

IMPACT OF A PAY-FOR-PERFORMANCE INTERVENTION: FINANCIAL ANALYSIS OF A PILOT PROGRAM IMPLEMENTATION AND IMPLICATIONS FOR OPHTHALMOLOGY (AN AMERICAN OPHTHALMOLOGICAL SOCIETY THESIS)

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ABSTRACT

Purpose: To determine whether a specific pay-for-performance program design will result in a decrease in global health care expenditures attributable to implementation of that program.

Methods: A retrospective analysis was performed of costs referable to the health plan during a baseline year in comparison to the year following the program implementation. All claims paid during the year prior to program implementation (Baseline) were compared with all costs during the first year of program deployment (Intervention). The primary outcome measure was global health plan expenditure. Secondary outcomes measures included global health plan expenditures adjusted for catastrophic cases and changes in costs by provider type attributable to the program implementation.

Results: Global expenditures, for Implementation relative to Baseline years, decreased to \$2,049,780 from \$2,316,929 (11.5%). When adjustment was made for catastrophic cases, costs decreased to \$1,645,568 from \$1,811,840 (9.2%). This cost reduction was achieved despite approximately a 10% increase in provider pricing per unit of service.

Conclusions: In this pilot, implementing the program was an effective way to reduce the total health care costs in the first year of implementation. This supports the concept and documents for the first time in a commercial population that an appropriately designed pay-for-performance system can reduce total health care costs by reduction in units of service. This reduction in units of service will more than offset a substantive increase in physician payment per unit of service. Pay-for-performance measures will impact the practice of ophthalmology as government, payers, employers, and consumers focus on value and on demonstrable, auditable outcomes of the care process.

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INTRODUCTION

Health care system design and operation remains one of the most widely debated issues in America today. Access and cost are two key elements in this conundrum as Americans struggle with providing as broad access as possible to an increasingly sophisticated and expensive system of care delivery—much of this determined by technology (including pharmaceuticals). In the United States expenditures for health care were nearly \$1.7 trillion in 2003, more than twice that of 1990 expenditure levels, and almost seven times the amount spent in 1980. The 2003 national health expenditures represented 15.3% of the gross domestic product, three times larger than in 1960. About half of this increase occurred from 1980 to 1992, when health as a share of the gross domestic product rose from 8.8% to 13.1%. This ratio remained roughly constant during most of the 1990s and began to rise again rapidly after 2000. The resultant growth in the cost of health insurance increased the percentage of the nonelderly population without insurance from 17.3% in 2002 to 17.7% in 2003 (or 44.7 million uninsured), an increase of 1.4 million over 2002. Similarly, the proportion of Americans with employer-based insurance declined from 63.3% in 2002 to 61.9% in 2003.¹

The current American health care system mechanism of physician (and hospital) payment appears to have resulted in substantial financial misalignment among all parties. Reimbursement per unit of service with a continually decreasing payment per unit of service drives providers to increase the units of service. Providers are encouraged to provide “more” care without obligatory validation that the care is “necessary.” This is further encouraged by “defensive medicine” as a corollary driver to excess care as physicians feel vulnerable with lack of a validated, defensible “best” care approach.² Even with this high level of spending, the quality of the American health care has come under increasing scrutiny. A recent Rand Corporation study conducted the largest and most comprehensive examination of health care quality ever done.³

That study assessed the extent to which recommended care was provided to a representative sample of the US population (selected from 12 metropolitan areas) for a broad range of conditions. Its key findings concluded that adults received only about half of recommended care. This lack of performance was similar for chronic, acute, and preventive care while the quality of care varied substantially by condition. None of the studied communities had consistently the best or worst quality across the variables studied. This documented broad variability of care necessarily implies both incomplete, inadequate care at one end of the spectrum and unnecessary, potentially risky, and expensive care at the other end.⁴ Nonstandard medical care (where specific evidence-based recommendations exist) was similarly addressed in the dual reports from the Institute of Medicine, “To Err is Human: Building a Safer Health System” (2000) and “Crossing the Quality Chasm: A New Health System for the 21st Century” (2001).^{5,6}

Several initiatives have been introduced to address these health care cost and quality issues. Financially rewarding physicians for incorporating evidence-based medicine (EBM) is part of a nationwide health care reform movement called “pay-for-performance” (P4P). Put simply, in a P4P model, providers are compensated based on the value of services rendered as opposed to the pure volume of services of rendered.

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In recent years, health care system strategies have increasingly focused on P4P program rationale, design, and implementation strategies.^{7,8} Pay-for-performance programs operate under the assumption that compliance with diagnostic and therapeutic recommendations derived by application of statistically significant (or, less effectively, consensus-endorsed) evidence-based data will lead to better quality care.⁹ (The American Academy of Ophthalmology's Preferred Practice Patterns are one early successful example of summary guidelines derived using a rigorous evidence-based approach). Uniform application of "appropriate" medical algorithms should lead to better outcomes and therefore lower long-term costs incurred by unnecessary testing and by the increased morbidity (and mortality) associated with inappropriate medical care. Operationally, P4P programs are designed to control costs by financially motivating physicians to render high-quality care with rewards for improving clinical outcomes, rendering preventive care, and/or adopting electronic information technology. More controversial P4P programs reward physicians for focusing on achieving cost savings.¹⁰

The P4P movement is in its infancy but has been widely supported by the Centers for Medicare and Medicaid Services,¹¹ Fortune 500 companies,¹² and health insurance companies.¹³ Studies have shown that physicians render higher-quality care when they are financially rewarded for value as opposed to volume, and recent research indicates that high-quality health care may result in lower cost.¹⁴ Conversely, poor-quality care implies inefficiencies, ineffectiveness, overtreatments and undertreatments, treating rather than preventing complications of chronic disease, correcting mistakes, and more medical malpractice—all of which lead to higher costs. Recently a committee of the Institute of Medicine, while recognizing the challenges imposed by a P4P system and the paucity of evidence as to its effects, strongly recommended moving forward with P4P as an important element in a comprehensive strategy to improve quality of care.¹⁵

The P4P movement has not been uniformly supported by physician groups and organizations. Concerns exist that P4P may fail because of physician rejection, and most experts agree that long-term health care reform cannot be achieved without active physician involvement. Some physicians fear that P4P will mandate treatment protocols and interfere with physicians' ability to make decisions based on their individual clinical judgment. Others express concern that P4P is primarily about cost reduction and is not focused on quality improvement.¹⁶ Others note that some of the P4P programs developed to date offer an inadequate financial incentive for physicians to adhere to administratively cumbersome guidelines that appear more about checking the right boxes and less about quality.⁷ The American Academy of Ophthalmology, recognizing that P4P quality indicators will be incorporated in Medicare as of July 2007, has worked actively to gain physician consensus for appropriate and valid eye care metrics.

A singular focus on physician performance alone may be inadequate to achieve both quality and global cost savings. An additional significant compounding variable producing suboptimal patient care concerns physician-patient communication deficits. This can result in poor patient compliance with physician instructions, inferior clinical outcomes, an increased malpractice risk profile, and ultimately higher costs.^{17,18} Multiple studies have demonstrated physician propensity to interrupt patient communications and demonstrate poor listening behavior. In one study only 15% of patients clearly understood their physicians' instructions, and half did not understand their role in their personal care plans (including adherence to medications).¹⁹ As most patients under commercial contracts have limited personal financial exposure and no immediate financial incentive for compliance, there is little pressure to personal involvement in healthcare and a sense of service entitlement.

In 2000, the author, another physician (obstetrician-gynecologist), and an individual with expertise and experience in health care organization development and health care transaction software development founded an entity to serve as a Preferred Provider Organization (PPO) incorporating EBM guidelines. In 2005, 61% of Americans in private health plans were enrolled in PPOs.²⁰ Between 2000 and 2005, as it matured its information technology infrastructure, staff, and operational systems (maintaining the same leadership team), this entity developed a product designated MedEncentive ("The Program") as described herein.

MedEncentive is a unique system incorporating the P4P model wherein providers are financially incentivized to comply with defined quality metrics designed to produce better-quality health outcomes. However, the Program uniquely recognizes the importance of patient participation in this compliance (or "adherence") process and offers a patient "information therapy" (Ix) module with financial incentives. Further, the amount of financial incentives is substantially greater than in the proposed Medicare system (about 10% as opposed to 1.5%).

MedEncentive's unique P4P program is designed to "bolt-on" to any health plan. It has developed an Internet-based service that financially rewards both physicians and patients for incorporating EBM guidelines and Ix prescriptions in their practices. The model is based on the premise that the physician is only half of the cost equation—the other half of the equation being the patient. Under the MedEncentive Program, physicians receive substantive financial incentives to prescribe treatments consistent with independent, validated, EBM guidelines, and patients receive financial incentives to follow the prescribed EBM treatments. The Program charges participating employers and health plans a monthly license fee based on the number of registered plan members. The Program implements both accountability and empowerment by advocating that P4P will not work until physicians and patients are both committed and have a stake in the health care process.

The MedEncentive Program is designed (1) to reward physicians for following EBM guidelines by substantially increasing their reimbursement per unit of service, (2) to reward patients for following Ix by rebating a portion of their copays, (3) to provide options for physicians who choose not to follow guidelines for medically sound reasons, (4) to internally validate compliance data, (5) to ultimately reduce health care costs by decreasing the number of units of service by adherence to EBM guidelines, and (6) to ultimately reduce costs and increase health quality by adherence to EBM guidelines with better ultimate enrollee health.

The Program functions in the following fashion:

1. A health plan (payer) or self-insured employer (purchaser) licenses the MedEncentive Program based on a per-member-per-month fee.
2. Participating physicians are provided with access to Web-based tools, including independently derived (by a consortium of academic institutions and marketed by HealthGate Data Solutions, Inc, of Boston, Massachusetts) EBM guidelines.²¹ These tools include algorithmically designed “best practice guidelines” for evaluation and management of over 100 common medical conditions imbedded within 20,000 electronic pages of text. Imbedded within each guideline are links to peer-reviewed publications along with standardized notations as to levels of evidence (multicenter prospective trial data, expert consensus, etc). This proprietary database is available only on a subscription basis, and the cost is imbedded in overall program administration costs. During the Intervention year, 117 EBM guidelines were available for use.
3. If an enrolled patient is seen by a participating physician, an ICD-9 diagnosis code on the insurance claim will identify that an EBM guideline exists for that ICD-9 code.
4. The physician is then contacted by e-mail and is notified of the guideline, is provided a link to it, and is queried whether or not he or she will follow the guideline and also prescribe Ix. If the physician answers yes, this triggers higher physician reimbursement and the patient is contacted via email and regular mail service about the Ix. If the physician answers no to the issue of guideline use or Ix, he or she is given the online opportunity to provide a medical reason for not following the guideline (eg, comorbidities or drug allergies). If no valid reason is provided, lower reimbursement is triggered.
5. The patient is then directed via e-mail or regular mail to the Program’s patient Web site. The patient’s understanding of his or her disease is tested, new information is presented, adherence to physician recommendations is determined, and the patient becomes eligible for a financial reward.
6. Physician and patient perusal of the Web site is monitored by the Program as one indicator of compliance and validity.

Information therapy programs have been developed to ameliorate a scenario well known to all physicians. It has been estimated that, for many medications, in only about 50% of cases are patients using the prescribed medication in the prescribed fashion.²² Reasons are numerous, including failure to fill the prescription for logistical or financial reasons, confusion over the dosing schedule, the perception of lack of benefit, drug side effects and drug-drug interactions, and finally pure ennui.²³ Patient adherence with nonpharmaceutical physician lifestyle changes (smoking cessation, weight loss, physical therapy, etc) is even less common. Programs that are successful in achieving greater patient “compliance” or “adherence” with physician recommendations are anticipated to result in better health.²⁴

MedEncentive Ix programs not only reinforce physician recommendations and pharmaceutical prescription adherence through alternative (Web-based) means, but they financially reward the patient for doing so.

The efficacy of most P4P programs requires improved clinical outcomes to achieve cost reductions. Because reduction in overall healthcare costs lags the process of improving clinical outcomes by 2 to 5 years, most P4P programs expect cost increases in the short term and cost savings after 2 or more years. The Program influences medical decision making by *both* the doctor and the patient with the potential for more immediate impact on cost reduction.

During 2003 and 2004, like most other employers in the United States, the City of Duncan (“the City”) faced steep increases in the costs of its health plan and a financial crisis to the entire City budget. Since the City was self-insured and its costs had reached a crisis point, drastic measures were considered. Like many other self-insured municipalities, the City faced these basic choices: (1) decreasing benefits to its employees by shifting more of the health costs to its employees; and/or (2) convincing providers (hospitals and physicians) to further discount their fees for medical services; and/or (3) implementing cost reduction measures in other areas of health care, namely pharmacy; and/or (4) reducing expenditures in other budgeted areas to fund increasing health care costs, thus reducing services to its citizens; and/or (5) raising taxes to the citizens of Duncan to cover the higher health care costs.

After conferring with its health benefits broker, the City chose to diminish benefits to its employees. This decision was met with resistance by City employees and, in particular, the local firefighters’ union. Confronted with the prospect of a strike by the firefighters, the City Manager requested that the broker provide some alternative options. After consulting the City’s third-party administrator, the MedEncentive Program was introduced to the firefighters’ union and the City Council. All agreed to pursue this innovative approach. The MedEncentive Program was implemented as part of the benefits program for the City of Duncan employees and their dependents beginning August 1, 2004. About 225 employees and 375 dependents and retirees were enrolled in the program.

Concurrently the benefit plan design was changed, introducing three other significant factors to reduce the growth in costs: (1) an increase in annual deductibles for health benefits and pharmacy benefits; (2) the addition of office visit benefits to the health plan; and (3) a change in provider network. The City increased plan member annual deductible payment from \$250 to \$600 per member per year. The City also increased the pharmacy deductible payment from \$7 to \$12 for generic drugs and from \$12 to \$25 for brand names. These plan changes shifted more of the health care costs from the City to the health plan members. The financial impact of this change decreased the City’s “claims paid” and increased the members’ “out-of-pocket” costs.

At the same time, the City improved the health plan benefit by including an office visit benefit that paid for doctor office visits and consultations with a \$25 per visit copayment. The financial impact of this change increased the City’s “claims paid” and decreased members’ “out-of-pocket” costs. The City also reduced the number of in-network providers and increased the number of out-of-network providers. Since the City’s health plan pays out-of-network providers 50% of allowed services, as opposed to 80% for in-network providers, the financial impact of this change increased the amount of ineligible claims, decreased the City’s “claims paid,” and increased the members’ “out-of-pocket” costs. This was counterbalanced by higher reimbursement rates for providers (hospitals, doctors, etc) on a per-unit-of-service basis for the MedEncentive network in comparison to the prior network.

By implementing the Program, the City potentially incurred higher costs in three areas. First, the City agreed to pay physicians that participated in the Program rates of reimbursements that were about 20% higher than the area's prevailing rates, and if a local physician chose not to participate or failed to participate, the City paid 20% less than the area's prevailing rates. Second, the City offered its health plan members a rebate on their office copay of \$25 per visit, up to a limit of \$100 per year per member and \$250 per family for agreed compliance with the MedEncentive Ix program. The financial impact of this change increased the City's "claims paid" and decreased the members' "out-of-pocket" costs. Third, the City paid the Program a fee of \$2.50 per-employee-per-month to access it.

In the Program a direct correlation is anticipated between physician and patient participation levels and cost containment. The higher the level of participation by physicians and patients (and the more timely the response by the participants), the more effectively the Program contains costs. An "Opportunity" in the Program is synonymous to an Ix prescription generated by a physician through the Program's Internet Web site applications. From the patient's (member's) standpoint, an "opportunity" generates the potential for rebate of a percentage of the copay. The voluntary nature of participation and built-in time limits for patients to respond to the Program "opportunities" therefore make physician and patient participation levels an important Program system metric. In the MedEncentive system, compliance by physician to EBM is confirmed via the internet by the patient. Similarly, patient compliance to Ix is confirmed by both patient viewing of the appropriate Web site and subsequently by the physician office. In mature Program installations patients are only able to receive their Ix prescription from their physician. To ensure that patients would not miss out on "opportunities," the City elected to allow the MedEncentive system to directly generate Information therapy prescriptions with an appropriate disclaimer.

The Program automatically tracks and reports participation levels by doctor and system-generated Ix prescriptions against total Ix prescription opportunities. It also tracks patient rewards and responses against total Ix prescription opportunities. By using findings from other research and acknowledging program design intent, The MedEncentive Program predicts certain outcomes as a measure of its efficacy.

HYPOTHESIS

P4P programs can result in a reduction in the rise of health care costs and possibly a true reduction of health care costs if system incentives are sufficient to garner sustained participation in the Program by both providers/physicians and by patients. Reduction in health care costs will be achieved by reduction in units of service. This will in turn be achieved by compliance (where medically appropriate) with evidence-based medicine guidelines. Although better outcomes should result in a long-term cost savings, short-term savings should be achieved by a reduction in "defensive medicine" diagnostic testing not supported by medical evidence and by better patient compliance. Sustained participation will be achieved only if the financial incentives are adequate, the system operation is not excessively cumbersome, and the payments per unit of service are not increased beyond a level that absorbs all savings achieved through reduction of units of service.

Specifically, by using MedEncentive's unique financial incentives, checks and balances, and distribution of evidence-based medical knowledge, a decrease of health care cost in the first year of the Program's implementation was predicted. Based on the Program's design, a redistribution of health care expenditures among medical providers and services in favor of physicians was anticipated. Since the practice of defensive medicine often deviates from evidence-based guidelines, it was predicted that the practice of defensive medicine services, such as radiology, should decrease with the introduction of the Program. Finally, it was predicted that the level of participation would correlate directly with the reduction in healthcare costs.

MATERIALS AND METHODS

To evaluate the impact on costs, all claims paid during the study period were analyzed. Secondary outcomes examining the impact of patient and physician participation used the transaction tracking capacity in the MedEncentive information system.

The health plan claims database of the third-party administrator for the City of Duncan was used to perform a retrospective analysis of the financial impact of the program. All claims from August 1, 2003, to July 31, 2005, were imported into the analysis database. Filters were used to remove duplicate claims. The analyses were done using two time periods defined by the "claims paid" date. Time frames for comparison included a Baseline (pre-MedEncentive) of "claims paid" date from 8/1/2003 to 7/31/2004 and an Intervention time frame (MedEncentive) of "claims paid" from 8/1/2004 to 7/31/2005. (The Program was implemented and active beginning on 8/1/2004.) A date filter was used to segregate nonduplicate claims into two time frames based on the *Date Paid* field. Group 1 (baseline N = 8,262) was defined as all claims paid between August 1, 2003, and July 31, 2004. Group 2 (Intervention N = 8,505) was defined as all claims paid between August 1, 2004, and July 31, 2004. Claims were separated into 5 categories using data in the encoded procedure field, as follows (Descriptor: Value):

- Unknown: NULL
- CPT-4: 10000-99999
- HCPCS: fields beginning with alpha characters
- Revenue Code: <9999
- Patient Refunds: >99999

CPT-4 encoded claims were considered to be physician services. HCPCS encoded claims were verified as dental services, medications, and supplies. Revenue Codes were considered as hospital costs, and patient refunds as Program costs. Pharmacy benefits

and costs were included in the benefits package and were extracted from a secondary claims extraction. Each set of claims was segregated by the categories, and a sum of costs was done for each category for the baseline and intervention time frames. The following elements were summarized for each category:

- Net Charges
- Ineligible Charges
- Deductible
- Out of Pocket Expenses
- Paid Amount

A second sorting of encoded claims by the following medical specialties based on CPT code ranges for the baseline and intervention year was performed using these categories:

- Surgery
- Radiology
- Pathology (including lab)
- Medicine (including visits and consultations)

Radiology was chosen for specific scrutiny as a surrogate for the practice of “defensive medicine.” It was hypothesized that compliance with EBM would lead to fewer unnecessary imaging studies. Because of the relatively small sample size, a breakout of ophthalmology-specific CPT code ranges was not statistically significant. In the commercial (non-Medicare) population, cataract surgery is much less commonly performed, as are other common procedures, including glaucoma, retina, and many oculoplastic surgical procedures.

The physician and patient participation statistics were generated from the MedEncentive information system including the total Rx prescriptions generated (by physicians or by the Program directly) and the number of patient rebate rewards. This information was compared against annual employer claims costs by month. Qualitative program data was collected through interviews conducted with patients, physicians, and administrators.

Total healthcare expenditures during the periods of study were calculated by combining both the City’s health plan expenditures and those expenditures incurred by health plan enrollees. Data integrity, findings, and conclusions were confirmed with City management, local physicians, and plan members.

RESULTS

Global healthcare expenditures incurred by the City and by its plan members are presented in Table 1. This includes both fixed and variable (claims) costs for both the Baseline and the Intervention years. Data are adjusted for changes in employment to ensure comparability of data sets. These total costs are segmented by the amounts paid by the plan members (Ineligible, Annual Deductibles, Coordination of Benefits, Out-of-Pocket) and paid by the City (Paid). The “Net Change” represents the difference between the Intervention Year and the “adjusted” Baseline Year. (The Baseline Year “adjusted” figures have been multiplied by a conversion factor of 0.977 to reflect the change in the average number of employees between the 2 years.) Finally, the “Percent Change” is the Net Change divided by the Baseline Year’s adjusted totals for the Net Charges and Paid amounts. Net Charges decreased \$267,149 from the Baseline Year to the Intervention Year. This represents a decrease to \$2,049,780 from \$2,316,929 (11.53%) in global healthcare expenditures during the period of study. The change in global healthcare expenditures (net charges) is depicted in Figure 1.

TABLE 1. P4P: NET CHANGE IN TOTAL FIXED AND VARIABLE EXPENDITURES FROM BASELINE TO INTERVENTION YEARS ADJUSTED FOR EMPLOYMENT*

DESCRIPTION	NET					
	CHARGES	INELIGIBLE	DEDUCTIBLE	COB	OOP	PAID
2003-04 Costs	\$2,370,279.57	90,494.30	67,955.15	19,063.58	230,499.54	1,962,280.60
2003-04 Adjusted	\$2,316,929.23	88,457.45	66,425.61	18,634.50	225,311.45	1,918,113.51
2004-05 Costs	\$2,049,780.23	88,072.14	139,255.98	43,341.38	178,672.41	1,600,438.32
Net Change	-\$267,149.00	-385.31	72,830.37	24,706.88	-46,639.04	-317,675.20
% Net Change	-11.53%					-16.56%

*These total costs are segmented by the amounts paid by the plan members (Ineligible, Annual Deductibles, Coordination of Benefits (COB), Out-of-Pocket (OOP), and paid by the City (Paid). The Net Change represents the difference between the Intervention Year and the “adjusted” Baseline Year. % Net Change is the Net Change divided by the Baseline Year’s adjusted totals for the Net Charges and Paid amounts.

Catastrophic event cases (major, costly cases) can skew data from any small to midsized enrollee base. Accordingly, a second comparison was made in which all costs for individuals that exceeded the City’s reinsurance specific stop-loss limits were then calculated. (For the City of Duncan, the individual stop-loss was \$30,000 per member per year.) Figure 2 illustrates this data set demonstrating a \$166,272 (9.18%) decrease in adjusted global healthcare expenditures.

The data were analyzed to ascertain the sources of the observed cost savings in Intervention as opposed to Baseline years. As predicted, the vast majority of the cost savings occurred because of decreased hospital-related costs and pharmacy (baseline year costs are presented in Table 2). While the costs related to program administration of EBM and Ix were slightly higher, they were negligible compared to the savings achieved as demonstrated in Tables 3 and 4. Figure 3 illustrates the net changes in costs by cost category during the study periods.

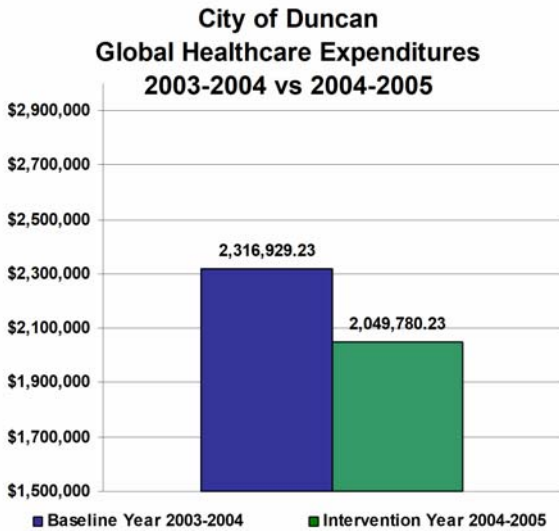


FIGURE 1

Global healthcare expenditures comparing Baseline to Intervention years.

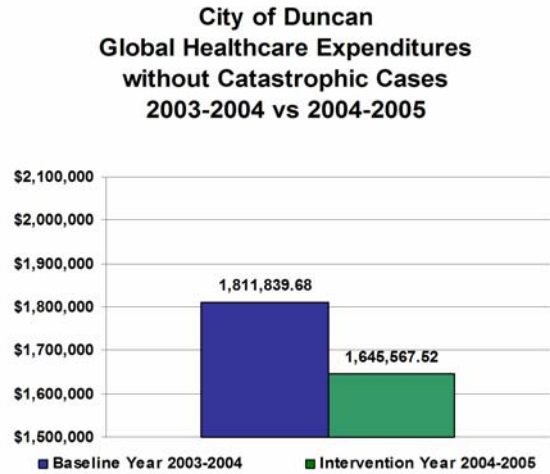


FIGURE 2

Global healthcare expenditures comparing Baseline to Intervention years with catastrophic cases eliminated.

TABLE 2. P4P: BASELINE YEAR COSTS (2003-2004) BY COST CATEGORY ADJUSTED FOR CHANGE IN AVERAGE NUMBER OF EMPLOYEES*

COST CATEGORY	NET CHARGES	% OF NET CHARGES	INELIGIBLE	DEDUCTIBLE	COB	OOP	PAID
Hospital	1,187,521.72	51.3%	43,439.31	9,949.27	9,229.37	137,154.20	987,749.56
Doctor	455,116.01	19.6%	34,960.31	54,657.36	8,145.83	74,866.35	282,499.44
Rx	377,863.68	16.3%	0.00	0.00	0.00	0.00	377,863.68
Admin	212,762.77	9.2%	0.00	0.00	0.00	0.00	212,762.77
Other	83,665.05	3.6%	10,057.83	1,818.98	1,259.29	13,290.89	57,238.07
Total	2,316,929.23	100.0%	88,457.45	66,425.61	18,634.50	225,311.45	1,918,113.51

*These total costs are segmented by the amounts paid by the plan members (Ineligible, Annual Deductibles, Coordination of Benefits (COB), Out-of-Pocket (OOP), and paid by the City (Paid). Admin, administrative; Rx, pharmacy.

Were the global cost savings referable to particular disease groupings? To further examine case mix acuity, total claims costs (Hospital, Doctor, and Other Charges) were sorted for both years by diagnoses according to the ranges found in the International Classification of Diseases—9th Revision (ICD-9). ICD-9 codes are grouped in 18 ranges or categories. The difference in Net Charges between the Baseline and Intervention years for each of these 18 diagnosis categories was computed, and then the categories were ranked according to this difference.

As Table 5 indicates, 13 of the 18 diagnosis categories decreased in Net Charges from the Baseline to the Intervention Year. A reduction in costs across a wide range of diagnoses such as this seems to imply that the overall cost reduction was not due to catastrophic cases or happenstance and may indicate that health care was delivered more efficiently and effectively in the Intervention Year.

It should be noted that other measures of acuity, such as the net change in hospital admissions and emergency department visits, all decreased from the Baseline Year to the Intervention Year. Hospital length of stays is another acuity measure that was not quantified.

Costs savings relative to the provision of eye care are imbedded within the “Doctor” column (Figure 3), with the exception of any

associated hospitalization and medication costs. In this non-Medicare age range (as in this commercial population pilot study), ophthalmologic care is much more heavily weighted toward nonsurgical care. ICD-9 range 320-389, which includes ophthalmology along with otorhinolaryngology, neurology, and neurosurgery, ranked at about the midpoint among all disease groupings.

TABLE 3. P4P STUDY: NET CHANGE IN COSTS BY CATEGORY FROM BASELINE TO INTERVENTION YEARS ADJUSTED FOR CHANGE IN AVERAGE NUMBER OF EMPLOYEES*

COST CATEGORY	NET CHARGES	INELIGIBLE	DEDUCTIBLE	COB	OOP	PAID
Hospital	-275,880.68	-266.06	52,760.10	20,370.16	-38,315.31	-310,429.56
Doctor	22,744.64	7,784.31	13,015.32	2,612.30	8,653.91	-9,334.48
Rx	-20,633.86	0.00	0.00	0.00	0.00	-20,633.86
Admin	7,339.73	0.00	0.00	0.00	-9,835.00	17,174.73
Other	-718.83	-7,903.56	7,054.95	1,724.43	-7,142.63	5,547.97
Total Change	-267,149.00	-385.31	72,830.37	24,706.88	-46,639.04	-317,675.20
% Net Change	-11.5%					-16.6%

*These total costs are segmented by the amounts paid by the plan members (Ineligible, Annual Deductibles, Coordination of Benefits (COB), Out-of-Pocket (OOP), and paid by the City (Paid). The Total Change represents the difference between the Intervention Year and the “adjusted” Baseline Year. % Net Change is the Net Change divided by the Baseline Year’s adjusted totals for the Net Charges and Paid amounts. Admin, administrative; Rx, pharmacy.

TABLE 4. P4P: NET CHANGE IN EXPENDITURES FROM BASELINE TO INTERVENTION YEARS BY MEDICAL SPECIALTY, ADJUSTED FOR EMPLOYMENT

MEDICAL SPECIALTY	2003-04 NET CHARGES	2003-04 NET CHARGES FOR CHANGE IN EMPLOYMENT	2004-05 NET CHARGES	\$ CHANGE FROM ADJUSTED BASELINE TO INTERVENTION YEARS	CHANGE AS A % OF TOTAL ADJUSTED 2003-04 NET CHARGES
Surgery	189,012.30	184,758.00	190,335.82	5,577.82	1.2%
Radiology	61,357.18	59,976.15	56,289.23	-3,686.92	-0.8%
Pathology	23,807.64	23,271.78	29,044.49	5,772.71	1.3%
Medicine	191,418.53	187,110.07	202,191.11	15,081.04	3.3%
Total	465,595.65	455,116.01	477,860.65	22,744.64	5.0%

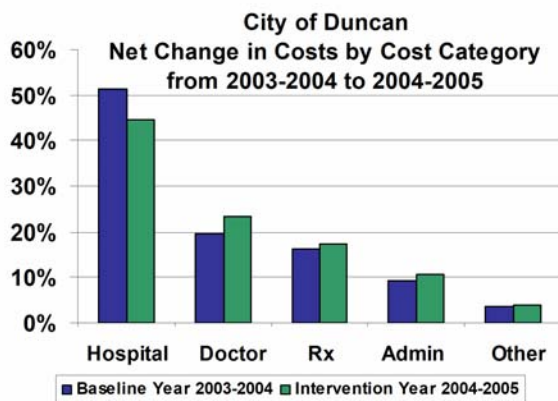


FIGURE 3

Change in costs by cost factor (Rx, pharmacy; Admin, administrative costs).

In an effort to determine if there is any evidence that the practice of defensive medicine was affected between the baseline year and intervention year, net changes in medical service categories were examined. While surgical, laboratory, and medicine physician charges increased moderately, there was a decrease in radiology paid claims that were used as a surrogate marker for defensive medicine (see Table 4). Not only did radiology costs not keep pace with increases in costs realized by other medical specialties, it was

the only specialty that experienced a net reduction in expenditures from the Baseline year to the Intervention year.

A key element in program economic impact is the degree to which both physicians and patients participated in the EBM and Ix programs, respectively. During the study, 379 (48%) of 798 Ix prescription physician opportunities were completed. In other words, in 48% of encounters where the opportunity for Ix prescription by physician presented itself, the patient was so instructed. Only 26 (7.6%) of 344 non-Duncan physicians participated in this fashion. (This group of physicians did not receive the opportunity for personal orientation to the MedEncentive system).

TABLE 5. P4P:TOTAL CLAIMS COSTS RANKED BY DIFFERENCE IN NET CHARGES BY DIAGNOSES GROUPS

ICD9 RANGE	DESCRIPTION	BASELINE YEAR		INTERVENTION YEAR		DIFFERENCE	
		2003-2004		2004-2005			
		NO. OF SERVICES	NET CHARGES	NO. OF SERVICES	NET CHARGES	NO. OF SERVICES	NET CHARGES
V01-V82	Supplemental Classifications w/Reproduction and Development	224	198,046	387	70,558	163	-127,488
390-459	Diseases of the Circulatory System	483	175,705	355	98,059	-128	-77,646
460-519	Disease of the Respiratory System	955	208,334	823	144,689	-132	-63,645
001-139	Infectious and Parasitic Disease	67	33,572	30	3,139	-37	-30,432
140-239	Neoplasms	123	39,012	60	10,487	-63	-28,524
580-629	Diseases of the Genitourinary System	387	124,205	305	98,468	-82	-25,736
800-999	Injuries and Poisoning	218	90,581	255	72,475	37	-18,106
320-389	Diseases of the Nervous System and Sense Organs	398	94,476	368	77,715	-30	-16,761
680-709	Diseases of the Skin and Subcutaneous Tissue	177	23,447	115	8,172	-62	-15,274
280-289	Diseases of the Blood and Blood Forming Organs	12	18,658	27	4,781	15	-13,877
710-739	Diseases of the Musculoskeletal System and Connective Tissue	1,567	303,132	1,458	293,943	-109	-9,189
240-279	Endocrine, Nutritional and Metabolic, and Immunity Disorders	264	35,819	322	33,152	58	-2,667
760-779	Certain Conditions Originating in the Perinatal Period	20	3,894	10	2,251	-10	-1,644
290-319	Mental Disorders	215	21,935	179	41,337	-36	19,402
630-677	Complications of Pregnancy, Childbirth, the Puerperium	70	39,573	44	59,087	-26	19,515
520-579	Diseases of the Digestive System	205	163,675	229	184,416	24	20,741
740-759	Congenital Anomalies	12	1,982	35	33,769	23	31,787
780-799	Symptoms, Signs and Ill-Defined Conditions	813	190,007	903	235,947	90	45,940
Totals		6,210	\$1,766,053	5,905	\$1,472,448	-305	-\$293,605

Four hundred sixty-two (43.8%) of 1054 patients who were given the opportunity to utilize the Ix program did so. This figure was substantively higher (115 of 200, or 57.5%) if the patient had three or more office visits during the Intervention year. Since any cost reduction should be linked to a successfully perceived Ix program, patients were asked to respond to a survey instrument as a part of their copay rebate reward. The question "On a scale from 1-5, how helpful has this information been to you in managing your disease or condition (1 being not at all helpful and 5 being very helpful)?" The aggregate score achieved was 4.23 on this scale. Detailed results may be seen in Figure 4.

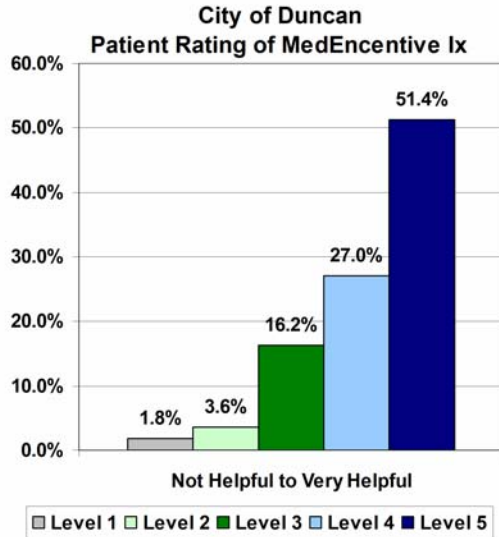


FIGURE 4

Patient ratings of Information therapy (Ix) value from 1 to 5 (with 5 being “Very Helpful”).

DISCUSSION

The City of Duncan’s implementation of the Program tested the hypothesis that a P4P system characterized by use of EBM and Ix (while paying a higher cost per unit of service) could reduce global utilization of healthcare services resulting in lower global costs. Four factors that increased the “per unit” cost had to be overcome by a sufficiently large decrease in utilization to achieve a decrease in overall health care cost. First was a higher rate of reimbursement to physicians for participating in the MedEncentive Program. The second factor was a patient rebate reward for Program participation. Third was an increase in price-per-unit-of-service from the baseline year as a result of changing the provider networks. Finally, the fees charged to the City by MedEncentive as administrative costs for use of its Program also increased the final “per unit” cost.

From the employer perspective, the City experienced substantial cost savings in its health benefits expenditures from the Baseline year to the Intervention year. To determine the impact of the Program on the City’s cost savings, the analysis examined data (1) from the perspective of the City’s expenditures and (2) from a global cost perspective that included the City’s expenditures plus payment made by members (employees, dependents, and retirees) of the City’s health plan. By also analyzing the data with and without catastrophic events, the effects of both reinsurance changes and anomalous healthcare events were negated.

After adjusting for catastrophic events, the global healthcare costs (including both City and enrollees) decreased by 9.2% (Table 1, Figure 1). This was over a time span in which health care costs increased by about 10% and during which physician reimbursement per unit of service decreased 5% to 10%. Since elements of benefit plan design and employee base were considered in the final economic analysis, the MedEncentive P4P plan implementation must be considered the major, if not sole, reason for a reduction in global health care costs.

This success is remarkable in that it occurred during the first year of implementation and required behavior changes on the part of both physicians and patients. Physicians and physician offices not only had to philosophically embrace the concept of EBM, but had to operationally become fluent in the Web-based process of guideline review and compliance. Similarly, a high level of patient participation was necessary for optimal results. While good participation was achieved, subsequent years should witness even higher levels of participation and greater potential for cost reduction and quality enhancement.

Even P4P advocates do not anticipate substantive positive benefits for several years—after which patients with chronic diseases begin to benefit from EBM care. Why then did MedEncentive generate such favorable cost reduction in a short period of time? It is designed to reduce unnecessary care through reduction in inefficiencies and unsupportable variations in care that increase cost. The Dartmouth Atlas Project recently determined that almost one-third of care for Medicare patients with chronic diseases was unnecessary. The same should be true for the commercial population. Again, with greater physician and patient participation and longer follow-up, the economic impact may be even more pronounced.

There was also predicted to be a redistribution of costs among the major categories (types) of cost in favor of physicians. Using the major cost categories of hospital, doctor, pharmacy, administrative, and other, the redistribution of overall (global) costs was reallocated in favor of physician services. This was not at all surprising based on the assumption that a combination of “defensive medicine” and healthcare unfocused on an evidence-based approach is likely to lead to unnecessary diagnostic imaging and unnecessary hospitalization. Similarly, enhanced patient compliance with physician instructions and medication prescriptions is also likely, even in the short term, to result in fewer hospitalizations. The administrative system required to operate and monitor both EBM and Ix, to link to the proper payment schedule, to train physicians and patients on the system, and to validate compliance certainly

adds to the cost base. However, in this study, the increased administrative costs were less than 3% of the decrease in hospital costs alone.

Societal economic and healthcare quality impacts from any EBM program will be naturally directly proportional to participation in the plan. In the MedEncentive system with its unique blend of combined physician and patient economic incentives, the overall participation rate by patients and physicians alike was about 50% where both groups had the opportunity for instruction in the system. (Out of network non-Duncan physicians, who only had the opportunity for an on-line Program tutorial or a telephone “help line,” participated at a much lower rate). Participation by patients increased as their health care encounters (and presumably health care needs) increased and became more complex. From a cost containment perspective, this is desirable because the sickest patients with the greatest opportunity for a positive health and economic benefit participate at a higher rate.

This was further validated by a telephone survey conducted at midyear to help determine plan members’ reaction to the Program. The most significant finding from the survey was that members who did participate tended to be older people with chronic conditions or people with a medical crisis. Members who did not participate tended to be younger and healthy. The principal reason for not participating was forgetfulness. Since the City continued to experience decreasing costs and the Program was enrolling members that consumed the majority of health care, no investment was made in measures to increase participation levels. Some inflections in the cost trend line were noted and appeared to correlate with spikes and dips in the participation levels, supporting the correlation of participation levels to cost containment impact.

Despite some limitations in data available for analysis, the results from the implementation of the Program in the City’s health plan shows a significant cost reduction in total health care costs over the first year of deployment.

The original objective of the City test project was to validate the MedEncentive Program in three key areas: First, to test the Program’s technical capabilities—determining if the Web applications functioned as designed in a “live” setting and demonstrating that it could successfully transfer data electronically between a claims repricer, a third-party administrator, and the MedEncentive information system. With some minor adjustments during the first 60 days and a transition from one claims repricer to another, the Program passed each design test and has functioned exactly as designed.

The second area of validation was to test physician and patient acceptance of the Program as measured by participation levels. The participation levels were satisfactory, especially in light of initial physician resistance and considering that participation stimulating tactics (such as telephone reminders, certified notification, and restricting Ix prescribing to physicians) were not incorporated.

The third area of validation looked at the Program’s ability to contain costs, which was the purpose of this analysis. Measuring cost containment capabilities of a program like MedEncentive requires some assumptions about using claims data to gauge cost containment. Steps were taken in this study to isolate other contributing factors from the Program, and multiple predictions were tested to substantiate the Program’s cost containment.

This study demonstrates probable cost effectiveness using one P4P program in one study population over an initial 1-year period. This in no way is meant to justify all P4P program designs or to validate all P4P approaches to healthcare cost control and quality improvement. The MedEncentive Program differs, for example, from the Medicare approach to this issue as well as the approach of several private organizations in some substantive ways.^{8,9,11} First, it should be noted that the Program based its physician reimbursement per unit of service on the premise that a 1% to 3% differential between noncompliance and compliance (as has been proposed by Medicare) would not adequately motivate a change in physician behavior—particularly given that incremental time and effort necessary to comply and document compliance. The Program used a net 50% differential between the fee schedule for compliance and noncompliance.

Second, most P4P programs focus solely or primarily on physician compliance with evidence-based guidelines. MedEncentive operates under the principle that patient adherence to patient behavior guidelines is important as well with regard to both cost and quality. Patients are therefore provided with a financial incentive (return of a portion of copays) for reading and complying with patient information materials (so-called information therapy, or Ix).

Third, mechanisms are in place (including postpayment reviews and monitoring of physician and patient browsing of the EBM Web site and Ix Web sites) to at least partially validate physician and patient compliance. There is no “foolproof” mechanism yet described to ensure that a physician indicating that he or she is complying with the EBM guidelines and requesting the higher reimbursement level is in fact being honest and accurate. However, 100% integrity is not necessary to achieve the sought-after improvements.

As noted above, this study covers only one study population—a small city. This city was chosen for study in part because of timing and in part because it constituted a relatively self-contained health care system with little out-migration for care. It is possible that the MedEncentive results might be more completely or less completely expressed in another setting with different access to the World Wide Web, a different pattern of community health care needs, or a more or less compliant physician population.

Finally, these data cover the first year of Program operation. It is possible that, over time, the cost reductions obtained will evaporate due to either lower levels of program participation, plan benefit changes, or other factors. However, on the other hand, it is possible that these initial benefits will be enhanced not only as the acute impact of physician and patient behavioral changes is felt, but also as the impact of improved disease management on long-term morbidity (and cost of care) becomes evident.

The potential significance of these findings is substantial. At a time when the national health care debate focuses on reducing the rate of health care cost increase, the Program realized true cost savings. Equally important, this is accomplished in part by incentivizing physician compliance with EBM guidelines and patient compliance with Ix—both of which should improve quality as well as cost. In a somewhat contrarian approach, physicians are paid more per unit of service under this plan than under other plans,

and significantly more than under MedEncentive *without* adherence to EBM guidelines. It also skews Program payments in favor of physicians relative to other healthcare costs (eg, facilities, pharmacy). The Program with its internal financial system and software has no known national counterpart, and this study represents the first publication of a pilot program incorporating an evidence-based approach in a non-volume-constrained system with true short-term reduction in healthcare costs.

While the Centers for Medicare and Medicaid Services move closer to adoption of an early phase P4P system,²⁵ evidence suggests that the system redesign debate has led to increasing penetration of “P4P” in the commercial sector. A recently published survey of 252 health maintenance organizations (HMOs) from 41 metropolitan areas showed that some sort of P4P was used by over half of the plans, representing more than 80% of the persons enrolled.²⁶ Typically, however, these P4P systems rewarded only the best performing physicians or physician groups (as opposed to all physicians, as in MedEncentive), used a very small subset of targeted metrics (such as diabetes care and mammography), and varied payments by no more than 5%. Clearly the term *pay-for-performance* does not describe a specific plan design, incentive package, set of EBM guidelines, and array of quality metrics. Rather, it describes a concept with a broad implementation spectrum.

Recently, Elliott Fisher, a member of the Institute of Medicine Committee on Rewarding Provider Performance, posed a number of questions that must be addressed for a P4P plan to be effective.²⁷ These included: (1) What is the underlying goal—quality or efficiency? (2) Are the measures accurate—are they appropriately flexible and risk-adjusted? (3) Is implementation feasible—the administrative burden? (4) Will rewards be sufficient—will the incentive change behavior? and (5) Could there be unintended consequences—effects on professionalism? He acknowledges that little data is available to answer these questions.

This study provides data that specifically address several of Fisher’s questions. The Duncan experience clearly demonstrated that implementation of a pilot program was feasible, was sustainable, and imposed a negligible financial and administrative burden (as reflected in the incremental administrative costs and the participation by physicians and patients). It also demonstrated that the reward level utilized was capable of driving physician behavior (as reflected by sustained physician participation). While it could be argued that sustained physician participation and the results of physician surveys (not included herein) supported the guideline flexibility and implementation options, no statistical evidence exists to bolster this argument. Quality remains unproven and will require a larger and longer-term study.

The implications for ophthalmology and for the delivery of eye care services are substantial. Whereas most of the recent national attention relative to P4P has been focused on Medicare initiatives, the nonfederal payers have also been searching for a P4P strategy. If widely implemented, such a strategy will impact that 45% to 50% of the typical ophthalmology practice that is covered under commercial contracts (traditional indemnity insurance, PPOs, HMOs, and similar product lines). Eye care is not a substantive economic driver for commercial health care costs relative to diseases such as asthma, cardiovascular disease, diabetes mellitus (not including retinopathy), and even breast health. However, among the guidelines developed by Healthgate are strabismus, conjunctivitis, primary open-angle glaucoma, diabetic retinopathy, and cataract. Similar prioritization can be expected by any entity developing EBM guidelines. Therefore, while not a major economic driver for “under age 65” healthcare, ophthalmologists can expect that a substantial proportion of their patient encounters will lead to ICD-9 disease codings that will trigger EBM guidelines under a P4P model. As Medicare moves to a P4P system, this will result in the typical comprehensive and subspecialist ophthalmologist having to comply with a P4P system in order to access higher reimbursement.

Furthermore, as EBM guidelines and Ix become part of the standard lexicon of patients as well as payers and employers, it is reasonable to anticipate that patients and employers will preferentially choose physician groups compliant with and supportive of those initiatives. Therefore, optimal practice patient care design will incorporate operational components (patient education, coding infrastructure, Web site support, etc) that will promote P4P compliance by physician and patient alike.²⁸

The data analysis from MedEncentive (and as it may emerge from similarly designed and implemented P4P systems) also places a burden on ophthalmologic organizations. Without appropriately designed and promulgated EBM guidelines (such as the American Academy of Ophthalmology’s Preferred Practice Patterns), American ophthalmologists will not be able to financially advantage themselves of optimal participation in P4P reimbursement systems. Without validated performance metrics, the impact of these systems cannot be effectively measured. The American Academy of Ophthalmology and responsible ophthalmologic subspecialty organizations have the unique expertise and resources to drive this process forward.

CONCLUSIONS

Nationwide, health care costs have increased at 3 to 4 times the rate of inflation (Consumer Price Index, or CPI). There is general consensus that this is not sustainable. This was no different for the City of Duncan, which was experiencing double-digit inflation in its health care costs. For many purchasers of health care, a slowing of the rate of inflation to single digits or, better yet, to the CPI rate would be considered a highly successful intervention. The City could not sustain its level of health care expenditures and had to take aggressive measures to reduce costs. Thus success required not only slowing cost inflation but achieving actual cost savings in the first year.

The City’s health care expenditures declined substantially from the Baseline year to the Intervention year. The MedEncentive Program was the principal contributor to this decline and a systematic analysis of claims data supplied by the City’s third-party administrator points to the following conclusions:

- The MedEncentive Program was designed to control the cost of health care by utilizing the Internet and financial rewards to elevate the standard of care and to encourage healthy behavior.

- The findings in this analysis support findings from previous studies conducted by highly respected organizations which determined that paying providers for adhering to EBM and dispensing health information to patients reduce health care costs.
- The Program operationally functioned as it was designed.
- Participation levels (and informal surveys of participants in the Program not reported herein) indicate that the Program had an impact on the behavior of local health care providers and member of the City's health plan.
- The City's costs began declining immediately after the adoption of the Program and continued to decline through the end of the Intervention year.
- After considering and quantifying other contributing factors, there was a substantive decrease in the City's health care expenditures attributable to the Program.
- Four predictions were made about specific cost outcomes that would occur as a result of the Program. These prediction were (1) cost containment would be achieved in the first year, (2) costs would be reallocated in favor of physicians, (3) defensive medicine would be reduced, and (4) a degree of correlation would occur between health care costs and physician/patient participation levels. Each of these predictions was either fully or partially substantiated.

The MedEncentive program emerged from simple concepts. First, physicians want to (1) be paid more for each service rendered and (2) practice medicine consistent with the highest standards of quality based on scientific evidence. Second, patients want to (1) be and remain healthy and (2) have the information to assist in that process. These simple concepts led to the design of a sophisticated plan design and operational matrix. With further refinement and experience, there is every reason to expect similar operational results. While the available data permits a largely financial and operational analysis, future analyses after multiple years of operation should allow a valid glimpse of the effect on health and on care outcomes. However, it is reasonable to anticipate that physician and patient adherence to validated "best practice guidelines" will result in better care than a highly variable, nonscientific approach employed by the same group of physicians and patients. This will be true for all medical disciplines, including ophthalmology, whose literature is replete with well-executed multicenter clinical trials on which the American Academy of Ophthalmology and others can base Preferred Practice Patterns. However, in the commercial, non-Medicare population, it will require a much larger study to validate this on a specialty-specific basis.

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