# Searching for a business case for quality in Medicaid managed care

**Sandra B. Greene**
**Kristin L. Reiter**
**Kerry E. Kilpatrick**
**Sheila Leatherman**
**Stephen A. Somers**
**Allison Hamblin**

**Background:** Despite the prevalence of evidence-based interventions to improve quality in health care systems, there is a paucity of documented evidence of a financial return on investment (ROI) for these interventions from the perspective of the investing entity.
**Purposes:** To report on a demonstration project designed to measure the business case for selected quality interventions in high-risk high-cost patient populations in 10 Medicaid managed care organizations across the United States.
**Methodology/Approach:** Using claims and enrollment data gathered over a 3-year period and data on the costs of designing, implementing, and operating the interventions, ROIs were computed for 11 discrete evidence-based quality-enhancing interventions.
**Findings:** A complex case management program to treat adults with multiple comorbidities achieved the largest ROI of 12.21:1. This was followed by an ROI of 6.35:1 for a program which treated children with asthma with a history of high emergency room (ER) use and/or inpatient admissions for their disease. An intervention for high-risk pregnant mothers produced a 1.26:1 ROI, and a program for adult patients with diabetes resulted in a 1.16:1 return. The remaining seven interventions failed to show positive returns, although four sites came close to realizing sufficient savings to offset investment costs.

**Key words:** business case for quality, Medicaid managed care, return on investment, quality-enhancing interventions

***Sandra B. Greene, DrPH,*** *is Senior Research Fellow, Sheps Center for Health Services Research, and Research Associate Professor, Health Policy and Administration, School of Public Health, University of North Carolina at Chapel Hill. E-mail: SandraB_Greene@unc.edu.*
***Kristin L. Reiter, PhD,*** *is Assistant Professor, Health Policy and Administration, School of Public Health, University of North Carolina at Chapel Hill.*
***Kerry E. Kilpatrick, MBA, PhD,*** *is Professor Emeritus, Health Policy and Administration, School of Public Health, University of North Carolina at Chapel Hill.*
***Sheila Leatherman, MSW,*** *is Research Professor, Health Policy and Administration, School of Public Health, University of North Carolina at Chapel Hill, and Visiting Professor, London School of Economics, United Kingdom.*
***Stephen A. Somers, PhD,*** *is President, Center for Health Care Strategies, Hamilton, New Jersey.*
***Allison Hamblin, MSPH,*** *is Program Officer, Center for Health Care Strategies, Hamilton, New Jersey.*

*This work was funded by the Center for Health Care Strategies, the Robert Wood Johnson Foundation, and The Commonwealth Fund.*
*This research protocol was approved by the institutional review board of the School of Public Health, University of North Carolina at Chapel Hill.*

*Health Care Manage Rev*, 2008, 33(4), 350-360

**Practice Implications:** Evidence-based interventions designed to improve the quality of patient care may have the best opportunity to yield a positive financial return if it is focused on high-risk high-cost populations and conditions associated with avoidable emergency and inpatient utilization. Developing the necessary tracking systems for the claims and financial investments is critical to perform accurate financial ROI analyses.

Over the last 5 years, there has been considerable discussion of the business case for quality in the literature. In our work, we have adopted the following definition:

> A business case for a health improvement intervention exists if the entity that invests in the intervention realizes a financial return on its investment in a reasonable time frame, using a reasonable rate of discounting. This may be realized in bankable dollars (profit), a reduction in losses for a given program or population, or avoided costs. In addition, a *business case* may exist if the investing entity believes that a positive indirect effect on organizational function and sustainability will accrue within a reasonable time frame (Leatherman et al., 2003, p. 18).

Using four case studies from carefully selected provider organizations, Leatherman et al. (2003) explored whether enhancing quality yields a positive return on investment (ROI) in health care. Their analysis showed that the entities making the investment in quality interventions did not realize positive returns on their investments. The authors expressed concerned that, "Without a business case for quality, it is unlikely that the private sector will move quickly and reliably to widely adopt proven quality improvements" (p. 18). Their article illustrated the misaligned incentives that act as impediments to implementing quality improvements on a broad scale in the United States.

In response to the challenges raised in the article of Leatherman et al. (2003), Stephen Somers (2003) proposed that Medicaid—the U.S. government-funded program for low-income categorically eligible individuals—might be in the best position to purchase for quality. Medicaid managed care organizations (MCOs) receiving full-risk capitated payments have the financial incentives to implement quality improvements that are cost effective. These health plans also presumably would have the requisite information systems to monitor the quality and financial performance of these improvements. Medicaid MCOs, primary care case management programs, prepaid health plans, and other managed care entities enroll approximately 60% of all Medicaid enrollees (Centers for Medicare & Medicaid Services, 2004).

Medicaid is now the largest health insurer in the United States both in terms of beneficiaries at 55 million and expenditures at $330 billion (Smith & Moody, 2005). The program, run through state Medicaid agencies, is a dominant player in many markets, especially those with few large employers providing health care benefits. By themselves, or potentially in concert with state employee purchasers, Medicaid agencies can exercise considerable leverage in setting standards for the plans and providers with whom they contract. This is especially true under full-risk capitation, where the crux of the business transaction is to transfer the incentives to control unnecessary expenditures from the state to the health plan. Further, because these purchasing arrangements have become so stable, Medicaid managed care entities have been able to establish comparably mature business partnerships with their provider networks, even paying them more than fee-for-service when necessary (Chang, Burton, O'Brien, & Hurley, 2003).

## Conceptual Framework

The general conceptual framework for the business case for quality in health care is derived from over a century of quality improvement efforts in industrial settings. The basic value proposition is that, from the perspective of the producer, investments in quality interventions will only be made if the expected ROI for the intervention is positive, unless there are compelling strategic reasons to sustain an intervention with a negative ROI. Given a fixed budget, we would expect a profit-maximizing firm to select quality interventions with the largest ROIs.

Although extensively documented in manufacturing industries (Harry & Schroeder, 2000; Juran & Godfrey, 1999), demonstrations of positive ROIs for improving quality in health care remain elusive. A recent workshop (Institute of Medicine, 2008) that addressed this issue concluded, "Throughout the country, institutional reluctance to invest in quality improvement and documentation of outcomes of quality improvement interventions remains a barrier to moving ahead" (p. 1). The report further noted, "In every other industry, quality has been recognized as a necessity for value" (p. 2). They went on to call for a strong research effort to establish the business case for quality improvement in health care. Additional

prescriptions for removing obstacles to investing in quality are summarized in a report on the Colloquia on Quality Improvement supported by The Commonwealth Fund (Blumenthal & Ferris, 2004).

This is not to say that there is a complete absence of literature linking systematic quality interventions to increases in value. Notable recent efforts include studies of the relationship between investment in information technology and hospital quality of care (Menachemi, Chukmaitov, Saunders, & Brooks, 2008) and the quality-enhancing effects of the implementation of electronic medical records (Kasley & Ozcan, 2008). These studies do not, however, calculate the ROI for these interventions from the perspective of the implementing organizations.

It is increasingly recognized that there are multiple opportunities to improve overall health system performance and quality of care while reducing utilization and cost. Well-selected and proven interventions may lead to significant savings because health care costs are so heavily concentrated in the sickest patients—10% of people account for 69% of health care spending (Monheit, 2003). RAND researchers point to many examples where preventive and chronic care can be cost effective: influenza and pneumonia vaccines reduce hospitalizations and deaths, better ambulatory management of medical conditions (e.g., asthma and congestive heart failure [CHF]) prevents hospitalizations, and improved management of mental health in areas such as depression can produce better health and rates of employment (McGlynn, 2004). However, even when interventions are known to be cost effective, it is not always clear that there is a business case for individual organizations to invest in providing better quality.

The business case has been distinguished from the economic case, which accounts for all discounted financial benefits and costs, wherever they accrue, and the social case, which extends the perspective to society as a whole and would score benefits such as increased productivity and improved quality of life (Leatherman et al., 2003). Classical cost–benefit analysis typically takes the perspective of society as a whole, the social case, whereas the business case calculates ROI from the purposively myopic perspective of the entity making the investment in the quality-enhancing intervention (QEI).

A business case is not simply a reduction of expenditures; it must take into account the sustainability of an organization providing health care. Although we concentrate in this article on direct financial considerations, additional factors relevant to the business case may be compliance with quality standards for participation with state, federal, or private payers; enhancement of the competitive positioning of the organization as a quality provider in the community; or preservation of long-term relationships with key strategic partners (Bailit & Dyer, 2004). An organization may find that providing quality health care is essential to maintaining the integrity of its internal mission and organizational culture, whether the monetary returns from a specific intervention are positive or negative. Yet, given several QEIs to choose from, decision makers, and payers, are more likely to implement interventions that improve patient care and show a positive financial ROI. From the perspectives of both private sector health care delivery organizations and government agencies charged with funding or delivering health care services, operating managers are reluctant to invest scarce resources in QEIs that cannot be shown to pay for themselves within a relatively short time horizon (U.S. Department of Veteran's Affairs, Health Economics Resource Center, Health Services Research and Development Service, 2004).

So far, there is little published evidence showing that quality interventions pay off for the entities that implement them. A systematic review (Kilpatrick et al., 2005) confirmed the almost total absence of refereed literature reporting data adequate to calculate an ROI for QEIs. Although there are a large number of reports of successful quality interventions, these articles almost always neglect to report what the intervention costs to develop and what it costs to operate on an ongoing basis. To encourage more authors to publish studies on ROI, we have previously outlined in detail the steps necessary to develop a business case for quality and the data needed to calculate an ROI (Reiter, Kilpatrick, Greene, Lohr, & Leatherman, 2007). The demonstration project described here followed the roadmap laid out in that article.

We hypothesized that entities will be more likely to make an investment in quality interventions if they expect a positive ROI. In this demonstration project, we sought to determine whether from a purely financial perspective the organizations that implemented specific quality interventions in Medicaid populations realized positive returns on their investments during the period of the intervention. If we found no positive ROI for the interventions we studied, we sought to determine the reasons for the negative returns and how these conditions could be mitigated.

## Project Design

This demonstration was conducted by the Center for Health Care Strategies, with researchers from the University of North Carolina at Chapel Hill (UNC) conducting the evaluation of the business case. Ten Medicaid managed care entities were competitively selected by the Center for Health Care Strategies to

participate in the demonstration on the basis of their ability to design and implement an evidence-based QEI, their focus on a chronic illness prevalent in Medicaid, and their organizational capability to collect data to track detailed cost and resource utilization to enable business case analyses. Selected entities represented a range of geographical regions (nine states), organizational structures (health plans, primary care case management programs, and external quality review organizations), financing environments (full-risk capitation to fee-for-service), target populations (children, pregnant women, older persons, and persons who are blind and disabled), and target clinical conditions (asthma, diabetes, CHF, chronic obstructive pulmonary diseases, substance abuse, high-risk pregnancies, and pressure ulcers and urinary tract infections among people with mobility-restraining disabilities). Accordingly, selected entities were broadly representative of the range of managed care environments and clinical needs of Medicaid populations across the United States (Table 1).

## Target Populations

Interventions were defined independently by each of the 10 sites and focused on a range of clinical conditions, as summarized earlier. One site implemented two separate QEIs so that the total number of QEIs we studied was 11.

Using the Johns Hopkins Adjusted Clinical Group Case-Mix software (Johns Hopkins University, 2006) or other similar patient-grouping techniques, eight sites targeted populations of enrollees with serious illness who were high cost in the baseline year and likely to continue needing high levels of medical services in the future. For these sites, the target populations generally included fewer than 500 enrollees. Two sites chose to define their target populations broadly, choosing all enrollees with at least one claim during the baseline year

**Table 1**

**QEI site summary**

| Site | QEI focus | Number of members (average member months in Year 2) | Study design |
|---|---|---|---|
| Community Living Alliance | Prevention and management of skin ulcers and skin wounds for members with disabilities | 244 | Before–After |
| Partnership HealthPlan of California | Provider-level improvements in care for members with diabetes | 689 treatment<br>5,424 comparison | Treatment–Comparison<br>Before–After |
| AXIS Healthcare | Prevention and care for urinary tract infections in members with disabilities | 202 | Before–After |
| Lacrosse County, Wisconsin | Improved care management for members with diabetes using American Diabetes Association best practice guidelines | 382 treatment<br>371 comparison | Treatment–Comparison<br>Before–After |
| Monroe Plan for Medical Care (asthma) | Improved care management for children with asthma | 4,070 | Before–After |
| Mercy Care Plan | Specialized case management to elderly members with diabetes, CHF, or COPD | 99 treatment<br>101 comparison | Treatment–Comparison<br>Before–After |
| Johns Hopkins HealthCare | Integrated medical care and substance abuse treatment of high-utilizing members | 277 treatment<br>138 comparison | Treatment–Comparison<br>Before–After |
| Monroe Plan for Medical Care (diabetes) | Improved care management for adults with diabetes | 1,799 | Before–After |
| Sentara Healthcare | Improved access to prenatal and infant care for high-risk pregnancies | 83 intervention babies<br>59 comparison babies | Treatment–Comparison |
| Arkansas Foundation | Nurse case management for high-risk children with asthma | 195 | Before–After |
| Care Oregon | Enhanced case management for high-risk members with multiple comorbidities | 361 | Before–After |

*Note*. The categorization of study design was by site. Analysis of data collected was by the authors. QEI = quality-enhancing intervention.

with a selected diagnosis. For these two sites, the number of eligible enrollees exceeded 500 persons (Table 1).

### Data Requirements

As a condition of participating in the demonstration project, sites were expected to provide 1 year of baseline and 2 years of postintervention data, including claims cost, billing, and membership data. Sites supplied 3 years of billing data for all health care services provided to the target population. This included data for hospital care, physician services in all settings, home care, long-term care, hospital ER use, and prescription drugs. Four sites provided similar data for a comparison group. Monthly membership counts were provided for each of the 36 months in the study. Each site also reported the cost of resources invested in the QEI during the baseline year and each of the 2 intervention years. Annual cost reporting periods were set to coincide with the baseline year and the two intervention years used for billing and claims data collection. Cost data are described in more detail in the sections to follow.

## Methods

### Evaluation Design

The basic evaluation design, for 9 of the 10 sites, is a comparison of enrollees' experience over three periods; the 12 months preceding the QEI (baseline), the first year during which the QEI was implemented (Year 1), and the second year of the fully implemented QEI (Year 2). Although sites were urged to also identify a comparison group, most had concerns about the ethics of randomizing individuals into treatment and nontreatment groups, believing that their QEI was, in fact, better patient care. Four sites resolved the ethical issues by using a comparison group drawn from a different geographic location, where they were not planning to implement the QEI. In the final evaluation, 9 sites employed a pre/postdesign, with four adding a comparison group. The remaining site targeted high-risk pregnancies using only a case–comparison design where the comparison group was high-risk mothers in the same geographic area who declined to participate in the QEI. The financial analysis strategy consisted of three parts: per-member per-month (PMPM) payments, utilization rates, and costs. PMPM payments and costs were combined to estimate ROI.

We first compared PMPM payments before and after introduction of the QEI, with additional comparisons between the cases and the comparison groups, where available. For sites with no comparison group, we calculated the difference in PMPM payments between the baseline year and each intervention year. A positive difference reflected savings from the QEI, meaning that intervention year PMPM payments were less than baseline year PMPM payments. A negative difference reflected payment increases in intervention years. For sites with a comparison group, we calculated *net savings* which were defined as the difference in PMPM payments between the baseline year and each intervention year for the treated group, the cases, less the difference in PMPM payments between the baseline year and each intervention year for the comparison group. For the case–comparison site, we calculated *savings* as the difference in PMPM payments between comparisons and cases. Where possible, PMPM payments were adjusted for price increases between the baseline year and the intervention years so that the difference would reflect utilization-related savings or increases. In addition to total PMPM payments, we also analyzed payments for specific types of care, including hospital care in inpatient and outpatient settings, long-term care, ER visits, office visits, home care, ambulance use, and prescription drugs.

Per-member per-month measurements were chosen as our unit of analysis to take advantage of all enrollees in the study at any given month as individuals entered and left Medicaid eligibility with a high frequency. Attrition rates ranged from a low of 12.8% in Community Living Alliance to a high of 76.3% for the Monroe Plan for Medical Care (asthma). Six sites, reflecting 7 of the 11 QEIs, chose to add more persons in Years 1 and 2. For these sites, a secondary cohort analysis was performed on the PMPM payments to see the impact of the QEI on only those patients who had been present at baseline.

Utilization rates for specific types of care were calculated and compared over the 3 years and between cases and comparison groups, where available. Utilization measures included hospital admission and day rates per 1,000 persons; long-term care day rates per 1,000 persons; and doctor visit, ER visit, and outpatient prescription drug rates per person. These rates illuminate underlying utilization changes that help to explain the changes in PMPM payments for specific categories of care.

Cost data related to each site's investment in its QEI (*investment costs*) reflected actual incremental cash outflows incurred to develop and operate the QEI as well as allocated opportunity costs. Specifically, sites measured annual cash expenditures on training programs and materials, statistical support, computer hardware and software, consulting services, and new personnel (e.g., nurse case managers). Sites also reported allocated costs, including portions of salaries of existing personnel and overhead to reflect the opportunity costs of personnel time and space devoted to the QEIs.

Return on investment was measured using a benefit–cost ratio defined as follows:

$$\text{Benefit-Cost Ratio} = \frac{[\triangle \text{PMPM}_{t0\text{-}t1}/(1.03) + \triangle \text{PMPM}_{t0\text{-}t1}/(1.03)^2]}{[\text{Investment costs}_{t0} + (\text{Investment costs}_{t1}/1.03) + \text{Investments costs}_{t2}/1.03^2)]}$$

where △PMPM reflects the change in PMPM claims costs, $t_0$ reflects the baseline period, $t_1$ reflects the first intervention year, $t_2$ reflects the second intervention year, and Investment costs reflects the cost of resources invested in developing and operating the QEI described earlier.

The numerator of the benefit–cost ratio reflects the sum of the discounted annual PMPM savings or payment increases. For sites with a comparison group, the numerator reflects the net PMPM savings (or payment increases) to the site. Savings or payment increases in each intervention year relative to the baseline year are discounted back to the baseline period using a discount rate of 3%.

The denominator of the benefit–cost ratio reflects the sum of the discounted investment costs incurred to develop and operate the QEI. Investment costs are also discounted back to the baseline period using a discount rate of 3%. Sites were encouraged to identify a discount rate that would reflect the opportunity cost of investing in the QEI; however, because most sites were not able to estimate their true opportunity cost or, as a proxy, their cost of funds, we chose a discount rate of 3% to reflect the fact that society generally values current over future consumption. Because the time frame for analysis was only 2 years after baseline, the results were not sensitive to discount rates within a reasonable range.

As defined, an intervention with a positive ROI would have a benefit–cost ratio of greater than 1. A benefit–cost ratio between 0 and 1 means that, whereas the QEI resulted in PMPM savings, the savings were not enough to offset the cost of resources invested in developing and operating the QEI. A benefit–cost ratio of less than 0 means that PMPM payments increased in intervention years relative to the baseline year. The benefit–cost ratio was defined in consultation with the sites to measure ROI from their perspective. Because none of the interventions involved large capital expenditures, sites viewed all of the costs associated with implementation and operation of the QEIs as ongoing investments in the interventions. In contrast, utilization-related savings and/or costs were viewed by the sites as the net benefit derived from the interventions. However, because the benefit–cost ratio is subject to interpretation, we also calculated ROI using the more standard measure of net present value. Results of this analysis were consistent with the conclusions drawn using the benefit–cost ratio and thus are not reported here.

## Findings

### Return on Investment

Four of the 11 QEIs achieved a positive ROI (Table 2, Figure 1). CareOregon experienced the largest ROI of 12.21:1 with its complex case management program to treat adults with multiple comorbidities. This was followed by an ROI of 6.35:1 for the Arkansas Medicaid program, which treated children with asthma with a history of ER use and/or inpatient admissions for their disease. Sentara Healthcare's intervention for high-risk pregnant mothers produced a 1.26:1 ROI, and the Monroe Plan for Medical Care's program for adult patients with diabetes resulted in a 1.16:1 return.

The remaining seven QEIs failed to show positive returns. Four sites, however, came close to realizing sufficient savings to offset investment costs. These included Johns Hopkins HealthCare's program for adults with substance abuse; Mercy Care Plan's program for elderly members with diabetes, CHF, or chronic obstructive pulmonary disease; the Monroe Plan for Medical Care's asthma program for children; and the Lacrosse County, Wisconsin's program for adult diabetes. Returns from these four interventions ranged from 0.20:1 (Johns Hopkins HealthCare) to −1.37:1 (Lacrosse County, Wisconsin).

Three sites experienced large losses from their QEIs. These included AXIS Healthcare's program to reduce urinary tract infections in people with disabilities (−18.3:1), Partnership HealthPlan of California's intervention for diabetic adults (−22.74:1), and Community Living Alliance's program for adults at risk of developing skin wounds and ulcers (−26.48:1).

### Investment Costs

The total discounted investment costs for the QEIs ranged from $101,727 in AXIS Healthcare to a high of $560,963 in Mercy Care Plan (Table 2, Figure 2). Sites with positive ROIs were generally more likely to report spending on case managers, nurse educators, and other clinical staff. Two sites reporting relatively high investment costs, the Monroe Plan for Medical Care (diabetes) and CareOregon, experienced positive ROIs. Conversely, three sites reporting among the lowest costs, Community Living Alliance, Partnership HealthPlan of

**Table 2**

**QEI ROI summary**

| Site | Target conditions | Investment costs, $ | Discounted savings (cost increases) from QEI, $ | ROI[a] |
|---|---|---|---|---|
| Community Living Alliance | Skin ulcers and disabilities | 135,673 | (3,592,181) | −26.48 |
| Partnership HealthPlan of California | Diabetes | 124,358 | (2,827,636) | −20.85[b] |
| AXIS Healthcare | Urinary tract infections and disabilities | 101,727 | (1,861,489) | −18.30 |
| Lacrosse County, Wisconsin | Diabetes | 247,397 | (339,397) | −1.37[b] |
| Monroe Plan for Medical Care (asthma) | Pediatric asthma | 459,742 | (166,245) | −0.36 |
| Mercy Care Plan | Elderly persons with diabetes, CHF, or COPD | 560,963 | (84,399) | −0.15[b] |
| Johns Hopkins HealthCare | Substance Abuse | 274,082 | 53,819 | 0.20[b] |
| Monroe Plan for Medical Care (diabetes) | Diabetes | 495,059 | 572,377 | 1.16 |
| Sentara Healthcare | High-risk pregnancies | 244,808 | 308,256 | 1.26 |
| Arkansas Foundation | High-risk pediatric asthma | 126,151 | 801,345 | 6.35 |
| Care Oregon | Multiple comorbidities | 526,290 | 6,423,776 | 12.21 |

*Note*. The categorization of study design and ROI was by site. Analysis of data collected was by the authors. QEI = quality-enhancing intervention; CHF = congestive heart failure; COPD = chronic obstructive pulmonary diseases.

[a]Cumulative 3-year ROI measured as a benefit–cost ratio [PMPM savings (losses) / investment costs].

[b]Net ROI calculated as payment changes in the case populations less payment changes in the control.

California, and AXIS Healthcare, had large negative ROIs. Although no pattern is discernable from looking at investment costs in isolation, this demonstration is noteworthy in capturing the magnitude and composition of these costs because so few published studies of quality interventions even reveal the related investment costs.

## Per-Member Per-Month Payment Savings

Sites that realized positive returns on their investment were those with the largest payment savings in Year 2 (Figure 3). We chose to report Year 2 savings because, by the second year, the intervention was fully operational and mature. Reported results reflect the experience of all patients ever enrolled in the QEIs. Results of the secondary cohort analysis for the six sites that added patients showed that, in every instance, the sign and magnitude of the ROI were relatively unchanged. We recognize that calculating ROI after only 2 years may seem like an extraordinarily short payoff period, but our experience was that sites showing positive payoff did so within 1 year, whereas the negative payoff sites continued on a negative trajectory throughout the course of the 2-year evaluation.

Among the seven sites with negative ROIs, the most common characteristic we observed was increases in hospital inpatient care and associated PMPM payments. The largest increase in days per 1,000 persons was 46.4% in Mercy Care Plan followed by 24.3% in Partnership HealthPlan of California and 12.6% in the Monroe Plan for Medical Care (asthma). Other sites including Community Living Alliance and AXIS Healthcare also experienced increases in inpatient hospital care, although at more moderate rates. Because the quality interventions were typically expected to reduce inpatient admissions, these negative results were disappointing.

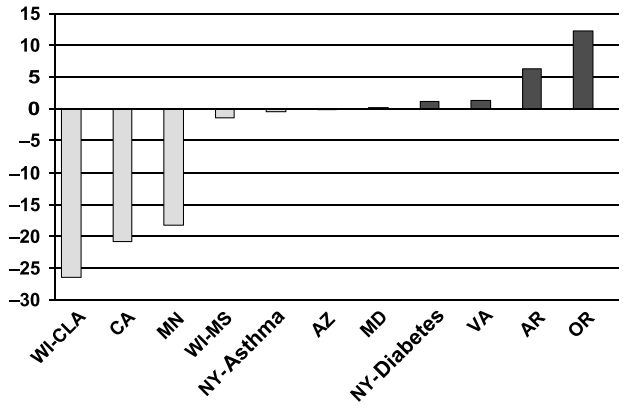
## Comparison Groups

With valid comparison groups, a pre/postevaluation of an effective QEI should have shown an absolute decrease in total PMPM payments or flatter growth in PMPM payments in cases relative to comparison groups over the 2-year intervention. This did not occur in any of the four sites with comparison groups: Mercy Care Plan; Lacrosse County, Wisconsin; Johns Hopkins HealthCare; and Partnership HealthPlan of California. None of these four sites experienced a positive ROI (Figure 1).

Contrasting the case and comparison groups at baseline indicated that the comparison groups and cases represented quite disparate populations for two sites. Total PMPM payments for the Johns Hopkins HealthCare comparison group were 23.7% lower than those for cases at baseline, reflecting lower inpatient hospital

**Figure 1**

**Return on investment[a] by site.**




WI-CLA = Community Living Alliance; CA = Partnership HealthPlan of California; MN = AXIS Healthcare; WI-MS= Lacrosse County, Wisconsin; NY-Asthma = Monroe Plan for Medical Care; AZ = Mercy Care Plan; MD = Johns Hopkins HealthCare; NY-Diabetes = Monroe Plan for Medical Care; VA = Sentara Healthcare; AR = Arkansas Foundation; OR = Care Oregon; [a]Measured as a benefit-cost ratio [PMPM savings (losses)/investment costs].

admission and day rates. Mercy Care Plan cases and comparisons were also strikingly different at baseline in terms of utilization. Although their overall PMPM payments were not too dissimilar, with payments for the comparison group 12.7% higher than those for cases, patients in the comparison group were hospitalized at twice the rate of patients in the intervention group and had half the rate of long-term care utilization.

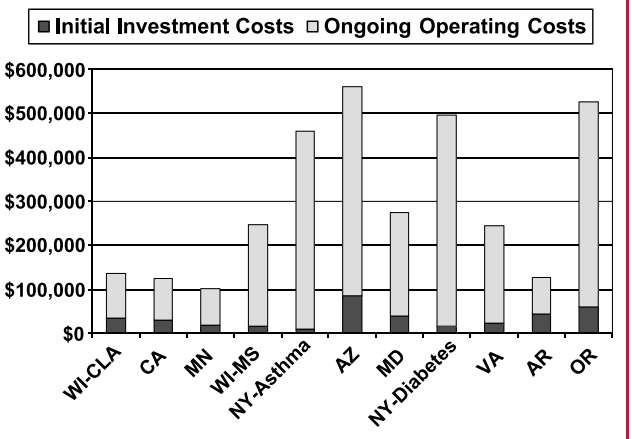
## Challenges and Limitations in Evaluating the Business Case for Quality

This demonstration identified many challenges associated with a rigorous analysis of the business case for quality in real-world settings such as Medicaid MCOs. The most important is the amount of effort it takes to access, transmit, safeguard, and analyze the considerable amount of claims and enrollment data that are necessary for a strong evaluation. Our initial assumption that Medicaid MCOs would have the ability to easily track the quality and financial impacts of quality improvement interventions proved optimistic. It was not unusual to require the design of new systems to collect and transmit data in the form needed for the evaluation. Second is the difficulty of employing randomized study designs in a Medicaid setting and of identifying adequate comparison groups in the absence of randomization. Many MCOs were ethically opposed to randomization. For those that opted to identify a nonrandom comparison group, the availability of reasonably similar patient populations was often severely limited.

Despite these challenges, we believe that it is possible to conduct more rigorous analyses going forward. Limitations of this study were in part, by design, because we were seeking broad participation from sites to test a relatively new concept. Consideration of the limitations of this study can be used to strengthen future findings. One limitation was that although our project encouraged and advised the inclusion of equivalent comparison groups, this was not required. Therefore, it is possible that our results were affected by the statistical phenomenon of regression to the mean or impacted by confounding factors. Also, this demonstration took a quantitative approach to measuring ROI, and the study was not designed to capture costs and/or savings other than those directly related to the QEI. For example, reputational and market share effects and avoided costs from reductions in medical malpractice are not included. Indirect financial benefits may be substantial; however, they are very difficult to quantify. Thus, our

**Figure 2**

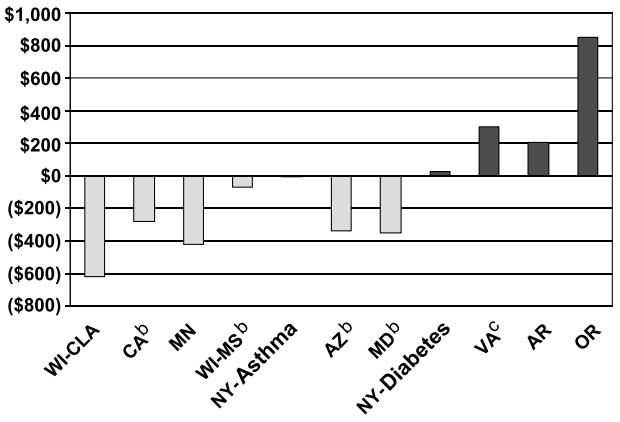
**Total discounted investment[a] costs.**




WI-CLA = Community Living Alliance; CA = Partnership HealthPlan of California; MN = AXIS Healthcare; WI-MS= Lacrosse County, Wisconsin; NY-Asthma = Monroe Plan for Medical Care; AZ = Mercy Care Plan; MD = Johns Hopkins HealthCare; NY-Diabetes = Monroe Plan for Medical Care; VA = Sentara Healthcare; AR = Arkansas Foundation; OR = Care Oregon; Analysis of the data collected was by the authors. [a]Cost incurred in intervention years discounted to the baseline period using a 3% discount rate.

**Figure 3**

**Total per-member per-month payment savings[a] (baseline–Year 2).**




WI-CLA = Community Living Alliance; CA = Partnership HealthPlan of California; MN = AXIS Healthcare; WI-MS= Lacrosse County, Wisconsin; NY-Asthma = Monroe Plan for Medical Care; AZ = Mercy Care Plan; MD = Johns Hopkins HealthCare; NY-Diabetes = Monroe Plan for Medical Care; VA = Sentara Healthcare; AR = Arkansas Foundation; OR = Care Oregon; Analysis of the data collected was by the authors. [a]Payment savings in year 2 discounted to the baseline period using a 3% discount factor; [b]net savings; [c]PMPM payment savings = (optima control babies − intervention babies).

approach is conservative. In addition, this study was not designed to evaluate the efficiency of the implementation process for the interventions. In fact, the sponsors of the research were pleased that all sites actually were successful in implementing their proposed interventions—an outcome that is not always achieved in broad-based demonstration projects. Another limitation was that participating sites were not required to track a uniform set of quality indicators. Each site submitted quarterly continuous quality improvement measures focused on identification, stratification, and outreach activities for each intervention; however, sites were not required to track clinical process or outcome measures. Measuring quality improvements would enhance the understanding of the quantitative claims analysis and ROI results. We realize that the ROI for an individual investing organization is only one aspect of a broader analysis of whether investments to achieve higher quality of care can have a positive financial outcome. This demonstration recognized the need to identify all the downstream effects of investments in quality but was not designed to include the full range of stakeholders needed to capture all the benefits and costs necessary to conduct a comprehensive analysis.

Two final study limitations are the limited time length of the interventions and ever-increasing health care costs. We only tracked the interventions for 2 years which may not be sufficient time for the ROIs to show cost effectiveness. Future studies will be longer than 2 years. In addition, this type of project must deal with the fact that health care costs typically rise annually. In the absence of suitable comparison groups to account for such trends, ROI calculations should include an alternative means of adjusting for the price increases that are embedded in successive years of health care costs. Without such an adjustment, we recognize that ROI analysis will understate financial savings associated with interventions.

Despite these design challenges, we nonetheless think that this demonstration has utility in providing a roadmap for future analyses of the business case for quality interventions and has highlighted a number of intervention characteristics that may hold potential for demonstrating near-term financial returns. We concur with a recent article that suggests that "the primary value to policymakers of the early experimental studies derives from the post hoc, non experimental efforts of researchers to better understand their findings" (Christianson, 2007, p. 529).

## Implications

This demonstration has highlighted a number of intervention characteristics that may hold potential for generating financial returns. We recommend that organizations developing quality interventions focus on target populations that are high risk and high cost (risk-stratified target populations) and target conditions that have potential for short-term ROI and primarily seek to reduce avoidable ER and inpatient hospital utilization. Although targeting high-cost high-risk populations does not guarantee a positive ROI, these groups comprise priority populations in terms of improving quality of care and reducing inefficient health care utilization. It is within these populations that the business case may be a powerful lever for driving improvements in quality of care.

Although only four of the sites achieved a positive ROI, we have demonstrated that a positive return can be achieved either with minimal investment costs or with significant investment costs. This suggests that the key determinant in a positive return is how the money is invested rather than how much. Sites in the business care of quality project with positive ROIs were generally more likely to report spending on case managers, nurse educators, and other clinical staff. Careful consideration should be given in choosing which interventions to

implement and what staffing levels are required such that scarce investment dollars are spent wisely.

Finally, we recommend that organizations seeking to implement new quality initiatives and to determine their ROI develop the necessary tracking systems for claims and financial data prior to implementation. Organizations that can perform ROI analyses effectively will be positioned for making improved business decisions on which quality interventions should be expanded and receive additional investment and which should be modified or eliminated.

## Policy Directions

Quality improvement in health care is certainly more salient than ever with payers, health care plans, and patients, all pursuing it with varying degrees of ardor. However, proof of the business case for quality—that there will be a positive return for investing in QEIs—remains, for the most part, elusive. It was our initial expectation that capitated Medicaid MCOs would have built-in financial incentives to develop QEIs which would reduce delivery costs sufficiently to show a positive ROI. We expected that the ability for the plans to retain any savings they made by improving care quality and lowering utilization and costs would motivate these organizations to work toward the goal of minimizing unnecessary utilization of health services. These expectations proved to be only partially true.

One possible explanation is that periodic rate adjustments by state Medicaid agencies mitigate the effects of the capitation incentive. It is the case that, within a budget period, if a capitated plan can deliver a given set of services less expensively, the plan may retain the savings. However, the state Medicaid programs will periodically review the capitation rates provided to the plans and may reduce these rates if the plans' profits are deemed to be too high. If the state adjusts the capitation rate by linking it to lower costs achieved by the plan, the incentive for cost efficiency is mostly nullified. The strength of plans' incentives depends on how frequently the rates are assessed and adjusted. If the rate reductions are made several years after the efficiencies are achieved, then the plan still has a financial incentive to pursue QEIs that reduce costs. It can also be the case that if the state sees the merit in sharing the gains with efficient plans, the incentive can remain strong. We do not know the extent to which possible disincentives cancelled out the power of capitation to enhance efficiency in this study, but several plans were clearly sensitive to their existence.

More robust tests of the business case should be undertaken to give stakeholders greater confidence that proposed QEIs are good buys for them. Similarly, studies are needed that assess the gains or losses for multiple stakeholders as a health plan's gain may be a provider's loss. It will be necessary to identify opportunities for realigning financing so that gains can be shared in ways that maximize everyone's interest in improving quality.

Generating a clearer picture of the business case for investments in quality, for the investing organization, and for the broader economic case for other health care entities could have significant policy implications. The potential for the attainment of this broader goal of demonstrating ROI should fuel greater investments in improving quality in health care.

## Acknowledgments

We would like to acknowledge Melanie Bella, MBA, senior vice president, of the Center for Health Care Strategies, and Carol Porter, applications analyst; Frances Ochart; applications analyst; and Charlotte Williams, research associate of the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill for their significant contributions to this project.

## References

Bailit, M., & Dyer, M. B. (2004). *Issue brief: Beyond bankable dollars: Establishing a business case for improving health care*. New York: The Commonwealth Fund.

Blumenthal, D., & Ferris, T. (2004). *The business case for quality: Ending business as usual for American health care*. New York: Commonwealth Fund.

Centers for Medicare & Medicaid Services. (2004). *Medicaid managed care overview*. Retrieved February 29, 2008, from http://www.cms.hhs.gov/MedicaidManagCare/

Chang, D. I., Burton, A., O'Brien, J., & Hurley, R. E. (2003). Honesty as good policy: Evaluating Maryland's Medicaid managed care program. *Milbank Quarterly*, *81*, 389–414.

Christianson, J. B. (2007). Evaluating pay-for-performance in Medicaid through real world observation. *Health Affairs*, *26*, w528–w531. (Published online June 26, 2007; 10.1377/ntlhaff.26.4.w528).

Harry, M., & Schroeder, R. (2000). *Six Sigma: The breakthrough management strategy revolutionizing the world's top corporations*. New York: Doubleday.

Institute of Medicine. (2008). *Creating a business case for quality improvement research: Expert views: Workshop summary*. Washington, DC: Institute of Medicine.

John Hopkins University. (2006). *Johns Hopkins ACG Case Mix System™*. Retrieved March 3, 2008, from http://acg.jhsph.edu

Juran, J. M., & Godfrey, A. B. (1999). *Juran's quality handbook*. (5th ed.). New York: McGraw Hill.

Kasley, A. S., & Ozcan, Y. A. (2008). Do hospitals with electronic medical records (EMRs) provide higher quality

care? An examination of three clinical conditions. *Medical Care Research Review OnlineFirst*. doi:10.1177/1077558707313437.

Kilpatrick, K. E., Lohr, K. N., Leatherman, S., Pink, G., Buckel, J. M., Legarde, C., & Whitener, L. (2005). The insufficiency of evidence to establish the business case for quality. *International Journal for Quality in Health Care*, *17*, 347–355.

Leatherman, S., Berwick, D., Iles, D., Lewin, L. S., Davidoff, F., Nolan, T., & Bisognano, M. (2003). The business case for quality: Case studies and an analysis. *Health Affairs*, *22*, 17–30.

McGlynn, E. A. (2004). There is no perfect health system. *Health Affairs*, *23*, 100–102.

Menachemi, N., Chukmaitov, A., Saunders, C., & Brooks, R. G. (2008). Hospital quality of care: Does information technology matter? The relationship between information technology adoption and quality of care. *Health Care Management Research*, *33*, 51–59.

Monheit, A. C. (2003). Persistence in health expenditures in the short run: Prevalence and consequences. *Medical Care*, *41*(Suppl. 7), 1153–1164.

Reiter, K. L., Kilpatrick, K. E., Greene, S. B., Lohr, K. N., & Leatherman, S. (2007). How to develop a business case for quality. *International Journal for Quality in Health Care*, *19*, 50–55.

Smith, V. K., & Moody, G. (2005). *Medicaid in 2005: Principles and proposals for reform*. Retrieved February 28, 2008, from http://www.nga.org/Files/pdf/0502MEDICAID.pdf

Somers, S. A. (2003). Medicaid can push for quality. *Health Affairs*, *22*, 260.

U.S. Department of Veteran's Affairs, Health Economics Resource Center, Health Services Research and Development Service. (2004). *QUERI economic analysis guidelines, April 2004*. Retrieved April 11, 2008, from http://www.herc.research.va.gov/files/MPDF_303.pdf