 1000 MM	248.9	235.4	-5.4%	-1.9%	0.0949
Average length of stay (ALOS) (a)	6.17	6.09	-1.4%	-0.5%	0.455
Emergency Dept. visits per 1000 MM†	110.0	119.8	8.9%	3.1%	<.0001
Ambulatory visits per 1000 MM†	1,135.4	1,115.4	-1.8%	-0.6%	0.0944
Prescriptions filled per 1000 MM†	3,424.4	3,451.2	0.8%	0.3%	0.3005

(a) Simple Average per Admission;

†Statistically significant when $P < 0.05$.

in health care expenditures slowed (ie, the rate of increase in Medicaid expenditures declined as time increased).

Discussion

This PHM program targeting the non-Medicare disabled segment of the Georgia Medicaid population demonstrated actual expenditures substantially lower than any projections based on relevant medical inflation rates. We found a parallel decrease in hospital admissions and hospital bed-days weighted for member months, with a slight absolute reduction in length of stay, consistent with an effect related to care coordination and chronic disease care management (CDCM). Unit costs per inpatient day, per admission, and per prescription increased 5%–6%, suggesting that reductions in provider payment rates do not explain the reduction in expenditure growth. Our mixed-effects growth models also demonstrated that the rate of increase in Medicaid expenditures declined as time increased, even though the population's risk profile measured by CDPS scores actually increased.

PHM targets clients for higher levels of contact based on risk stratification. For example, 57.9% of persons in the highest decile of Medicaid expenditures are still in the top 10% of enrollees for generating Medicaid expenditures 2 years later.¹⁶ The aged and disabled segment of the Medicaid population accounted for two thirds (68.7%) of all Medicaid spending in 2006.¹⁷ According to the Kaiser Commission on Medicaid and the Uninsured, the disabled accounted for three fourths (76%) of the \$10.4 billion growth in US Medicaid expenditures from 2005–2006 (after adjustment for the shift to Medicare Part D drug spending for dual-eligibles).¹⁸

There is tremendous variability in Medicaid expenditures from state to state, with corresponding state-to-state variability in expenditure trends from year to year.¹⁹ Growth in overall Medicaid expenditures PMPM in Georgia from 1991 to 2004 averaged 6.4%, but expenditures in the 3-year period of 2002–2004 rose 15.7%.²⁰

Any impact of this PHM program on moderating the trend toward rapidly rising Medicaid expenditures must be interpreted in the context of recent negative trials of DM in the Medicare demonstration program. For example, a recent meta-analysis of Medicare care management programs found only 3 of 20 that achieved some level of quality improvement “at or near budget neutrality.”⁷ Certainly Medicare and Medicaid differ in their benefits and in the clinical characteristics of their populations, but the disabled segment of the Medicaid population shares with the Medicare population a high prevalence of chronic disease and multimorbidity.

In addition, not all PHM/DM programs are the same. For example, the Medicare demonstration projects reported on a very “light-touch” or low-intensity telephone contact with patients. Similar findings from a randomized, intent-to-treat design study of the Florida LifeMasters Supported SelfCare demonstration program (also primarily telephonic contact) showed “virtually no overall impacts on hospital or emergency room (ER) use, Medicare expenditures, quality of care, or prescription drug use for the 33,000 enrollees,” although savings could be shown for specific diagnostic subgroups in a high-cost region of the state.²¹ Traditional MCOs may be similarly ill equipped. A survey of executive leaders of 95 California MCOs found that although there was substantial interest in increasing CDCM, “insufficient financial resources at the plan level, lack of organizational leadership and commitment in physician organizations, and limited information technology in physician offices were barriers to CDCM expansion.”²²

It may also be that PHM shows a greater return on investment in populations in greater need of care coordination. The Medicaid disabled population is characterized by low-income, low health literacy, and high rates of multiple medical comorbidities, as well as high rates of co-occurring mental health disorders, favoring a program whose design and financial incentives target overall population health outcomes rather than one-disease-at-a-time metrics.

Our results are consistent with similar recent studies. For example, a 2008 report of a randomized trial embedded in the Indiana Medicaid PHM/DM program found cost increases in both the intervention and control groups, but statistically significant cost avoidance (actual vs. projected

TABLE 3. AVERAGE COSTS, ADULT MEDICAID DISABLED POPULATION ENROLLED IN GEORGIA ENHANCED CARE; BASELINE YEAR VS. PROGRAM YEAR 1

	Baseline Year	Program Year 1	Annualized* Percent Change
Average costs per inpatient bed-day	\$1,255.96	\$1,455.07	5.6%
Average costs per inpatient admission	\$8,105.54	\$9,324.56	5.3%
Average drug costs per prescription	\$67.28	\$78.31	5.8%

*Total change spread over 34 months.

TABLE 4. MEANS PER MEMBER PER MONTH (PMPM) GEORGIA ADULT MEDICAID RECIPIENTS

Service Type	Base Year	Program Year 1		Trend		
	Gross	PMPM ^a	Gross	PMPM ^b	% Change (34 mos)	Annualized % Change
Inpatient	\$111,726,827	\$252.75	\$119,848,587	\$281.15	11.20%	4.00%
Outpatient (c)	\$58,701,518	\$132.79	\$44,611,732	\$104.65	-21.20%	-7.50%
Physician	\$41,829,457	\$94.63	\$44,068,744	\$103.38	9.30%	3.30%
Other (d)	\$30,275,245	\$68.49	\$34,439,333	\$80.79	18.00%	6.30%
Drug	\$106,575,088	\$241.09	\$117,754,796	\$276.23	14.60%	5.10%
Total	\$349,108,134	\$789.74	\$360,723,193	\$846.20	7.10%	2.50%
Total with Stop-Loss	\$342,531,427	\$774.87	\$344,778,781	\$808.80	4.40%	1.50%

Note: Base year represents individuals enrolled in fiscal year 2004 (July 1, 2003 through June 30, 2004) and performance year includes individuals enrolled between May 1, 2006 and April 30, 2007. Simple averages were derived by dividing the total Medicaid program payments for each category by the aggregate member months.

(a) Gross divided by 442,052 member months.

(b) Gross divided by 426,285 member months.

(c) Includes State change in hospital outpatient reimbursement from 90% to 85.6% of costs effective July 1, 2004.

(d) Program Year 1 expenditures include \$13.94 PMPM disease management capitation payment.

expenditures), especially in the subset of congestive heart failure patients.²³ A 2009 longitudinal study of the statewide impact of the program covering 44,213 Medicaid enrollees with diabetes or congestive heart failure concluded that "claims were increasing before ICDMP, flattened in the years around program initiation, and remained flat in the final year of follow-up."²⁴ In contrast to "light-touch" telephonic case management, the Indiana program involved more intensive case management, including home health nurse visits and direct provider engagement, with a conscious focus on the impact of multiple comorbidities (eg, chronic pain from osteoarthritis was associated with increased costs among those with diabetes).²⁵

A study of more than 35,000 clients enrolled in a Virginia Medicaid PHM/DM program found statistically significant improvements "in patient's drug compliance and quality of life while reducing (ER), hospital, and physician office visits and adverse events," with a specific cost savings related to reduced hospitalization rates.²⁶ More focused disease-

specific programs may be less effective. A pre-post assessment of utilization from 2001–2003 among 15,275 high-risk beneficiaries in Florida's Medicaid DM program (interventions targeting 4 specific disease categories) was able to demonstrate significant absolute reductions in emergency department visits, hospital admissions, and inpatient bed-days,²⁷ but other costs, such as pharmaceutical expenditures, increased and no cost offsets were found.⁶ Even so, studies of this program have found additional benefits in clinical measures such as blood pressure, cholesterol control, and medication adherence.²⁸

Are there uniquely effective elements of the Georgia Enhanced Care (GEC) program? The GEC program used RNs as health coaches as part of a larger team that also included pharmacists, psychologists, and social workers specifically trained to address multiple risks and comorbidities in a whole-person approach. In addition, the program attempted to engage the physicians who care for these complex patients, and also worked at the level of systems

TABLE 5. PROJECTED VS. ACTUAL MEDICAID EXPENDITURES (TOTAL AND PMPM) FOR GEC-ENROLLED DISABLED MEDICAID RECIPIENTS IN PERFORMANCE YEAR 1 ADJUSTED ONLY FOR INFLATION USING VARIOUS ASSUMPTIONS FOR COST TRENDS

Inflation (Cost Trend) Assumption for Comparison	Projected Annual Increase (%)	Projected Expenditures	Projected PMPM	Actual Expenditures	Actual PMPM	Difference in Actual vs. Projected Expenditures	Difference in Actual vs. Projected PMPM
Consumer Price Index (CPI) ^a	2.1%	\$356,103,290	\$835.4	\$360,723,193	\$846.2	+\$4,619,902	+\$10.8
US Medical Inflation Rate ^(b)	3.6%	\$370,544,038	\$869.2	\$360,723,193	\$846.2	-\$9,820,845	-\$23.0
US Medicaid Program Trends ^(b)	7.1%	\$404,307,760	\$948.4	\$360,723,193	\$846.2	-\$43,584,568	-\$102.2
Georgia Medicaid Program Trend for disabled, non-dually eligible enrollees ^(c)	11.5%	\$450,914,314	\$1057.8	\$360,723,193	\$846.2	-\$106,135,533	-\$211.6

(a) Bureau of Labor and Statistics, CPI Annual Average Indices.

(b) CMS: National Health Expenditures By Type Of Service And Source Of Funds: Calendar Years 2007–1960.

(c) Mercer Report to DCH: Georgia Enhanced Care Disease Management Program Financial Results for Performance Year 1 (APS), March 25, 2008. Page 14.

Note: Based on individuals who were disabled and enrolled in Georgia Medicaid. Base year represents individuals enrolled in fiscal year 2004 (July 1, 2003 through June 30, 2004) and performance year includes individuals enrolled between May 1, 2006 and April 30, 2007. Payments represent total payments for the period. Other expenditures include monthly program administrative payment of \$13.94 per enrollee. Per member per month expenditures were derived by dividing total payments by the total eligible member months.

GEC, Georgia Enhanced Care; PMPM, per member per month.

change (eg, negotiating a state policy change so that Georgia Medicaid would reimburse for influenza and pneumonia vaccines when clinically indicated). In order to facilitate interaction between the RN health coaches and patients or their providers, some of the health coaches were moved out of the call center to frontline clinical practice settings such as high-volume hospital emergency departments and federally qualified health centers.

A key element of the strategy was that the program's financial incentives were weighted heavily (80% of revenues at-risk) toward a whole-person, whole-population return on investment target, rather than targeting individual disease outcomes. Because there were no opportunities for the program to limit access to services as might be found in a utilization management program, cost savings could only be achieved by coordinating care to be more efficient and more effective in preventing costly complications, hospital admissions, or exacerbations of chronic disease.

While some evaluation studies have included a control group,⁶ this was an uncontrolled study of a real-world program implementation. However, even without a control group, we can rule out some alternative explanations for the gap between actual and projected expenditures. For example, a shift in the age-race-sex mix or duration of enrollment or diagnostic case-mix of the population could explain a moderation of cost increases per member, but Table 1 appears to exclude these as possible explanations. In fact, despite a slight shift in age distribution, the case-mix actually appears to favor a trend toward higher costs. Because CDPS scores are used in part to predict a Medicaid population's future expenditures, these changes from baseline to program year indicate a population that increased its Medicaid expenditure risk by 21%-24%. This helps rule out regression to the mean or population changes in risk profile as explanations for the moderation in cost inflation. A study of patients with chronic obstructive pulmonary disease in the Colorado Medicaid program found virtually no regression to the mean or secular trend toward improvement in cost or utilization patterns.²⁹

Neither was there any decline in unit cost (dollars paid per prescription or per office visit or per bed-day), suggesting a shift to lower cost providers or to deeply discounted medications was found to explain the moderation in Medicaid expenditure growth. A disproportionate impact on overall costs and average cost per member by a small number of costly outliers was also ruled out by calculating the expenditure variance both with and without the stop-loss cap.

In a certified actuarial report (unpublished data, *Georgia Enhanced Care Disease Management Program Financial Results for Performance Year 1*, APS Healthcare; Mercer Government Human Services Consulting; March 25, 2008), the state's actuarial consulting firm identified all potential program changes that might have had an impact on expenditures or on cost-growth trends. In so doing, they adjusted their annualized Medicaid cost growth trend assumption from 13.8% to 11.5%, based on program changes in 2004 and 2005 prior to program implementation, but then asserted that "No additional program changes that would impact the eligible population have occurred between the end of FY-2006 and the end of the Program Year 1 performance period." This independent and certified actuarial report confirmed that the program "substantially exceeded" its bend-the-trend target savings guar-

antee even after adjusting for any other program changes that might have influenced expenditures.

Conclusions

Real-world implementation of programs across entire states or entire segments of the Medicaid population must often be evaluated without the luxury of experimental randomized controlled trial designs. Despite these limitations, the decline in rate of cost increase concurrent with the implementation of this PHM program for disabled Medicaid enrollees suggests a target of opportunity for other states seeking to reduce Medicaid expenditures. Our study findings also highlight the feasibility of addressing multiple risks and comorbidities in a whole-person approach for individuals with such clinically and socially complex health care needs. Further studies, including controlled trials, will be needed to more rigorously measure the impact directly attributable to such programs.

Author Disclosure Statement

APS Healthcare designed and implemented this disease management program after being awarded a contract by Georgia Medicaid. The National Center for Primary Care at Morehouse School of Medicine was subcontracted by APS Healthcare to provide clinical oversight and data analytics throughout the program's implementation. This subcontract provided support to the core research infrastructure at Morehouse School of Medicine, including salary support for key Morehouse personnel (Rust, Strothers, and Moore), as well technical support from subcontracted experts in health economics (Miller, McLaren, and Sambamoorthi). Economic evaluations were conducted independently from APS staff. This article represents the views of the authors and does not represent the views of any of their organizations or institutions.

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