
Pay-for-Performance Success Using Doctor-Patient Interactive Rewards

An Evaluation of the Impact of the MedEncentive Program on the City of
Duncan Health Plan

A MedEncentive Study • September 15, 2006



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MedEncentive

evidence-based rewards for a healthier world.

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Executive Summary

...validating the MedEncentive Program

An issue that affects most Americans is the inaccessibility to high quality and affordable health care. An underlying cause of this issue is the current health care delivery system, which is driven by incentives that reward consumption – a system that does not encourage provider or patient accountability. A concept designed to alleviate over consumption and the lack of accountability that has received a great deal of interest is referred to as pay-for-performance or P4P. Simply stated, pay-for-performance programs intend to offer purchasers and consumers the opportunity to buy health care on the basis of quantifiable value.

The future of the P4P movement is clouded by widespread physician resistance, the lack of patient involvement, and the absence of a demonstrated return on investment (ROI) to the purchaser. This report evaluates a year long trial of a unique P4P program that represents an important breakthrough in overcoming these obstacles.

On August 1, 2004, the City of Duncan, Oklahoma (“the City”) incorporated the MedEncentive P4P Program (“Program”) into the City’s self-insured employee health plan. After a full year with the Program in place, the City’s health plan costs decreased significantly in comparison to the prior year. Two other employers (CompONE Services and the City of Durant) independently tested the Program and experienced similar health care cost reductions, thus increasing the Program’s probability of efficacy.

During the year in which the City incorporated the MedEncentive Program (“Intervention Year”), the global expenditures for the City’s health plan, including fixed and variable costs for both the City and the health plan’s members, decreased by 11.5% in comparison to the same time period for the year prior to the adoption of the Program (“Baseline Year”). Using the same basis of comparison but excluding catastrophic cases, costs decreased 9.2%. The cost reduction included a nearly 10% increase in provider pricing which was absorbed by the City’s health plan. It also included the cost of the Program (including the Program’s access fees and the rewards paid to physicians and patients).

After a systematic consideration of other cost-related variables, this study concludes that there is strong evidence that the MedEncentive Program achieved a level of independent physician and patient participation in its unique P4P method to cause a significant portion of the City of Duncan’s global health care cost reduction, thus producing a substantial return on investment to the City and its employees. The findings and conclusions of this study imply that MedEncentive’s system of *doctor-patient interactive rewards* could have a profound impact on improving the quality of health care, encouraging healthier behavior, and controlling overall costs.

Background

...accessing high quality and affordable health care



The City of Duncan implemented MedEncentive to address runaway health care costs

Statement of Problem

The problem of escalating health care costs threatens the American economy and the wellbeing of the American public. Numerous ways to contain health care costs have been tried over the last three decades with little or no success. In retrospect, these attempts have failed primarily because they did not address the underlying factors that encourage consumption and drive costs higher. These factors include:

1. **Poor Quality of Care** - A seminal study by the RAND Corporation¹ determined that Americans receive recommended care only 55% of the time. This leads to poor clinical outcomes and higher costs. Another well-documented aspect of poor quality of care is the variability of care^{2, 3} from provider to provider and from geographic location to location. This wide variability indicates a degree of unnecessary care that contributes to high cost.
2. **Poor Doctor-Patient Communications** - Studies have documented that a leading complaint about health care among patients is the poor communications with their doctors. One study⁴ reported that doctors interrupt patients within the first 23 seconds of an encounter. Another study⁵ determined that 15% of patients fully understand what their doctors tell them and 50% of patients leave their doctors' offices uncertain of what they are suppose to do to care for themselves. These studies go on to report that poor doctor-patient communications causes misdiagnosis, inferior clinical outcomes⁶, malpractice⁷, and higher costs.
3. **Misaligned Provider and Patient Incentives** - There are three incentive misalignments that are characteristic of the American health care delivery system

¹ McGlynn EA. The Quality of Health Care Delivered to Adults in the United States. RAND Corporation.

² Wennberg J. Small Variations in Health Care Delivery, and Understanding Geographic Variations in Health Care Delivery.

³ Dartmouth Atlas of Health Care 1998.

⁴ Beckman HB. The Effect of Physician Behavior on the Collection of Data.

⁵ Article reference: Is Your Doctor Really Listening to You? Kaplan SH, University of California, Irving, National Center for Policy Analysis. *Daily Policy Digest*, 2004. Source: Levine M. Tell the Doctor All Your Problems, but Keep It to Less Than a Minute.

⁶ Stewart MA. Effective Physician-Patient Communication and Health Outcomes: A Review.

⁷ Levinson W. Physician-patient Communication. The Relationship with Malpractice Claims Among Primary Care Physicians and Surgeons.

that drive costs higher. First, the primary method for compensating providers, especially physicians, is based on the volume of services rendered as opposed to the quality or value of services rendered. This volume-based method of reimbursement encourages physicians and hospitals to provide more care as opposed to better care. Second, providers practice what is referred to as “defensive medicine” to avoid medical malpractice lawsuits. In so doing, doctors prescribe drugs and perform procedures that may provide lawsuit protection but have been determined by evidence-based medicine to be unnecessary. Research⁸ has concluded that defensive medicine increases health care cost by 5% to 9%. The third misalignment involves how insurance causes patients to behave. When patients have little or no out-of-pocket costs, a degree of entitlement occurs. Furthermore, health benefits do not reward patients for healthy behaviors or compliance to care recommendations. All three of these incentive misalignments stimulate health care inflation.

The developers of the MedEncentive Program recognize that controlling health care costs must focus on doctors and patients in addressing these three underlying causes. In other words, an effective cost containment method must offer doctors and patients financial and psychological incentives that facilitate a higher standard of care and better patient health knowledge while encouraging healthier patient behavior.

Pay-for-Performance

One solution for improving health care quality and control cost that is receiving a good bit of attention is referred to as pay-for-performance or P4P. The P4P movement intends to compensate providers (physicians, hospitals and other caregivers) on the basis of the value of services rendered as opposed to the historical method of compensation that is based on the volume of services rendered. There are more than 100 pay-for-performance programs being tested across the U.S. and Great Britain. MedEncentive is considered a pay-for-performance program. However, MedEncentive is unlike any other P4P program in a number of ways. To better understand the MedEncentive’s unique characteristics, a brief description and critique of the typical P4P program is in order.

There are approximately 120 pay-for-performance programs in the U.S. at various stages of development. None of these programs are more the 3 years old, so the P4P movement is still in its early stages. Most P4P programs have been developed and sponsored by U.S. health insurers and governments, with a few sponsored by health providers (physicians and hospitals) and one sponsored by a large private employer⁹. Nearly all of these programs reward only providers (hospitals and physicians) and none offer interactive patient rewards. In other words, these P4P programs hold providers exclusively accountable for improving the quality of care and controlling costs, thus leaving patients out of the equation. Providers generally earn rewards for compliance to treatment guidelines for a few high cost diagnoses (such as diabetes and cardiac care), or for preventative health screenings/care, or for incorporating health information technology.

⁸ Kessler D. Do Doctors Practice Defense Medicine?

⁹ Bridges to Excellence sponsored by General Electric

The financial rewards to providers are often based on complicated formulas that involve multiple criteria to include treatment guidelines adherence, patient satisfaction surveys and the adoption of health information technology. Some of the more controversial programs use claims data and other factors to “economically credential” providers or hold providers responsible for patient behavior.

Consequently, the pay-for-performance movement has experienced difficulty in the rate of adoption. The following is a list of reasons the P4P adoption rate has been slow:

1. Physicians have legitimate concerns about P4P and what it means to the practice of medicine. As a result, physicians have been resistant to P4P adoption for the following reasons:
 - a. the performance measurements which physicians sense are being imposed upon them are seemingly unclear, complicated, or unfair;
 - b. physician performance is judged by unknown third parties;
 - c. physician ratings will be publicized without due process (this issue is often referred to as program “transparency”);
 - d. physicians are concerned about being publicly stratified, using questionable criteria, as “good or bad” and “expensive or inexpensive”;
 - e. physicians are forced to abdicate their clinical judgment in favor of mandated treatment protocols which doctors consider to be “cookbook medicine”;
 - f. physicians are required to perform more time-consuming administrative work and add more technology with little or no remuneration;
 - g. performance payments to physicians are made infrequently (annually), failing to reinforce positive performance (the Pavlovian effect); and
 - h. patient compliance is not influenced.
2. Patients are not involved in or rewarded by most pay-for-performance programs, thus negating a significant opportunity to control costs.
3. Physician and patient performance are not interactive or confirmatory of each other.
4. Most P4P programs offer performance opportunities for only a few diseases or for adopting health information technologies.
5. Most P4P programs are prone to fraud and abuse.
6. Most P4P programs are expensive to deploy and maintain.
7. No P4P program to date has been able to produce a demonstrated return on investment for the purchaser/payer.

The MedEncentive Program

MedEncentive is a unique web-based pay-for-performance program designed to achieve the goals of health care quality improvement and cost containment. The MedEncentive Program “bolts-on” to any health plan to improve the standard of care, encourage healthy behavior and control costs. The Program accomplishes these objectives through its patent-pending methods that interactively reward both physicians and patients for incorporating evidence-based medicine¹⁰ (EBM) and information therapy¹¹ (Ix). The

¹⁰ Evidence-based medicine is, by definition, treatments that produce the best clinical outcomes with the least amount risk to the patient, at the lowest possible cost according to scientific methods such as randomized studies and empirical observation.

MedEncentive Program is specifically designed to address the underlying causes of health care inflation (poor quality of care including variability of care, poor doctor-patient communications, and misaligned incentives) while resolving the issues that prevent the widespread adoption of pay-for-performance listed above.

In practice, the Program offers financial and psychological rewards to physicians and patients when they access MedEncentive’s websites to 1) declare compliance to or provide a reason for deviating from an EBM guideline¹², and 2) dispense and consume an information therapy prescription for each office visit. The Program’s rewards are further contingent upon the physician and patient agreeing to have their declarations confirmed by the other party, on-line. This method of “declare and confirm” acts as a built-in check and balance that creates what the Program’s developers refer to as “*doctor-patient interactive accountability*” that helps improve performance and encourage healthy behaviors.

This study involved the MedEncentive Program’s first pilot installation, and analyzes the Program’s capabilities to achieve the following internal objectives:

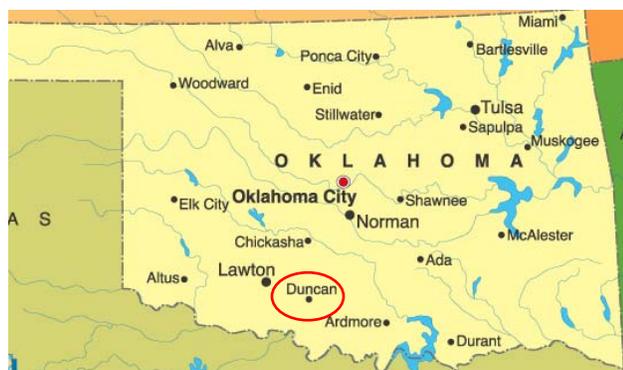
1. Operational functionality of its web-based applications;
2. Physician acceptance of, participation in and compliance to EBM and Ix;
3. Patient acceptance of, participation in and compliance to EBM and Ix;
4. Cost containment sufficient to create a return on investment in the Program for the purchaser/payer (City of Duncan).

These internal objectives are discussed in more detail later in this section.

The City of Duncan

Duncan is community with a population of approximately 22,000 located in south central Oklahoma. Oil and gas were discovered in 1921 and Halliburton is a principal employer. Duncan’s median household income is ranks as average in the region.

The City of Duncan is a self-insured employer that experienced three consecutive years of double-digit health care cost inflation. Similar to most municipalities, the City faced a budget crisis due to rising health care cost. To solve the crisis, the City considered reducing health benefits, but this resulted in employee dissatisfaction led by the local firefighters union. This prompted the City Manager¹³ to consider other options. The City’s benefits broker¹⁴ and third party administrator¹⁵ (TPA) suggested the yet untested MedEncentive Program. The City



¹¹ RAND Corporation. Consumer Use of Information When Making Treatment Decisions.

¹² HealthGate Data Corporation, Burlington, MA. supplied MedEncentive’s EBM guidelines and medical content for the trial

¹³ Clyde Shaw is City Manager of the City of Duncan

¹⁴ Steve Whitten, Whitten Insurance Agency, Duncan, Oklahoma was the City of Duncan’s insurance agent during the trial.

Council and the Employee Benefits Council elected to approve the City Manager's recommendation to implement the Program. Simultaneously, the City increased the plan's annual deductible and offered a new office visit benefit. The Program caused a change in the City's provider network (from PPO Oklahoma to Physicians Direct Network). Each of these variables was taken into consider to isolate the impact of the MedEncentive Program.

The City of Duncan Implementation of the MedEncentive Program and the Reward System

The MedEncentive Program was implemented as part of the mid-year benefits revision implemented by the City of Duncan on August 1, 2004. The Program enrollment consisted of 228 to 233 employees plus 325 to 375 dependents and retirees. Physicians and City employees received orientation thirty days prior to and after the implementation date. The orientation for physicians included a Program introduction to the local physician organization leaders and membership, luncheon presentations to local office staff, and in-office instruction. Physicians also received an instructional video and printed material. Employee orientation included a health fair to launch the Program, employee group instruction and City management instruction. Employees also received an instruction video and printed materials. The City's re-pricer (ClaimShop, Dallas) created tiered physician pricing capabilities, and the City's plan administrator (Kempton Group Administrators, Oklahoma City) created patient rebate capabilities. Routing logic and electronic interfaces were created to make the process fully automatic.

Local physicians were recruited to participate in the Program that involved negotiating terms with the local physician organization. The physician fee schedule was a key consideration. MedEncentive (on behalf of the City) and the Duncan Physician Organization (DPO) executed an agreement that called for a three-tiered fee schedule. The agreement specified that physicians would earn the highest rate of pay (approximately 20% higher than the area average) for office services in which they responded appropriately to e-mails sent by MedEncentive containing EBM treatment guidelines. Some diagnoses did not have EBM guidelines in which case the physician was asked to only prescribe Ix to the patient, thus earning the second tier pay rate (approximately 10% higher than the area average). If the physician chose not to participate or failed to file the claim or respond to the e-mail in a timely fashion, then he/she was paid at a third and lowest rate (approximately 20% less than the area average).

When a participating physician voluntarily answered an e-mail from the Program (which was triggered each time the physician filed an insurance claim for an office visit service rendered to an enrolled member/patient¹⁶), the physician gained



¹⁵ Kempton Group Administrators, Oklahoma City, Oklahoma was the City of Duncan's insurance agent during the trial.

¹⁶ As a point of clarification, a "plan member" or "member" for the purposes of this study is synonymous with a "patient." Members include employees and retirees plus their dependents covered by the health plan.

access to the Program’s website (Figure 1). In the website, the physician was asked to:

1. review EBM treatment guidelines (Figure 2) and answered the question, “Are you following this guideline in treatment of this patient.” A “no” response by the physician triggered a pop-up menu that listed reasons for deviating (Figure 3 – anti-cookbook medicine feature) from a given guideline; and
2. prescribe information therapy to each patient.

Participation also implied that the physician agreed to:

1. allow the patient to rate the physician’s performance against EBM treatments and, if applicable, express an opinion about the physician’s reason for deviating from a guideline;
2. allow MedEncentive to authenticate the physician’s responses to the Program’s website questions; and
3. review and respond accordingly to the patient’s responses to the Program’s Ix questionnaires that are made available to the physician as described below.

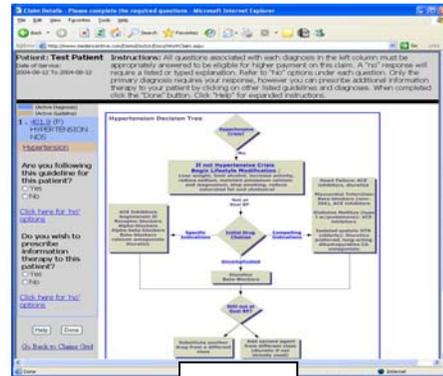


Figure 2

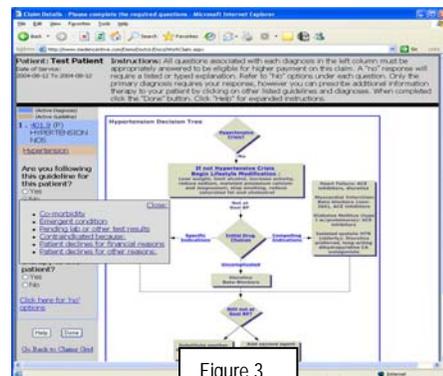


Figure 3

A City of Duncan patient earned rebates against his/her out-of-pocket medical costs when he/she responded to the physician’s Ix prescription letter (Figure 4), which was sent automatically via mail by MedEncentive. The Ix prescription directed the patient to the MedEncentive website to:



Figure 4

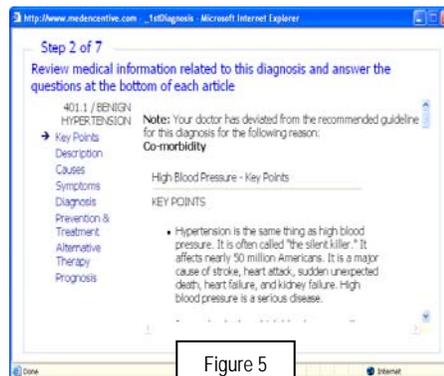


Figure 5

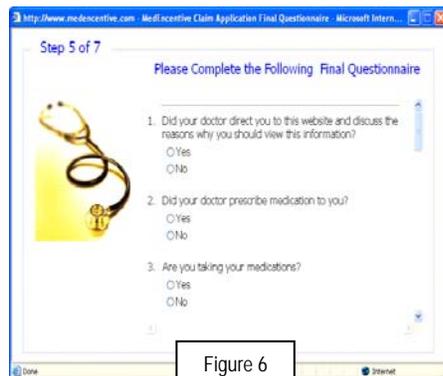


Figure 6

1. review medical content (Figure 5) including recommended (EBM) treatments for the patient’s condition;
2. demonstrate knowledge of this information by answering questionnaires (Figure 6);

3. declare compliance to the indicated treatment guidelines or wellness programs; and
4. rate his/her physician's performance against the recommended treatments or express an opinion about the physician's reason for deviation from a guideline.

The patient also agreed to allow MedEncentive to forward his/her responses to the physician (excluding the physician rating) and to authenticate the patient's website responses. As the patient answered the questions, he/she scored points. Once the point total reached an established threshold, a voucher (Figure 7) appeared which informed the patient that MedEncentive is authorizing the payer¹⁷ to send a rebate check to the patient.



Figure 7

Initially, the City offered a \$10 rebate per office visit up to \$100 per year for individual coverage and \$250 for family coverage. The employees asked the City to increase rebates to \$25, which was granted in the first 30 days of the implementation.

MedEncentive charged the City an access fee of \$2.50 per employee per month. This fee plus the physician bonus compensation and the patient rewards have been included in the cost analysis reported in this study.

The implementation described above was completed in approximately 60 days from the date the City Manager, the City Council and the Employee Benefit Council approved the Program.

Internal Program Objectives

Besides cost containment, MedEncentive focused on achieving the following internal objectives:

1. Program Operational Functionality – Prior to the implementation, the Program's web-based applications had never been tested in a live installation. Neither had the electronic interfaces with the City's plan administrators essential to processing claims and participant rewards. The first internal objective was to prove that the Program's technological processes functioned as designed and that the web-based applications and processes fully supported the rewards methods. "Operational functionality" included determining the web-based applications' capabilities to:
 - a. be fast and easy to use by physicians;
 - b. be easy for patients to understand and use;
 - c. electronically and automatically transfer data and transactions among claims administrators and the participants;
 - d. efficiently and effectively store data and report information; and
 - e. facilitate the reward methods, so there would be;

¹⁷ Kempton Group Administrators has been the City of Duncan's third party administrator (TPA) for several years including the Baseline and Intervention years.

2. Physician and Patient Participation in the Program – A key objective of the Duncan installation was to determine if and to what degree independent physicians and members of a municipality health plan would participate in the Program and adhere to the EBM and Ix components. Reasonable efforts were employed to orient participants and maintain the Program through the Intervention Year. Extraordinary efforts and participation enhancement tactics such as automated participant reminders were not introduced during the Intervention Year to prevent obscuring the results.
3. Cost Containment and Return on Investment – The City of Duncan’s objective for adopting the Program was to contain its health care inflation and realize a return on investment in the Program. Successful cost containment should slow inflation to rates less than historical or less than the national average, hoping for an outright reduction in health care expenditures¹⁸.

Measuring Participation Levels, Expenditures and Ix Efficacy

Physician and patient responses to MedEncentive’s web-based applications were used to measure participation levels and qualify the perceived benefit of the Program by patients. Levels of participation were measured as 1) the ratio of successful responses to total “opportunities” for both doctors and patients, 2) the percent of patients who participated based on the frequency of “opportunities” incurred per patient, 3) the percent of high cost individuals who participated, and 4) the participation among local physician who received orientation versus non-local physicians who received no orientation.

A claims database provided by Kempton Group Administrators was the basis for analyzing the financial impact of the Program. All claims analysis used the “date-incurred” data as opposed to “date-paid” data. Date-incurred is synonymous with date-of-service. Date-incurred data is the most accurate method for measuring the direct impact of any cost containment intervention. The study allowed six months after the end of the Intervention Year to gather date-incurred claims data to insure we captured essentially all costs.

Kempton supplied pharmacy and fixed cost data. Re-insurance costs that could be tied to the Intervention Year experience were available late in 2005.

Time frames for financial comparison included a Baseline year of “date-incurred” data from August 1, 2003 to July 31, 2004 and an Intervention year of “date incurred” data from August 1, 2004 to July 31, 2005.

Consideration of Health Plan Revisions that Influenced the City’s Costs

As previously mentioned, in addition to the MedEncentive Program, three other changes were made to the City’s health plan. These changes introduced variables that would impact cost. The specifics of these changes along with the MedEncentive Program are explained below:

¹⁸ The terms “costs” and “expenditures” are synonymous and will be used interchangeably throughout this study.

1. An Increase in Annual Deductibles – The City increased the annual deductible from \$250 to \$600 per employee. The City also increased the pharmacy deductible 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 (employees, dependents and retirees). The financial impact of this change decreased the City’s “claims cost” and increased the members’ “out-of-pocket costs”.
2. Office Visit Coverage was Added – The City improved the health plan benefit by including an office visit benefit that paid for doctor office visits and consultations, less a \$25 per visit co-payment. The financial impact of this change increased the City’s claims paid and decreased members’ out-of-pocket costs.
3. A Change in the Provider Network and Provider Reimbursement Rates – In order to implement the MedEncentive Program, the City had to change its provider network from PPO Oklahoma to Physician Direct. This change may have 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 potentially increased the amount of non-network claims, thus decreasing the City’s claims costs and increasing the members’ out-of-pocket costs. This was counterbalanced by Physician Direct’s higher reimbursement rates for providers (hospitals, doctors, etc.) on a per-unit-of-service basis in comparison to PPO Oklahoma.
4. The MedEncentive Program – By implementing the MedEncentive Program, the City 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 co-pay of \$25 per visit, up to a limit of \$100 per member per year and \$250 per family per year. The financial impact of this change increased the City’s “claims paid” and decreased the members’ “out-of-pocket” costs. Third, the City paid MedEncentive a fee of \$2.50 per-employee-per-month to access the Program.

In effect, these benefit changes either increased costs or shifted health care costs between the plan member and the City. In order to properly measure the impact of the MedEncentive Program these variables had to be recognized and isolated. The Methodology, Analysis, and Findings sections develop the analysis of variables.

Units-of-Service versus Price-per-Unit-of-Service

The overarching premise behind pay-for-performance (P4P) programs has to do with compensating (financially rewarding) providers for the value of their services as opposed to the volume of services. While there is not a consensus on how to measure value, pay-for-performance programs generally compensate physicians for practicing better quality care and for improving patient clinical outcomes. More specifically, P4P programs encourage providers to practice evidence-based medicine, to implement electronic health records, and to render preventative care, all as measures of quality. If we define health care quality as providing care that studies and empirical methods have determined to be

the most effective, efficient and safest means of diagnosing, treating and preventing diseases and injuries, then the P4P programs conclude that a natural by-product of quality is lower costs. Conversely, the P4P movement concludes that poor quality health care is defined as under-treatment, over-treatment and mistreatments of patients. Based on this definition, studies have shown the correlation of quality to costs^{19 20}

Health care costs are a product of price-per-unit-of-service multiplied by the number of units sold or consumed. P4P suggests that there will be fewer units-of-service sold and consumed (less utilization) if the quality of care is made better (more efficient and effective) by paying providers a higher price-per-unit-of-service to render better care. The MedEncentive Program takes this concept one step further by also rewarding patients for compliance to recommended care and adhering to healthy behaviors.

The City of Duncan's implementation of the MedEncentive Program tested the concept of a higher unit price achieving better quality that, in turn, reduces utilization. Five factors that increased the "per unit" cost had to be overcome by a decrease in utilization sufficient enough to achieve a decrease in overall health care cost. These factors were:

1. A higher rate of reimbursement to physicians for successful participation in the MedEncentive Program.
2. Patient rebate rewards for successful participation in the MedEncentive Program.
3. An increase in price-per-unit-of-service from the Baseline Year as a result of changing the provider networks from PPO Oklahoma to Physician Direct.
4. An increase in hospital fees.
5. The fees charged to the City by MedEncentive for use of its Program.

All of these factors were included in the financial results of this analysis.

Participation and Program Operations Background

The MedEncentive Program is predicated on the existence of a direct correlation between physician and patient participation levels and cost containment. By design, the higher the level of voluntary participation by physicians and patients (and the more timely the response by the participants), the more physicians and patients ***declare and confirm each other's compliance*** to evidence-based medicine and information therapy, the more effective the Program becomes in terms of cost containment. "Opportunities" in the MedEncentive Program is synonymous to office visits and to information therapy (Ix) prescriptions that are 1) offered to the physician for generation to the patient and 2) offered to the patient by the physician or by the system for consumption through the Program's web-based applications. Each "opportunity" had pre-determined time limits for participants to successfully complete the web-based questionnaires.

In the Program's ideal application, patients received their Ix prescription from their physician. The purchaser/payer can establish this as a policy. As a result and depending on the amount of the financial reward, patients begin to expect, request and even demand their Ix prescriptions. This can increase physician participation, doctor-patient

¹⁹ Wennberg, JE. The Care of Patients with Severe Chronic Illness

²⁰ Remus, D. Exploring the Nexus of Quality and Cost

interaction, and Program efficacy. However, in start-up installations it is recommended that physicians be given a grace period to acclimate to the Program. During the grace period, patients can receive what is referred to as “system-generated Ix” prescriptions (with the appropriate disclosure) to prevent penalizing patients for physician non-participation. The City of Duncan chose to allow physicians a grace period and directed MedEncentive to generate Ix prescriptions to make sure members would not miss-out on “opportunities.”²¹

Efforts to stimulate participation consisted of introductory employee and physician orientation sessions (which took place in July, August and September 2004), on-site set-up of some physician offices, five on-site updates with City management, and an update and re-education session with physicians at their county medical society meeting halfway through the Intervention Year. Special measures to stimulate participation such as automatic telephone reminders (telephony) to patients, automatic fax reminders to physicians, certified reminder letters to physicians, prescription slips (for physicians to give to patients), and additional financial rewards or consequences were considered. It was determined that introducing these measures during the Intervention Year would add variables that would cloud the study’s results. Therefore, the implementation of these Program improvements was postponed until after the Intervention Year.

Telephone support was provided throughout the Intervention Year. As expected, call volume was highest during the first few months after installation. The amount of support needed after the first few months can be characterized as minimal. In other words, the Program was relatively self-sustaining.

The MedEncentive Program automatically tracked and reported participation levels. The computer system compiled volumes of physician and system-generated Ix prescriptions and calculated ratios of these volumes against total Ix prescription opportunities. The Program also tracked patient rewards and responses against total Ix prescription opportunities.

Participant Surveys

An informal telephone survey was conducted with plan members in January 2005. Members’ attitude toward the program was generally positive. Participation varied on the basis of age (older people participated more), type of condition, (chronically ill members participated more the healthy members), and acuity of condition (severely ill members participated more than mildly ill members). The following question was added to the patient website halfway through the Intervention year: *“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 results of the responses to this question and comments from Program participants are included in the Findings section.

²¹ It should be noted that the other two test employers adopted the same grace period policy because these employers’ medical communities were not well oriented to the Program. It should also be noted that patient participation levels were even higher in these two employers than with the City of Duncan which may explain these employers’ high levels of cost containment.

Purpose of the Study

... finding the MedEncentive factor

The purpose of this study is fourfold:

1. Report on the degree of voluntary participation in the MedEncentive pay-for-performance program by independent physicians and city government employees, retirees, and dependents during a year long trial with the City of Duncan's health plan.
2. Report on the City employees' perception of the program as a useful health management tool.
3. Report on the variances in health care expenditures experienced by the City of Duncan's global health expenditures during a year long trial after adopting the MedEncentive Program in comparison to the previous year's expenditures.
4. Determine if and to what degree expenditures were contained in the City of Duncan's health plan as a result of physician and patient participation in the MedEncentive Program.

Design

...a retrospective analysis



Based on previous studies, the quality improving and cost containing capabilities of evidence-based medicine (EBM) and information therapy (Ix) have been established in isolation. The quality improving and cost containing capabilities of the pay-for-performance (P4P) concept has also been demonstrated in isolation or otherwise. These factors were considered “givens” in the design of this study.

When we refer to “studies in isolation” we mean that these studies were generally constrained to only a few diagnoses (one to three diagnoses) managed by physicians employed by a single entity or closely associated in some manner consisting of common interests, motivations and/or mandates. However, the real world consists of independent providers who tend to resist mandates and who manage thousands of diagnoses. Therefore, one of the purposes of this trial was to create an environment as close to real-world conditions as possible.

In order to approximate real-world conditions, the trial’s design characteristics included the following:

1. Independent physicians who were free to voluntarily participate in the Program on a patient-by-patient and occurrence-of-care basis.
2. 117 evidence-based medicine treatment guidelines involving hundreds of diseases, injuries and states of wellness, plus medical content that could be prescribed to patients that covered essentially all diagnoses.
3. Independent physicians who were free to use their clinical judgment to comply with or deviate from EBM treatment guidelines provided physicians voluntarily provided reasons for deviating from a guideline that would be subsequently reviewed by their patients.
4. Independent physicians who were free to voluntarily prescribe information therapy to their patients on a patient-by-patient and occurrence of care basis.
5. Patients from a population of city government employees, dependents and retirees, which represented a demographic spectrum that is considered challenging from the perspective of health and healthcare.

6. Patients who were free to voluntarily participate in the Program on an occurrence-of-care basis.
7. Financial and other types of rewards for both physicians and patients designed to encourage participation and compliance to EBM and Ix.
8. A web-based application that was designed to:
 - a. be fast and easy to use for physicians to encourage participation;
 - b. be easy to use and accessible to patients to encourage participation;
 - c. be easily administered and completely automated; and
 - d. gather pertinent information and statistics for measurement and reporting purposes.
9. Independent third parties were solicited to supply cost data and to review methodologies and results.

The study is based on a retrospective analysis of:

1. Physician and patient participation levels as recorded in MedEncentive's web-based software applications designed to facilitate the Program's reward methods.
2. All health claims processed for the City of Duncan by its third party administrator (TPA), Kempton Group Administrators, for medical services incurred during a Baseline Year²² (immediately preceding the introduction of the MedEncentive Program) in comparison to the Intervention Year²³ with the Program implemented.
3. All health care fixed costs incurred by the City as compiled by Kempton Group Administrators.
4. Responses by patients to a specific question embedded in the Program designed to measure patient health care self-management.

Variables that impacted cost were distilled and/or considered to isolate the impact of the MedEncentive Program. Subsequently, hypotheses formulated to measure the efficacy of the MedEncentive Program were tested against the distilled data. Finally, the methodology and results were reviewed and validated by the City of Duncan's management, Kempton, the Duncan physician leadership, and others.

²² The "Baseline Year" started August 1, 2003 and ended July 31, 2004

²³ The "Intervention Year" started August 1, 2004 and ended July 31, 2005

Methodology

...systematic and objective processing of the data and hypotheses

This study systematically and objectively correlated physician and patient participation levels in the MedEncentive Program to health plan costs. The following steps accomplished this:

1. Formulate hypotheses intended to measure the efficacy of the MedEncentive Program based on the Program's design and theoretical results. These hypotheses call for gathering and analyzing physician and patient participation level data, the City's employment²⁴ between the Baseline and Intervention years, and the City's health plan expenditure data between the Baseline and Intervention years.
2. Gather and analyze physician and patient participation level data compiled by the MedEncentive web-based application.
3. Gather the City's health plan expenditure raw data for the Baseline and Intervention years compiled by the City's third party administrator, Kempton Group Administrators.
4. Sort and distill the expenditure raw data to remove or explain the other significant cost variables and factors.
5. Test the hypotheses against the distilled data and report findings.
6. Draw and report conclusions.
7. Validate methodologies, hypotheses, findings and conclusions with the City's management, Kempton, and Duncan physician leadership.
8. Critique study and compose summary.

What follows is a description of the hypotheses and the analytical processes used in this study.

Predicting Results as a Means of Measuring the MedEncentive Impact

The following hypotheses were developed from the MedEncentive Program's design features that are intended to produce specific theoretical outcomes. These hypotheses are subsequently tested to measure the Program's efficacy:

1. Physician and Patient Participation in the Program would be Sufficient to Produce Cost Containment and a Return on Investment in the First Year of Program Implementation – The conventional wisdom about P4P programs tends to be clinical outcome-driven. It suggests that clinical outcomes must improve before costs can be achieved. Since it takes time and often more aggressive near-term EBM therapy to improve clinical outcomes for many of the most costly chronic conditions, most P4P proponents expect an increase in near-term costs. This logic expects cost containment to follow in two to five years after implementing P4P when chronic patients begin to respond to

²⁴ Refer to Appendix A for a description of the adjustment to normalize the number of employees between the Baseline and Intervention years.

EBM. MedEncentive is both a process-driven and outcomes-driven program. As such, the MedEncentive Program suggests that real-time rewards for compliance to evidence-based medicine plus better patient understanding and self-management through information therapy will produce near-term cost containment in addition to the longer-term cost containment related to improved clinical outcomes. The developers of the MedEncentive Program support this premise on the basis of the Program's ability to alleviate unnecessary care, abate defensive medicine, and engage patients in self-management, all of which occurs almost immediately as physicians and patients participate in the Program. This premise is further supported by studies that have determined that nearly 30% of care to the chronically ill is unnecessary²⁵ and patients armed with timely health information will tend to opt for the most conservative, least expensive care²⁶.

If one accepts the fact that EBM and Ix have been proven to produce improved care and healthier behavior which leads to lower costs in controlled environments, then MedEncentive's challenge in this trial was to demonstrate that independent physicians and a representative cross section of patients with a full array of medical conditions would be motivated by MedEncentive's system of rewards and easy to use web-based application to incorporate EBM and Ix at sufficient levels to achieve cost containment and a return on investment (ROI) to the City. Therefore, physician and patient participation levels were predicted to be sufficient to produce cost containment (as a surrogate of improved care and health) and an ROI in the City's health plan in the first year of the Program's implementation.

2. The Program's Design Should Theoretically Cause a Redistribution of Expenditures among Cost Categories in Favor of Physicians and Administration – The MedEncentive Program is designed to control costs when the purchaser invests in the Program to financially reward physicians and patients for a higher standard of care and healthier behavior. Based on these designed features, a redistribution of health care expenditures among medical providers and services in favor of physicians and administration was predicted.
3. The Program's Design Should Theoretically Cause a Reduction in Defensive Medicine – The MedEncentive Program is designed to alleviate the need for physicians to practice defensive medicine. In effect, the physician achieves a degree of medical malpractice risk management by practicing the MedEncentive Program. It follows that some measure of defensive medicine be taken to test the Program's impact. The consensus of opinion among physicians was that radiology would be a good surrogate for defensive medicine. In other words, there should be lower radiology costs in the Intervention Year than the Baseline Year relative to other medical service costs if The Program abated defensive medicine.
4. If the Program Produces the Desired Results then Patients Should Theoretically Perceive Information Therapy as Beneficial – The RAND Corp study that showed the effectiveness of dispensing health information to patients suggest that we test a prediction that patient would perceive a health benefit from the Program's

²⁵ Wennberg, JE. The Care of Patients with Severe Chronic Illness.

²⁶ RAND Corporation. Consumer Use of Information When Making Treatment Decisions.

information therapy. Therefore, during the Intervention Year a question was added to MedEncentive's patient website that asked the following: *"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)?"* All patients who successfully completed their information therapy (after the introduction of this question) answered this question.

Analytical Objectives

The systematic and objective analysis of the data first involved identifying analytical objectives. These objectives included the following:

1. Gather the entire City's health plan expenditures for the Baseline and Intervention years, including fixed costs and claims costs from the City's plan administrator (Kempton).
2. With guidance from Kempton, eliminate claims that should be excluded from the analysis such as duplicate claims and services not covered by the major medical health plan such as dental and optometry services.
3. Compile the City's total health plan expenditures for the Baseline and Intervention years based on the date services were incurred as opposed to the date claims were paid.
4. Eliminate or account for the change in total employment between the Baseline and Intervention years by adjusting the City's total health plan expenditures to annual expenditures per employee.
5. Eliminate, account or acknowledge other contributing variables to isolate the impact of the MedEncentive Program. These variables included; a) the change in unit price of medical services, b) the increase in the health plan's annual deductible, c) the addition of the office visit coverage benefit, d) acuity levels and catastrophic cases, and e) the change in the provider network.
6. Determine the impact of the MedEncentive Program on costs by developing and testing specific hypotheses or predictions based on the Program's design to affect specific theoretical outcomes. Sort and analyze the data accordingly.
7. Determine the impact of the MedEncentive Program on the perceived benefit by patient participants by compiling and reporting survey results.
8. Calculate a return on investment for the City of Duncan.
9. Confirm the methodology, findings and conclusions with the supplier of the data (Kempton Group Administrators) and the participants (City of Duncan management, local physicians, and plan members).

A detailed description of how the data was processed can be found in Appendix A

Analysis

...addressing the variables to isolate MedEncentive's impact

There were a number of variables that impacted the costs in both the Baseline and Intervention years. To isolate the impact of the MedEncentive Program on global costs, the significant cost-related variables were considered and a systematic process of distilling, acknowledging and accounting for these variables was performed. The analysis of the results of this process is described in this section.

Analysis of the Variables

The following table lists the cost-related variables that were analyzed for this study. From left to right, the table presents the expected cost effect (result) of each variable and then indicates whether the expected result was confirmed. The “Shifted Cost To:” column indicates whether the variable caused expenditures to be shifted to or incurred by and the employer or the plan member or both or neither. The right-hand column labeled “Distilled or Resolved By:” gives a brief description of the method by which each variable was distilled or resolved from the MedEncentive variable.

Table 2 – Variables Expected, Actual Results, Impact on Analysis and Method of Resolution

Variable	Expected Result	Result Was:	Shifted Cost To:	Distilled or Resolved By:
Deductible Benefit Change	Increase in Deductible Amount	Confirmed	Plan Member	Net Charges
Office Visit Benefit Change	Decrease in Out-of-Pocket Costs	Confirmed	Employer	Net Charges
Provider Network Change	Increase in Ineligible Amount	Not Confirmed	Plan Member	Insignificance
Hospital Unit Price-Fees	Increase in Hospital Fees	Confirmed	Both	Inclusion ²⁷
Case Mix Acuity	Decrease in severe case costs	Confirmed	Neither	Multiple Means ²⁸
Physician Rewards	Increase in Physician Fees	Confirmed	Employer	Inclusion ²⁴
Member Rewards	Decrease in Out-of-Pocket Costs	Confirmed	Employer	Inclusion ²⁴
MedEncentive Fees	Increase in Administrative Costs	Confirmed	Employer	Inclusion ²⁴

What follows is an explanation of the processes used to distill or account for each cost variable in order to isolate the impact of the MedEncentive Program.

1. **Annual Deductibles** - In the Findings section below, Tables 16 and 20 indicate an adjusted net increase in annual deductible costs to plan members of \$72,830.37.

²⁷ Inclusion means the variable was included in the difference between the Baseline and Intervention years and had to be off-set by a reduction in utilization to achieve a decrease in overall costs.

²⁸ Multiple means were used to distill case mix acuity to include removing the catastrophic cases from both years and recalculating the change in overall costs, comparing the average charge per hospital service and per case basis, and analyzing the net change in costs among diagnosis categories.

This was expected since the City increased the health plan’s annual deductible from \$200 in the Baseline Year to \$600 in the Intervention Year, thus shifting costs from the employer to the plan member. By employing “Net Charges”²⁹ (which is the sum of the City and members’ expenditures) in a global cost analysis, the cost shifting between the parties is arithmetically resolved.

It is known that an increase in annual deductibles can also affect plan members’ behavior and dampen consumption in the first year. To what degree this impacted the City’s global cost reduction was not determined in this study. However, the other two test employers did not change their annual deductibles and, as it has been previously reported, these employers also experienced overall annual cost reductions.

2. **Office Benefit Change** – Since the City added an office visit benefit in the Intervention Year, a shift in costs from the health plan member to the employer was intended and expected. To confirm this expected result required examining the “Doctor”³⁰ activity for office visit services. By calculating the difference in Deductibles and Out-of-Pocket expenditures for office visits between the studied years, less the patient reward rebates, a reduction in cost of \$15,172 was realized by the health plan members. The following table presents this calculation:

Table 3 – Office Benefit Cost Shifting Between Baseline and Intervention Years

Cost Shifting Impact of the Office Visit Benefit	
Increase in Out-of-Pocket Expenditures for Office Visits	18,847
Decrease in Deductibles for Office Visits	-24,184
Sub-total	-5,337
Rebate Rewards	-9,835
Total Cost Reduction to Plan Members	-\$15,172

In this case, a cost reduction to plan members implies that the cost was shifted to the City. Therefore, the City incurred an increase in cost of \$15,172 as a result of the office visit benefit and the MedEncentive patient rebate rewards. This office visit benefit and rebate rewards variables are neutralized by, again, using Net Charges as the basis of the analysis.

3. **Change in Provider Network** – After examining the provider distribution between the Baseline and Intervention years, it was concluded that the change in provider networks had little or no meaningful impact on the City’s or the plan members’ costs due to in-network or out-of-network activity. In other words, the plan members and the City did not expend any appreciable amount due to the number of providers that were in-network versus out-of-network as a result of the change in provider networks since the providers in the two networks were essentially the

²⁹ Refer to Appendix A for a description of “Net Charges.”

³⁰ Refer to Appendix A for a description of “Doctor” charges.

same. However, the change in provider networks did have an effect on hospital unit pricing, which is described below.

4. **Reimbursable Hospital Unit Pricing** – Kempton Group Administrators confirmed that the price per unit of reimbursable “Hospital”³¹ services increased from the Baseline Year to the Intervention Year due primarily to increases in hospital pricing and the change in provider networks. (Note: For this discussion, reimbursable fees or prices are synonymous with Net Charges.)

The plan members used multiple hospitals that had varying prices. However, the principal hospital used by most plan members was Duncan Regional Hospital. To determine the amount hospital prices may have increased, a sampling of prices from the Kempton data was gathered for Duncan Regional in both years. The following table is presents the results of this sampling.

Table 4 – Change in Hospital Pricing

Sampling of Duncan Regional Hospital Pricing							
Year	Diagnosis	Code	Date Incurred	Gross Price	Adjustment	Net Charge	% Increase
2003-'04	724.5	0610	12/04/2003	1,700.00	102.00	1,598.00	
2004-'05	724.5	0610	05/10/2005	1,870.00	112.20	1,757.80	10.00%
2003-'04	786.2	0250	02/11/2004	199.00	11.94	187.06	
2004-'05	786.2	0250	12/15/2004	215.00	12.90	202.10	8.04%
2003-'04	486	0250	03/29/2004	199.00	11.94	187.06	
2004-'05	486	0250	01/27/2005	215.00	12.90	202.10	8.04%
2003-'04	V76.12	0403	11/19/2003	134.00	8.04	125.96	
2004-'05	V76.12	0403	12/13/2004	145.00	8.70	136.30	8.21%
2003-'04	490	0250	09/25/2003	312.00	18.72	293.28	
2004-'05	490	0250	01/08/2005	342.58	20.55	322.03	9.80%
2003-'04	496	0250	06/03/2004	199.00	11.94	187.06	
2004-'05	496	0250	01/05/2005	205.50	12.33	193.17	3.27%
2003-'04	574.20	0250	10/24/2003	367.00	22.02	344.98	
2004-'05	574.20	0250	05/16/2005	396.50	23.79	372.71	8.04%
Baseline Total				\$3,110.00			
Intervention Total				\$3,389.58			8.99%

Based upon this sampling, it can be concluded that the price per unit of reimbursable Hospital services increased approximately 9% from the Baseline Year to the Intervention Year. Therefore, to achieve the overall cost reductions reported in the Results section, below, total utilization and acuity of cases had to decrease sufficiently to offset the increases in reimbursable Hospital unit pricing reported here.

5. **Case Mix Acuity** – Case mix acuity is the severity of disease and injury in a population of people. Case mix acuity raises a number of questions such as:

³¹ Refer to Appendix A for a description of “Hospital” charges.

“Since total costs went down from the Baseline to the Intervention Year, where there fewer catastrophic cases that only occurred in the Baseline Year?” and “Did a catastrophic injury (which MedEncensive could not be expected to prevent or control) occur in either year?” and “Did plan members that incurred high costs in the Baseline Year take Ix and have lower costs in the Intervention Year?” and “Was the reduction in costs simply due to the happenstance?” The following analysis was performed on the data to help resolve this variable.

A common method to distill the affects of acuity due to happenstance is to remove the catastrophic cases from the comparative data sets. Using the City’s reinsurance threshold for annual specific coverage of \$30,000 per patient to define a catastrophic case, the costs associated with these patients were removed from both the Baseline and Intervention years. As reported in Tables 16 and 17 in the Findings section, below, the percent cost reduction from the Baseline to the Intervention years decreased 11.53% inclusive of all costs and all cases, and decreased 9.18% excluding catastrophic cases.

Another means to measure acuity is to examine hospital charge activity. A review of Hospital charges reveals the information presented in the following table.

Table 5 - Hospital Net Charges per Service

Year	Net Charges	# of Hospital Services	Average Charge/Service
2003-'04 ³²	\$1,187,521.72	730	\$1,626.33
2004-'05	\$911,641.04	882	\$1,033.61
\$ Difference	-\$275,880.68	152	-\$592.72
% Difference	-23.23%	20.79%	-36.45%

As the Table 5 indicates, there were more Net Charges in the Baseline Year than the Intervention Year in spite of the fact that there were more units of Hospital services incurred in the Intervention Year. This could imply that the acuity level was higher in the Baseline Year or the application of more units of Hospital services produced a lower level of acuity in the Intervention Year.

To further examine case mix acuity, total claims costs (Hospital, Doctor and Other³³ 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 eighteen diagnosis categories was computed and then the categories were ranked according to this difference. The following table presents this information.

³² The 2003-04 totals are adjusted for the difference in the number of employees between the Baseline and Intervention years. The computation of the employment adjustment factor can be founded in Appendix A.

³³ Refer to Appendix A for a description of “Other” charges.

Table 6 – Total Claims Costs Ranked by Difference in Net Charges by Diagnoses Groups

ICD9 Range	Description	Baseline Year 2003-'04		Intervention Year 2004-'05		Difference	
		# of Services	Net Charges	# of Services	Net Charges	# 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

As Table 6 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 room visits all decreased³⁴ from the Baseline Year to the Intervention Year. Hospital length of stays is another acuity measure that was not quantified. (Quantifying these acuity measures will be the subject of future studies.) The impact of member turnover was also considered and was judged as not significant by the City's management.

³⁴ Decreases of these measures of acuity were determined by actual count.

6. **Physician Pricing and Rewards** – A primary intent of the MedEncentive Program is to influence physician and patient decision-making during office visits. This intent is based on the premise that significant portion of the decisions that affect health quality and cost are initiated during office visits. Therefore, the MedEncentive Program focuses on applying the financial and psychological rewards to office visits. As a result of this intended design feature, we expected to see Doctor expenditures to increase relative to Hospital expenditures and perhaps relative to the other categories of cost. Even more specific, we expect to see the price per unit of office visit to increase relative to other physician services such as surgeries, laboratory tests and radiology. To test these hypotheses, the reimbursable office service fees and the overall Doctor service fees had to be calculated and compared between the Baseline and Intervention years.

During the Intervention Year, the MedEncentive Program directed the City’s plan administrator to pay physicians approximately 10% to 20% more than the Baseline Year’s reimbursable fees for office visits, according to the Program’s performance criteria spelled-out in a provider network agreement executed with local physicians and the provider network. This agreement also stipulated that a physician would be paid approximately 20% less than the Baseline Year’s office visit reimbursable fees each time the physician failed to participate in the Program. With this variability in pricing, an average of reimbursable office visit fees was used to determine the percent increase or decrease in Doctor overall fees and office visit fees between the Baseline and Intervention years. The following tables present the average reimbursable fees for Doctor overall services and for reimbursable office visits. Table 7 presents Doctor overall reimbursable services. (Note that 2003-04 Net Charges and units of service have been adjusted for the change in employment to improve the accuracy of the analysis.) Table 8 presents the overall average change for all office visits. To take into account changes in the mix of office visit services between the Baseline and Intervention years, Table 9 presents the reimbursable pricing difference for the intermediate level of office visit services for an established patient (99213)³⁵.

Table 7 – Change in Average Overall Doctor Reimbursable Service Pricing

Year	Net Charges	# of Doctor Services	Avg Charge/Visit
2003-'04 ³⁶	\$455,116.01	4,296	\$105.94
2004-'05	\$477,860.65	4,416	\$108.21
\$ Difference	\$22,744.64	120	\$2.27
% Difference	5.00%	2.80%	2.14%

Table 8 – Change in Average Office Visit Reimbursable Pricing

Year	Net Charges	Number of Office Visits	Average Charge/Visit
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³⁵ The intermediate level of office visit service for a patient established with a physician is the most prevalent office visit service. The Common Procedural Terminology (CPT) code for this service is 99213 which was used to sort the data sets for this service.

³⁶ 2003-04 Net Charges and the Number of Office visits are adjusted for changes in total employment between the Baseline and Intervention years.

2003-'04	\$100,264.83	1,475	\$67.98
2004-'05	\$107,013.08	1,397	\$76.60
\$ Difference	\$6,748.25	(78)	\$8.63
% Difference	6.73%	-5.29%	12.69%

Table 9 – Change in Average Intermediate Office Visit (99213) Reimbursable Pricing

Year	Net Charges	Number of Office Visits	Average Charge/Visit
2003-'04	\$42,367.51	775	\$54.67
2004-'05	\$45,922.49	750	\$61.23
\$ Difference	\$3,554.98	(25)	\$6.56
% Difference	8.39%	-3.23%	12.00%

As Tables 8 and 9 indicate, the reimbursable price per unit of office visit service increased approximately 12% from the Baseline Year to the Intervention Year, while Doctor overall services inclusive of office visit services (presented in Table 7) increased only 2.14 %. This finding confirms the expectation that the Program would cause office visit to increase relative to other Doctor services. It is worth noting that the number of office visits decreased while the number of Doctor overall services (and Hospital service) increased. The fact that the pricing and unit volumes are moving in opposite directions for overall Doctor and Hospital services versus office visits may be due to a number of reason including an improvement in the standard of care. In other words, the higher standard of care practiced in the office setting combined with more knowledgeable patients and healthier patient behavior may be translating into lower overall costs.

It is also noted that the added office visit coverage benefit plus the Program’s rebate rewards did not cause an increase in office visit volume as one might expect. This too could be due to a number of reasons to include a higher standard of care, more knowledgeable patients, and healthier patient behavior.

Finally, it is noted that reducing the City’s overall health care costs implies that total utilization and/or case mix acuity had to have decreased sufficiently to offset the increases in Doctor unit pricing reported here and Hospital unit pricing reported above, plus off-set the administrative cost of the Program.

- 7. Patient Rewards** – According to Kempton Group Administrators, a total of \$9,835 was paid by the City in patient rebate rewards. This amount can be found in Tables 18 and 19 in the Findings section, below, categorized as Administration under the Out-of-Pocket (OOP) column. Since patient rebate rewards merely shifts costs between the City and plan members, there is no direct impact to global costs, which again is synonymous to Net Charges. Nevertheless, this is an important statistic to track and analyze because it measures participation and implies patient compliance. It is also important from the standpoint of determining how large does a rebate reward need to be and what criteria must be met by the patient to achieve a therapeutic benefit, healthier behavior, better clinic

outcomes, and lower costs. These types of questions will be left for future studies and as the Program becomes more sophisticated.

8. MedEncentive Fees - The City paid \$2.50 per-employee-per-month to MedEncentive for access to the Program. There were 2,736 employee-months during the Intervention Year. Therefore, MedEncentive's fees were \$6,840, which represented an additional cost to the City. As previously mentioned, to achieve the overall cost reductions, total utilization and case mix acuity had to decrease sufficiently to offset the investment in the MedEncentive Program plus offset the increase in Hospital and Doctor unit pricing.

Analysis of Participation

An important part of this study was analyzing physician and patient participation. The MedEncentive system supplied much of the participation data. This data was augmented and reconciled with the payment of rebates to patients supplied by Kempton Group Administrators.

Since the participation in the Program is voluntary for physicians and patients, one important measure of participation is the number of completed information therapy prescriptions in relationship to the total number of prescription "opportunities" generated as a result of on applicable doctor's office visit. The level of physician participation was measured as a ratio according to the following formula:

$$\text{Physician Participation \%} = \text{Successful Physician Responses} \div \text{Total Prescription Opportunities}^{37}$$

In addition to the overall participation ratio, the level of physician participation among physicians who received Program orientation versus the total physician population was examined.

Patient participation measurement is slightly more complicated since the Program is designed to generate information therapy prescriptions in two ways: 1) a combination of physician and system-generated prescriptions, or 2) physicians generated prescriptions only. In the combination configuration, the MedEncentive computer system automatically generates Ix prescriptions from claims data if the physician fails to do so within the allotted time limits. The benefit of this method is that more patients receive information therapy. Based on the cost savings results of the other test employers (CompONE and City of Durant) who had low physician participation but high patient participation as a result of system-generated Ix, there is strong evidence to suggest that providing patients Ix, no matter how it is generated, is of significant benefit.

In the other Program configuration, patients can only receive their information therapy prescription from their physician. Since the Program is voluntary to the physician, patients can be deprived of a prescription if their physician fails to participate for whatever reason. There is some logic for taking this approach. Since patients are placed

³⁷ Prescription Opportunities for physicians are synonymous to applicable office visits.

in a position to ask and perhaps demand their Ix prescriptions, a natural and potentially beneficial tension is created between the physician and the patient. Furthermore, some may suggest that the only proper party to prescribe information is the physician, especially if the patient's condition involves a sensitive diagnosis such as cancer or a mental illness.

The City of Duncan opted to have the MedEncentive Program configured to produce both physician and system-generated Ix prescriptions. Therefore, a "physician-generated" or "system-generated" information therapy prescription was sent to a patient for each applicable office visit, unless the physician directed that no Ix should be sent. As a result, the level of patient participation was measured as a ratio according to the following formula:

$$\text{Patient Participation \%} = \text{Successful Patient Responses} \div \text{Total Prescription Opportunities}^{38}$$

We were interested in determining if patient participation levels were influenced by physician versus system-generated Ix, so we performed the following calculations:

$$\text{Patient Participation \% from Physician-generated Ix} = \frac{\text{Successful Patient Responses}}{\text{Total Physician-generated Ix Prescription Opportunities}}$$

and:

$$\text{Patient Participation \% from System-generated Ix} = \frac{\text{Successful Patient Responses}}{\text{Total System-generated Ix Prescription Opportunities}}$$

We know that once a person is knowledgeable about a subject, then that knowledge is retained for some period of time. With this in mind, logic leads one to surmise that one dose of information therapy would have some residual effect. Therefore, we wanted to know how many patients took at least one Ix prescription against the total number of patients who received at least one Ix prescription. This ratio is expressed in the following equation:

$$\text{\% of Patients Who Responded to at Least One Ix Prescription} = \frac{\text{Number of Patients Who Responded to at Least One Ix Prescription}}{\text{Number of Patients Who Received at Least One Ix Prescription}}$$

Informal surveys of patient participants during the trial led us to believe that participation may be influenced by the patient's condition and age. Our surveys indicated that older chronic patients and patients with severe conditions seemed to be participating at higher levels than younger healthy patients. Instead of studying the participant demographics (which will be the subject of future studies), we chose to measure patient participation levels on the basis of the number of opportunities per patient. Using the previous equation, we computed the number of patients who took at least one Ix prescription and

³⁸ Prescription Opportunities for patients where the Program is configured to both physician and system-generated Ix are synonymous to applicable office visits.

who had 3 or more office visits (opportunities) during the Intervention Year. We then compared this ratio to the ratio for all patients and the ratio for patients incurred less than three office visits.

This thought process led us to consider whether the Program was particularly beneficial to patients with the highest incurred costs, which prompted the following question: *“How many patients who incurred the highest health care costs in either the Baseline or Intervention years responded to at least one information therapy prescription as a percentage of the number of patients in this high cost subset who had an opportunity to respond to at least one prescription during the Intervention Year?”*

The answer to this question plus the results of this study including the outcomes of the predictions made to measure MedEncentive Program’s efficacy are presented in the Findings section, which follows.

Analysis of Return on Investment

Since the trial was one year in length, a simple return on investment (ROI) calculation was considered the most as appropriate economic measurement as opposed to a net present value (NPV) or an internal rate of return (IRR). Even though the patient rebate rewards shifted costs from the City of Duncan to the plan members, this ROI was calculated from the City’s perspective since the City was at risk for all of the cost components, including patient rebate rewards.

If we disregard discount rate, it is relatively simple to calculate a one-year return on investment:

$$\% \text{ ROI} = ((\text{benefit-cost}) / \text{cost}) \times 100$$

or...

$$\% \text{ ROI} = (\text{net cost savings}/\text{cost of Program}) \times 100$$

This is formula that was used to calculate ROI where the cost of the Program equaled the sum of:

Total net premium payments to physicians + total patient rebate rewards + MedEncentive fees

Findings

...cost reductions and validated predictions

In the Analysis section, we addressed the variables that could have impacted the change in the global health plan expenditures for the City of Duncan to isolate the impact of the MedEncentive Program. In the Methodology section, hypotheses were offered to test the impact of the Program. In this section, we present the study’s findings beginning with the hypotheses.

- A. Prediction #1: Physician and Patient Participation in the Program would be Sufficient to Produce Cost Containment and a Return on Investment in the First Year of Program Implementation – Participation and cost findings are examined to test this hypothesis.

Physician Participation Levels

A total of 1,142 information therapy prescription physician opportunities³⁹ occurred in the Intervention year. Using the participation formula introduced in the Analysis section, the following table presents the overall physician participation volumes and levels of participation ratios for the Intervention Year.

Table 10 – Physician Participation Levels

Description	Ix Prescriptions	Ix Opportunities	Level of Physician Participation
Duncan Physician-generated Ix	379	798	47.5%
Non-Duncan Physician-generated Ix	26	344	7.6%
Overall	405	1,142	35.5%

As Table 10 indicates, the overall level of physician participation was 35.5% while participation among Duncan physicians was 47.5%. As expected, the level of participation among non-Duncan physicians who did not receive orientation was low at 7.6%.

Patient Participation Levels

As mentioned in the Analysis section, the City opted to have the MedEncentive Program produce “system-generated” Ix prescriptions if and when physicians failed to participate for whatever reason. Therefore, “physician-generated” and “system-generated” information therapy prescriptions were sent to patients for each office visit (unless the physician directed that no Ix should be sent). The following table presents

³⁹ Opportunities are synonymous to office visits incurred during the Intervention Year.

patient participation levels relative to all physician and system-generated information therapy opportunities.

Table 11 - Patient Participation Levels Relative to All Ix Opportunities

Description	Ix Opportunities	Patient Responses to Ix	% of Ix Receiving Patient Responses
Doctor Generated Ix	307	157	51.1%
System-generated Ix	747	305	40.8%
Total Patient Activity	1,054	462	43.8%

As Table 11 indicates, patients responded to 43.8% of the 1,054⁴⁰ information therapy patient opportunities generated during the Intervention Year. Patients responded more frequently to information therapy prescribed by their doctor (51.1%) as opposed to system-generated prescriptions (40.8%). However, in absolute terms, patient responded to nearly twice as many system-generated Ix prescriptions than physician prescriptions (305 system versus 157 physician). Had the City not elected to configure the Program with system-generated Ix, a large number of patients would have been deprived of Ix. Logic leads us to believe that the Program would have been less effective as a result. Therefore, it is recommended that system-generated Ix should be offered to patients, at least during a grace period to allow physicians to acclimate to the Program.

When considering the number of patients who participated versus the number of patients who had an opportunity to participate and how patient participation was affected by the number of individual patient’s office visits incurred per individual patients during the Intervention Year, we discovered the following:

Table 12 – Patient Participation Levels Based on the Number of Office Visits Incurred per Patient During the Intervention Year

Description	Patients Incurring Office Visits	Patients Responding to at Least One Ix	% of Patients Participating
Patients with > 3 Visits	200	115	57.5%
Patients with < 3 Visits	172	57	33.1%
Overall	372	172	46.2%

As Table 12 indicates, there were 372 patients who incurred an office visit covered by the Program during the Intervention Year. (This represents approximately 65% of the health plan’s members.) Within this sub-set of plan members, 172 or 46.2% responded to at least one information therapy prescription. When we stratify this population on the basis of frequency of health care, 115 or 57.5% of patients with 3 or more office visits during the Intervention Year responded to at least one Ix prescription. This compares to 33.1% of patients participated who incurred less than 3

⁴⁰ The variance between the 1,142 total physician Ix opportunities and the 1,054 total patient Ix opportunities is a result of 1) physicians electing to not prescribe Ix to individual patients and 2) due to the time patients were allotted to respond to prescriptions which carried past the end of the Intervention Year. The principal reasons physicians did not prescribe Ix to patients were 1) medical content was not available on the website for a patient’s condition, and 2) information could be detrimental to the patient’s health.

office visits. This confirms our informal survey that suggested that participation increases as the health care needs of patients increase. In other words, healthier patients participated at a lower frequency relative to patients with greater health care needs. Assuming the efficacy of evidence-based medicine and information therapy, this finding is exactly what one would want to be the case from a cost containment standpoint.

Continuing with the same thought process, we posed this question: *“How many patients who incurred the highest health care costs in either the Baseline or Intervention years responded to at least one information therapy prescription as a percentage of the number of patients in this high cost subset who had an opportunity to respond to at least one prescription during the Intervention Year?”* To answer this question, we identified the 20 patients who incurred the highest costs for each year. We then examined the participation levels and cost characteristics of this group of patients in the Intervention Year. The following two tables present our findings.

Table 13 – Participation and Claims Costs for the 20 Patients with Highest Incurred Costs

Description	2003-'04	2004-'05	\$ Difference	% Difference
# of Patients Examined	20	20	N/A	N/A
# of Top 20 Patients Who Took Ix in 2004-'05	14	15	N/A	N/A
% of Top 20 Who Took Ix in 2004-'05	70.0%	75.0%	N/A	N/A
# of Ix Prescriptions Completed	53	51	N/A	N/A
# of Patients in Top 20 in Both Years	N/A	4	N/A	N/A
Total Claims Costs (Hospital, Doctor and Other)	1,766,053.17	1,472,447.91	-293,605.26	-16.6%
Top 20 Patients Claims Costs	739,171.82	645,040.11	-94,131.71	-12.7%
Top 20 Patients Costs as a % of Total Costs	41.9%	43.8%	N/A	N/A
Top 20 Patients Claims Costs per Patient	36,958.59	32,252.06	-4,706.58	-12.7%

Table 14 – Claims Costs for the 20 Patients with Highest Incurred Costs in 2003-04

Description	2003-'04	2004-'05	\$ Difference	% Difference
2003-'04 Top 20 Patients Costs in Each Year	739,171.82	288,294.90	-450,876.92	-61.0%

As Table 13 indicates, the 20 patients that incurred the greatest amount of health care for the Baseline and Intervention years represented 41.9% and 43.8% of total annual claims costs respectively. There were four patients who made the top 20 both years. Among these 36 patients, participation in the Program was high. In fact, 70% of the patients in the top 20 for the Baseline Year successfully completed one or more information therapy prescriptions in the Intervention Year, while 75% of the patients in the top 20 for the Intervention Year successfully completed one or more Ix prescriptions. As Table 13 indicates, total claims costs decreased 16.6% for all members from the Baseline Year to the Intervention Year, while costs incurred by the top 20 patients in the Intervention year decrease by 12.7% compared to the top 20 in the Baseline Year. As Table 14 indicates, total costs decreased by 61.0% for the

Baseline Year's top 20 patients in terms of costs incurred by these same patients in the Intervention Year.

If we consider the Intervention Year's top 20 patients and compare average incurred costs of the 15 who completed one or more information therapy prescriptions to the 5 patients who completed none, we find the following results.

Table 15 - Average Annual Claims Cost Among the 20 Patients with Highest Incurred Costs in the Intervention Year

Description	Taking Ix	Not Taking Ix	\$ Difference	% Difference
2004-'05 Average Cost Among Top 20 Patients	32,252.01	36,674.45	-4,422.44	-12.1%

As Table 15 indicates, the average annual claims costs for the 15 patients who completed information therapy were 12.1% less than the average claims costs for the five who failed to complete any information therapy.

Global Health Care Expenditure Results With and Without Catastrophic Cases

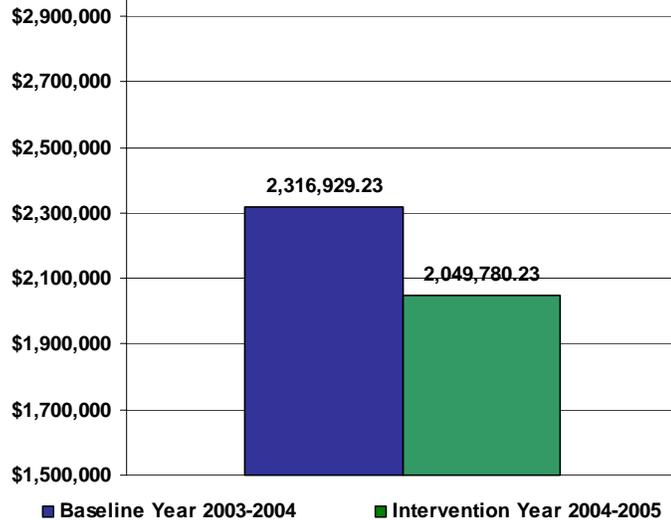
Net Charges in the following table represents total global expenditures, including all fixed and variable (claims) costs incurred by the City and the plan members for both the Baseline and Intervention years. These total costs are segmented by the amounts paid by the plan members (Ineligible, Annual Deductibles, Coordination of Benefits (COB), Out-of-Pocket) and paid by the City (Paid). The “Net Change” represents the difference between the Intervention Year and the “adjusted”⁴¹ Baseline Year. Finally, the “Percent Change” is the Net Change divided by the Baseline Year’s adjusted totals for the Net Charges and Paid amounts.

Table 16 - 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%

As mentioned in previous sections, to isolate the MedEncentive impact on the global expenditures of the City’s health plan involved focusing on Net Charges. As Table 16 indicates, Net Charges decreased \$267,149 from the Baseline Year to the Intervention Year. This represents an 11.53% decrease. Graph 1 illustrates the Net Charges from Table 16.

**City of Duncan
Global Healthcare Expenditures
2003-2004 vs 2004-2005**



Graph 1

To help distill the impact of catastrophic cases from the Baseline Year to the Intervention Year, we subtracted the costs for individuals that exceeded the City’s reinsurance specific stop-loss limits⁴². In the case of the City of Duncan, its specific stop-loss was \$30,000 per member per year. The following table presents the results from this further distillation of the cost data.

⁴¹ 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 two years. The conversion factor description and computation can be found in Appendix A.

⁴² Specific stop-loss is the dollar amount above which a self-insured employer’s reinsurance company assumes financial liability for an individual plan member.

Table 17 - Net Change in Total Fixed and Variable Expenditures from Baseline to Intervention Years without Catastrophic Cases, Adjusted for Employment

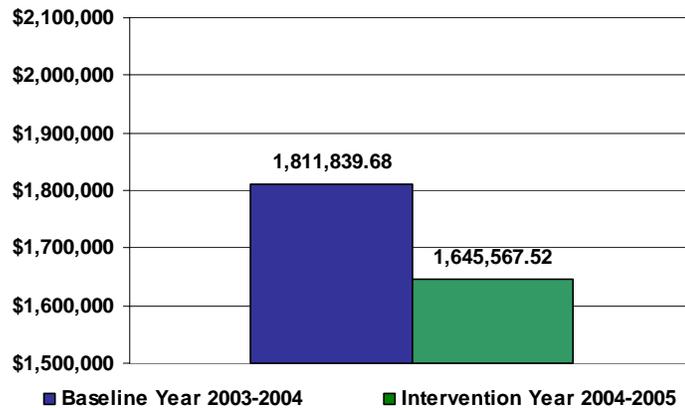
Description	Net Charges
2003-04 Total Costs	\$2,370,279.57
2003-04 Catastrophic Cases	\$558,439.89
2003-04 Costs Less Catastrophic	\$1,811,839.68
2004-05 Total Costs	\$2,059,615.23
2004-05 Catastrophic Cases	\$414,047.71
2004-05 Costs Less Catastrophic	\$1,645,567.52
\$ Difference	-\$166,272.16
% Difference	-9.18%

As Table 17 indicates, Net Charges without catastrophic cases decreased \$166,272 from the Baseline Year to the Intervention Year. This represents a 9.18% decrease. Since this result is close to the decrease found with the catastrophic cases (11.53% reduction), it could be concluded that catastrophic cases only marginally impacted the cost reduction finding. It follows that there were other reasons, including the introduction of the MedEncentive Program, which caused the City's cost reduction.

Graph 2 illustrates the Net Charges from Table 17.

As mentioned in the Analysis section, it is important to note that the cost reduction was achieved in spite of increases in hospital and physician pricing and the added administrative cost of the MedEncentive Program. By any measure, this represents a significant result.

**City of Duncan
Global Healthcare Expenditures
without Catastrophic Cases
2003-2004 vs 2004-2005**



Graph 2

Return on Investment

Using the ROI calculation introduced in the Analysis section, the %ROI was computed with and without catastrophic cases.

Table 18 – ROI With and Without Catastrophic Cases, Adjusted for Employment

Description	Results
ROI Inclusive of Catastrophic Cases	
Net Premium Payments to Physicians ⁴³	\$12,050
Rebate Rewards to Patients	\$9,835
MedEncentive Fees	<u>\$6,840</u>
Total Program Costs	\$28,725
Plan's Annual Cost Reduction Including Program Costs	-\$295,874
Plan's Annual Cost Reduction Excluding Program Costs	-\$267,149
% ROI w/Catastrophic Cases	930.02%
ROI Exclusive of Catastrophic Cases	
Net Premium Payments to Physicians	\$11,411
Rebate Rewards to Patients	\$9,185
MedEncentive Fees	<u>\$6,540</u>
Program Cost w/o Catastrophic Cases	\$27,136
Plan's Annual Cost Reduction Including Program Costs	-\$193,409
Plan's Annual Cost Reduction Excluding Program Costs	-\$166,272
% ROI w/o Catastrophic Cases	578.84%

As Table 18 indicates, the calculated return on investment in the Program was 9.3 to 1 including the catastrophic cases and 5.8 to 1 excluding catastrophic cases. If we assume that the Program accounted for only a fraction of the savings, these ROIs are sufficiently large to conclude that the Program achieved its intended purpose of producing a financial benefit to the City of Duncan and its health plan members. This is especially true when we take into account that the national rate of health care inflation was approximately 10% and the provider prices increased nearly 10% during the Intervention Year.

Summary of Prediction #1

What follows is a summary of the findings related to the hypothesis: *“Physician and Patient Participation in the Program would be Sufficient to Produce Cost Containment and a Return on Investment in the First Year of Program Implementation”*

⁴³ Net Premium Payments to Physicians represents the approximate amount of rewards paid to physicians for office visits derived by multiplying the total number of office visits in the Intervention Year by the difference in the average Net Charge for office visits between the Baseline and Intervention years.

- Overall participation in the Program by physicians is best characterized as low to moderate.
- Overall participation in the Program among patients is best characterized as moderate. However, participation by patients incurring the highest costs was found to be high. Furthermore, participation by patients incurring high costs had lower annualized costs in the Intervention Year compared to the Baseline Year and lower annual average cost than patients who did not participate. Patient participation increased as the frequency of care per patient increased.
- After adjusting for changes in the average number of employees and in spite of additional administrative costs related to the MedEncentive Program and provider price increases, the City of Duncan’s global health plan expenditures decreased by 11.5% inclusive of catastrophic cases and 9.2% exclusive of catastrophic cases in the first year after implementing the Program.
- The calculated return on investment was 930% inclusive of catastrophic cases and 578% exclusive of catastrophic case. These ROIs were sufficiently large to conclude that the Program produced an economic benefit even if it accounted for a fraction of these ROIs. This is especially true when we take into account that the national health care rate of inflation was 10% and the providers increased their fees by nearly 10% during the Intervention Year.
- There is evidence that supports the hypothesis that low to moderate physician participation combined with moderate to high patient participation in the Program were sufficient to produce cost containment and a return on investment in the first year of the Program’s implementation. This evidence includes the findings of the other predictions described below, plus the fact that the other two test employers also experienced cost reductions after implementing the MedEncentive Program.

B. Prediction #2: The Program’s Design Should Theoretically Cause a Redistribution of Expenditures Among Cost Categories in Favor of Physicians and Administration

To test this prediction involved a relatively straight-forward process of summing the total fixed and variable costs by the cost categories of Hospital, Doctor, Pharmacy (Rx), Other and Administration for both the Baseline and Intervention years, and then comparing these results. Even though we tallied costs incurred by the plan members (Ineligible, Deductible, Coordination of Benefits, and Out-of-Pocket) and the City (Paid), Net Charges is the proper statistic to isolate the Program’s impact. For this reason, Net Charges are highlighted in the following tables that present the results.

Table 19 - Baseline Year Costs (2003-2004) by Cost Category

Cost Category	Net Charges	% of Net Charges	Ineligible	Deductible	COB	OOP	Paid
Hospital	\$1,214,865.97	51.0%	44,439.56	10,178.37	9,441.89	140,312.36	1,010,493.79
Doctor	\$465,595.65	19.5%	35,765.32	55,915.92	8,333.40	76,590.25	289,004.36
Rx	\$386,564.49	16.2%	0.00	0.00	0.00	0.00	386,564.49
Admin	\$217,661.91	9.1%	0.00	0.00	0.00	0.00	217,661.91
Other	\$85,591.55	3.6%	10,289.42	1,860.86	1,288.29	13,596.93	58,556.05
Total	\$2,370,279.57	100.0%	90,494.30	67,955.15	19,063.58	230,499.54	1,962,280.60

Using the conversion factor of 0.977 to adjust the Baseline Year's expenditures to account for the change in the average number of employees produced the results presented in the following table.

Table 20 - 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

Table 21 - Intervention Year Costs (2004-2005) by Cost Category

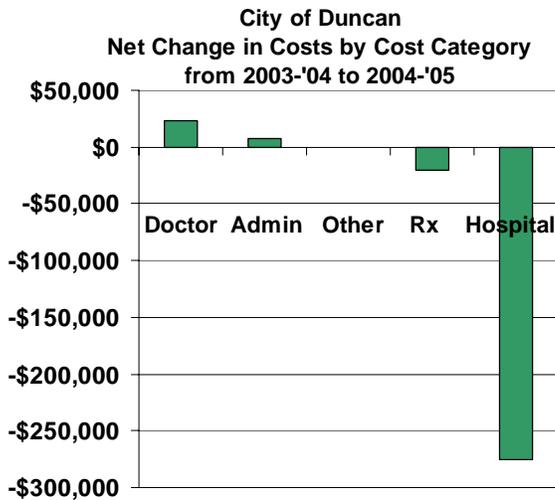
Cost Category	Net Charges	% of Net Charges	Ineligible	Deductible	COB	OOP	Paid
Hospital	911,641.04	44.5%	43,173.25	62,709.37	29,599.53	98,838.89	677,320.00
Doctor	477,860.65	23.3%	42,744.62	67,672.68	10,758.13	83,520.26	273,164.96
Rx	357,229.82	17.4%	0.00	0.00	0.00	0.00	357,229.82
Admin	220,102.50	10.7%	0.00	0.00	0.00	-9,835.00	229,937.50
Other	82,946.22	4.0%	2,154.27	8,873.93	2,983.72	6,148.26	62,786.04
Total	2,049,780.23	100.0%	88,072.14	139,255.98	43,341.38	178,672.41	1,600,438.32

The following table presents the net change in costs as derived by subtracting the adjusted Baseline Year's results in Table 20 from the Intervention Year's results in Table 21.

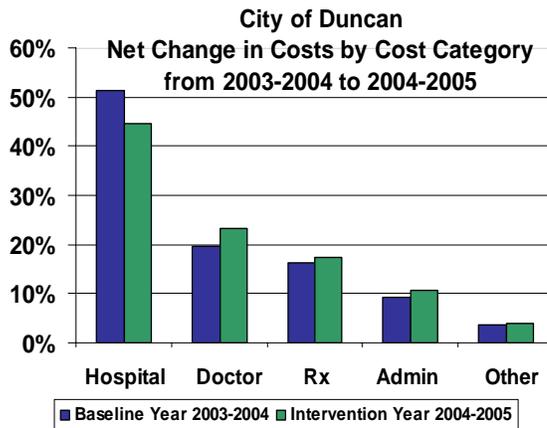
Table 22 - Net Change in Costs by Category from Baseline to Intervention Years Adjusted for Change in Average Number of Employees

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%

The net change results presented in Table 22 confirm the prediction that the Program would cause redistribution among of cost categories in favor of Doctor and Administration. These results are depicted in Graph 3 and 4.



Graph 3



Graph 4

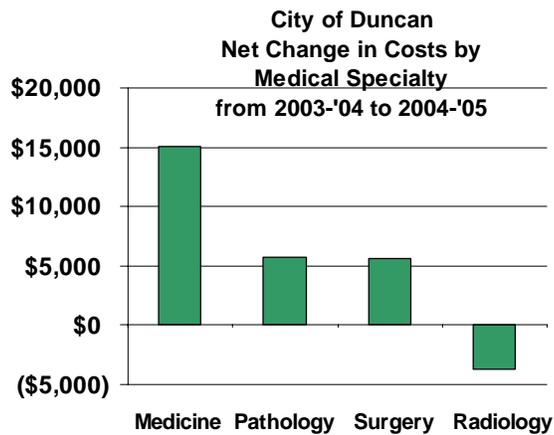
- C. Prediction 3: The Program's Design Should Theoretically Cause a Reduction in Defensive Medicine – As stated in the Methodology section, a consensus of opinion among medical practitioners is that a good measure of defensive medicine abatement would be a reduction in the volume of radiological tests. In other words, radiological tests are frequently ordered to prevent malpractice, even though best practices (evidence-based medicine) do not recommend such testing. To test the hypothesis that the Program would reduce the practice of defensive medicine, the net change in costs by medical specialties from the Baseline Year to the Intervention Year was examined to determine how the net change radiology costs compared relative to the change in costs of the other medical specialties. The following table presents the results of this examination.

Table 23 - 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 Adjusted 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%

As Table 23 indicates, not only did radiology costs not keep pace with increases in costs realized by the other medical specialties, it was the only specialty that experienced a net reduction in expenditures from the Baseline Year to the Intervention Year.

Another finding that confirms the impact of the Program was the magnitude of the increase in the Medicine⁴⁴ specialty category relative to the other specialty categories. Though these cost increases are relatively minor in relationship to global costs (refer to the “Doctor” cost category in Table 22 and Graph 3), nevertheless, the Program is designed to reward physicians when they prescribe information therapy during office visit encounters. Therefore, we expect that the Medicine specialty category cost should increase after implementing the Program.



Graph 5

The results of this analysis (which are depicted in Graph 5) provide a basis of confirmation that defensive medicine was abated after the Program’s implementation.

- D. Prediction #4 - If the Program Produces the Desired Results then Patients Should Theoretically Perceive Information Therapy as Beneficial** – To test this prediction, patients were asked to answer the following question to accumulate points toward their rebate reward: “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

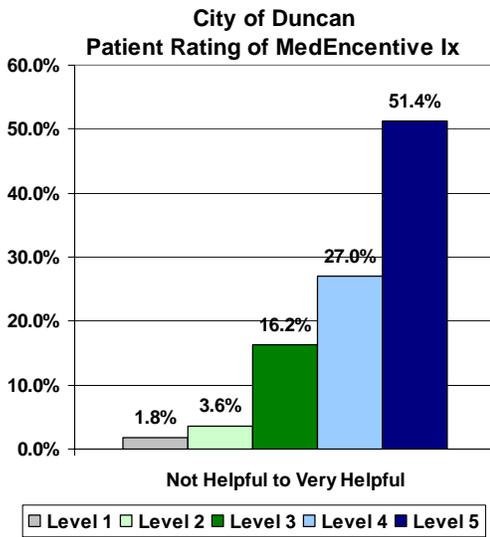
⁴⁴ The Medicine specialty category includes office visit services which are paid at a premium through the Program.

very helpful)?” The results of the responses to this question are reported in the following table.

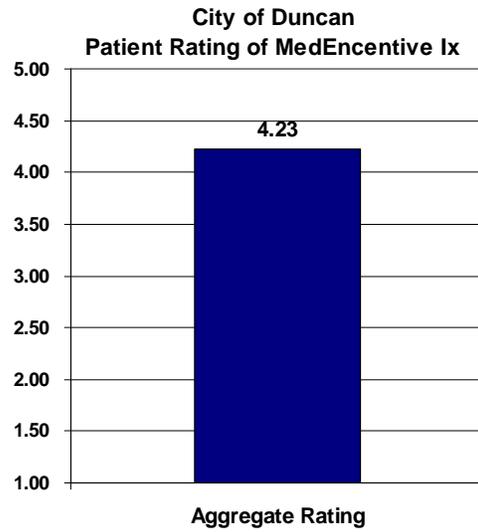
Table 24 – Patient Responses to the Perceived Benefit of the Information Therapy Dispensed by the Program

Description	Level 1	Level 2	Level 3	Level 4	Level 5	Totals
# of Responses	2	4	18	30	57	111
% of Responses	1.8%	3.6%	16.2%	27.0%	51.4%	100.0%

The aggregate score of these responses is 4.23 on a scale of 1 to 5 with 5 meaning the information therapy was very helpful. The results of this survey (which are depicted in Graphs 6 and 7) indicate that this prediction was confirmed.



Graph 6



Graph 7

Discussion and Critique

...significant cost reductions but study has limitations

The MedEncentive Program is specifically designed to alleviate the underlining causes of health care cost inflation, which are 1) poor quality health care, 2) poor doctor-patient communications, and 3) the lack of proper incentives. The MedEncentive Program does not expect every doctor and every patient to be compliant all the time. Nor does the Program expect to resolve every health care quality and cost issue. There are scenarios and special circumstances that will retard adherence to the Program. However, one of the key lessons learned from this study is that the Program can achieve a sufficient level of efficacy with incremental participation and strategic compliance. Furthermore, the Program's quality improvement and cost containment capabilities are predicated on certain axioms. These include the following:

1. The vast majority of physicians want to practice a high standard of care that is based on the latest scientific and empirical evidence. Physicians are prevented from doing so because of the lack of time, information, tools and incentives.
2. The vast majority of patients want to be healthy and remain healthy. There is a large percent of patients that lack information to self-manage their health or lack requisite incentives to change unhealthy behavior.

The original objective of the City of Duncan project was to validate the MedEncentive Program in three key areas. The first area of validation was to determine the Program's "operational functionality"⁴⁵ by testing its web applications capabilities in a "live" setting. With the exception of some minor adjustments during the first 60 days and a change in the claims re-pricer (from Claimshop to CareVu), the Program passed all functionality criteria and succeeded in performing as designed.

The second area of validation involved determining physician and patient acceptance of the Program as measured by participation levels. Participation levels met expectations, especially in light of some initial physician resistance and considering that tactics⁴⁶ to stimulate participation were postponed until after the Intervention Year. More importantly, participation among the high cost patients exceeded expectations, which helps explain the cost containment results.

⁴⁵ Operational functionality criteria included automatically: 1) delivering evidence-based medicine guidelines and medical content; 2) dispensing information therapy; 3) transferring data electronically between a claims re-pricer (initially Claimshop in Dallas and then CareVu in Lubbock), a third party administrator (The Kempton Group in Oklahoma City), and the MedEncentive information system; and 4) affecting the reward methods.

⁴⁶ Tactics to stimulate physician and patient participation which were introduced after the Intervention Year are causing significant include (such as physician fax reminders, patient telephone reminders, certified notification, and restricting Ix prescribing to physicians)

A third area of validation looked at the Program's ability to contain costs and produce a return on investment. This was the primary focus of the study. The City of Duncan's health plan experienced overall cost reduction after implementing the MedEncentive Program that produced a significant calculated ROI. A systematic approach was taken to isolate other variables from the MedEncentive Program. The Program's developers are aware that the City's change in benefits, including an increase in the members' annual deductible, could have had an impacted on cost containment that is not fully recognized in the process of isolating the impact of the MedEncentive Program. For this reason, specific predictions were made to substantiate the impact of the Program and all of these predictions were confirmed. Furthermore, the other two test employers also experienced overall cost reductions after implementing the MedEncentive Program, and these employers did not change their annual deductibles.

For those of who may wonder how the Program could achieve the magnitude and relative quickness of the cost reductions, the Program's developers offer the following explanations:

1. Other studies (which have been cited earlier) and the consensus of opinion have concluded that MedEncentive's active elements - evidence-based medicine and information therapy - are effective at improving health care quality which leads to cost containment. Therefore, the essential test of the Program is its ability to achieve levels of physician and patient participation and compliance to EBM and Ix through the Program's unique reward methods and website applications. If participation and compliance reach a certain level, then cost containment will occur. This study confirms that result.
2. A widely held assumption by P4P advocates is that a typical P4P program will achieve a return on investment after a few years when chronic patients begin to benefit from EBM care. The developers of the MedEncentive Program agree that there are long-term and long lasting economic benefits for its Program for this reasoning. However, the MedEncentive Program achieved a shorter term ROI exhibited in the trials due to the following reasons:
 - a. The Program is designed to alleviate unnecessary care. A number of studies have confirmed that inefficiencies, abusive practices, and variations in care account for a significant portion of overall health care costs. A recent study⁴⁷ conducted by the Dartmouth Atlas Project has determined that almost one third of care for Medicare patients with severe chronic illnesses is unnecessary. An improvement in the quality of care would reduce the amount of unnecessary care that produces immediate cost reduction. It is suggested that this occurred to some degree in the trials. In fact, based on the Dartmouth study, the cost savings achieve in this trial is a fraction of what could be achieved.
 - b. The abatement in defensive medicine causes an immediate reduction in costs. This study found evidence that this occurred with the adoption of the MedEncentive Program.

⁴⁷ Wennberg, JE. The Care of Patients with Severe Chronic Illness.

- c. As previously reported, studies have determined that the lack of effective communications between doctors and patients affect the quality and cost of health care. The MedEncentive Program improves this communication and patient understanding immediately. The 2005 RAND Corp study on dispensing health information found that informed patients were not only better able to self-manage their health, but these patients tended to choose the most conservative, least expensive option. Again, this would cause a short-term economic benefit.

To deny the trial results would require the rejection of all of these facts plus the conclusion that the financial and psychological rewards created by the Program did not improve the standard of care, or improve the health knowledge of any chronically or severely ill patient, or shape the health behavior any patient. The developers of the Program suggest that this denial process is implausible and counter by asking:

“What are the alternative solutions to health care quality improvement and cost containment? What possible solution is there that does not engage physicians and patients in positive, pro-active and real-time manner? What other sustainable alternative has succeeded in producing an ROI?”

The developers go on to agree that a larger and longer-term study would increase statistical confidence. This is a logical next step that is in fact occurring.

In the end, precisely measuring cost containment capabilities of any intervention has limitations. Jay Kempton of Kempton Group Administrators summarized one significant limiting aspect of health care cost containment analysis with this statement:

“We can measure what was done, but we cannot measure what was not done. In other words, claims data cannot tell us about the lab test that was not ordered or the hospital admission that was avoided.”

Conclusions

...MedEncentive played a significant role in reducing cost

The City of Duncan's health care expenditures declined significantly after implementing the MedEncentive Program in spite of an increase in provider pricing and the cost of the Program. A systematic analysis of the City's fixed and variable health care costs was conducted to isolate the impact of the Program from other variables. Four predictions were made about specific cost outcomes that would occur as a result of the MedEncentive Program. These predictions were 1) participation in the Program would be sufficient to produce cost containment and a return on investment in the first year, 2) costs would be redistributed among cost categories in favor of physicians and administration, 3) a measure of defensive medicine would be reduced, and 4) patients would perceive a benefit from utilizing the Program in self-managing their health. Each of these predictions was either significantly or partially substantiated. None of the predictions was disproved.

Based on the findings of this study, there is good evidence that the MedEncentive Program played a significant role in the City of Duncan's reduction in health care costs. Furthermore, MedEncentive's system of *doctor-patient interactive rewards* was able to satisfy the essential criteria for pay-for-performance success by simultaneously achieving:

1. widespread independent physician acceptance and support;
2. interactive patient accountability with high ratings of value to personal health;
and
3. a significant return on investment for the employer/purchaser.

The findings of this study imply that MedEncentive's system of *doctor-patient interactive rewards* could have a profound impact on the delivery of health care by improving the standard of care, encouraging healthier behavior, and controlling overall costs.

Postscript

...confirming the study's findings and conclusions is only the beginning

Since the end of the trial, we have had the advantage of time to make additional observations. In addition, the Program has benefited from numerous enhancements. The combination of longevity and enhancements has served to confirm the Program's proof of concept. The following events and observations have occurred in the year following the end of the trial:

- **Non-Catastrophic Costs Continued to Decline** - The City of Duncan's non-catastrophic global expenditures continued to decline after the trial. Using a 90-day claims run-out period, non-catastrophic Net Charges⁴⁸ through the ten months after the end of the trial decreased 19.8% and 15.7% compared to the same time period for the Baseline and Intervention years, respectively.
- **Program Enhancements** - A number of Program enhancements were on the drawing board when the trial was launched. They were purposefully withheld from the trial to prevent introducing additional variables. Each of these improvements has had a significant impact on the performance of the Program since the end of the trial. These enhancements include:
 1. A website application that allows the physician to practice the Program at the time of service and allows the patient to receive their information therapy prescription before they leave the doctor's office. This real-time version is more convenient for the physician and compresses the time between when services are rendered and when patients receive their prescriptions. The result has been higher participation levels. We also expect that the timeliness achieved by this real-time version will improve the efficacy of information therapy. This premise is the basis of a future study.
 2. Automatic physician fax and patient telephone reminders have caused increases in participation levels. The impact of these reminders was evident immediately.
 3. Reward amounts and parameters have been adjusted to achieve specific results. Physicians are paid more for practicing the real-time version of the Program as opposed to the after-the-fact version used during the trial. The City of Duncan increased its patient reward from \$25 to \$30. This is causing patients to request information therapy from their physicians more aggressively.
 4. Our preliminary experiments with adjusting reward amounts and parameters indicate that strategic applications of rewards is a powerful tool that can be used

⁴⁸ Catastrophic cases tend to occur randomly from year-to-year while the occurrence of non-catastrophic health care tends to be less random. Therefore non-catastrophic Net Charges is a better near-term indicator of the overall trend in health care costs for any given population impacted by the current MedEncentive Program. The number and relative size of catastrophic cases plus global costs compared to historical or regional/national health care inflation are also useful measures which be the target of future MedEncentive applications.

to target desired performances and behaviors. The Program developers suggest that the reward system creates what is referred to as “doctor-patient interactive accountability” which has limitless applications in achieving better health and cost containment.

5. In 2006, MedEncentive added Healthwise[®] Knowledgebase, a comprehensive electronic health information and decision-support tool for Ix programs. This medical content has expanded and improved the information available to participating physicians and patients. It also allows MedEncentive to be offered to Spanish speaking participants.
 6. The post-trial period has prompted the development of a method which incorporates the Program’s concepts and principles to address catastrophic cases by making hospitalizations less frequent, shorter, and safer while improving post-discharge clinical outcomes. Another method will focus on preventions.
- **Physician versus Patient Participation** - From the trial, we were able to conclude that physician and patient participation in the Program is correlated to costs. One post-trial observation which warrants additional investigation is the relative impact of physician versus patient participation. During the trial, the City of Duncan requested that employees and dependents receive information therapy even if their physician failed to participate for any given office visit. Non-physician prescribed information therapy became known as “system-generated” Ix. These system-generated Ix prescriptions were turned off shortly after the trial. This caused the number of prescriptions to decline. Shortly thereafter, the City’s monthly expenditures began to rise. Later, this policy was reversed and expenditures appeared to have decreased. Though these are only preliminary observations, it does appear that patient participation has a higher degree of correlation to near term cost containment.
 - **Other Installations and Demonstrations** – In January 2006, INTEGRIS Health, Oklahoma’s largest integrated health system, offered the MedEncentive Program as an option of its employee health plan. Approximately 1,700 members and 1,500 physicians in the Oklahoma City area enrolled in the Program. Introduction, enrollment and orientation were accomplished with three people in less than ninety days, thus confirming the Program’s scalability demonstrated in the Duncan trial. With regards to the future, MedEncentive is collaborating with a consortium of physicians in Oklahoma and Kansas in proposing a demonstration project to Medicare (CMS). Additional demonstrations and commercial installations are being planned in Oklahoma and other parts of the country.

Acknowledgements

...pioneers in health care reform

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...building the basis for the MedEncentive Program

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Appendix A

What follows is a detailed description of the methods used to process the data.

Gathering the Raw Data

Raw data for the cost analysis was supplied by Kempton Group Administrators⁴⁹, the City's third party administrator (TPA) during the study period. The data supplied was grouped as claims data and fixed costs expenditures. These two sets of data were combined to derive total costs.

1. Fixed Costs - The City's health plan fixed costs includes reinsurance, provider network (PPO) fees, utilization review (UR) fees, administration fees and broker fees. These costs are primarily based on the number of employees enrolled in the City's health plan and charged by the TPA on a monthly basis. Also included in this data set were the City's pharmacy expenditures. These expenditures are based on consumption compiled monthly by a pharmacy management program vendor and charged through the TPA. All fixed costs in this analysis were taken directly from data prepared by Kempton from actual expenditures.
2. Claims Data - All claims processed by the TPA for medical services incurred from August 1, 2003 to July 31, 2005 were imported into the analysis database. Each claim contained the following data elements:

<u>TPA's Descriptor</u>	<u>Description</u>
Case	TPA internal control number
Cert #	TPA internal control number
Clmt #	TPA internal control number
Last Name	Patient's last name
First Name	Patient's first name
Relation	Patient's relationship to the employee
Print Date	Date claim was paid
DCN	TPA internal control number
ICD-9	Primary diagnosis code supplied by the provider
CPT-4	Service or procedure code
Modifier	Code to further describe CPT code
POS	Place of service code
Incurred	Date service was rendered
Total Charge	Charge submitted by provider
Savings	Difference between total charge and the allowed fee
Charge	Allowed fee for service (according to provider contract), also Net Charge
Ineligible	Disallowed amount due to out-of-network provider or non-covered service
Deductible	Annual deductible
COB	Coordination of benefits with another insurer of the patient
OOP	Member out-of-pocket costs for office co-payments
Paid	The amount paid by the City
Provider Type	Types of providers included hospitals, doctors, other, surgery center, etc.
Provider Name	Self-explanatory

In order to accurately measure the impact of the MedEncentive Program, claims with incurred dates during the Baseline and Intervention periods had to be

⁴⁹ Kempton Group Administrators is located at 525 Central Park Drive in Oklahoma City. The firm's principal contributors to the study were Jay Kempton, David ,and

gathered. Since using the incurred date data is the most appropriate and objective method to measure the Program’s impact, and since it takes time to process and pay claims, an adequate period of time was needed after the studied period to allow claims processing to take place. Kempton suggested that a period of 90 days would be adequate to capture the vast majority of services after the end of the studied periods. As a conservative measure, a period of six months (180 days) was actually used. This meant that all paid claims through January 31, 2006 for services incurred during the studied period were included in the analysis. Once the date incurred data was gathered, the Baseline Year and Intervention Year data were segregated into two data sets by sorting on the incurred dates.

Refining the Raw Data

Before the impact of the MedEncentive Program on the City’s health plan cost could be measured, the data from the Baseline and Intervention years required processing. Filters were employed to remove claims from the two data sets that were not applicable. These included duplicate claims, dental and optometry claims, and claims for incurred dates prior to or after the Baseline and Intervention periods. The identification of the non-applicable claims was relatively straightforward. All claims data that was sorted from the original data sets supplied by Kempton has been stored in a manner that facilitates reconstruction of the original data sets for the purposes of reconciliation and subsequent analysis.

Adjusting for Changes in the Average Number of Employees

In order to accurately compare expenditures incurred during Baseline Year to the expenditures incurred during the Intervention Year, an adjustment for the change in the number of employees had to be computed. Kempton supplied the monthly employment census. The following table presents this data and the computed conversion factor.

Table 1 – City of Duncan Employment during Baseline and Intervention Years

Months	2003-04	2004-05
August	235	231
September	234	232
October	244	233
November	234	224
December	233	225
January	232	223
February	226	225
March	231	228
April	232	224
May	232	231
June	232	230
July	234	230
Total	2,799	2,736
Annual Average	233	228
Conversion Factor	0.977	

By dividing the Intervention annual average census by the Baseline census, a conversion factor of 0.977 was derived. This factor is used to adjust the Baseline Year's expenditures for an accurate comparison to the Intervention Year's expenditures. This employment conversion factor is used throughout the cost analyses.

Establishing Data Set Metrics and Accounting for Other Variables

Each individual claim contained the following financial values:

<u>TPA's Descriptor</u>	<u>Description</u>
Total Charge	Charge submitted by provider
Savings	Difference between total charge and the allowed fee
Charge	Allowed fee for service (according to provider contract), also Net Charge
Ineligible	Disallowed amount due to out-of-network provider or non-covered service
Deductible	Annual deductible
COB	Coordination of benefits with another insurer of the patient
OOP	Member out-of-pocket costs for office co-payments
Paid	The amount paid by the City

For this study, Total Charges and Savings had little or no applicability (except for computing hospital fee increases). Net Charges represents the health plan's global expenditures i.e., the combination of the expenditures paid by the City plus all amounts paid by the members. To derive the difference between Net Charges and City's Paid amount, one subtracts (adds) the Ineligible, Annual Deductible, Coordination of Benefits, and Out-of-Pocket amounts. The difference between the Net Charges and the Paid amounts generally represents the members' share of the health plan's total expenditures. These amounts are instructive in terms of accounting for the impact of variables such as cost shifting (the increase in annual deductible and the addition of the office visit), provider network changes, and the MedEncentive Program.

Sorting Data to Consider Other Factors and to Test the Hypotheses

Described in the following sections are the steps that were taken to sort the data to consider other factors that influenced a change in costs between the Baseline and Intervention years. The following sections also describe how and why the data was sorted to test the hypotheses.

1. Redistributing Expenditures by Cost Category – By design, payers utilizing the MedEncentive Program will pay physicians more, rebate out-of-pocket payments to patients, and pay an administrative fee for the Program. As a result, expenditures in the cost categories of Doctor and Administration should increase as a result of implementing the MedEncentive Program. To achieve a net cost savings, expenditures in the other cost categories (Hospital, Pharmacy, and Other) would need to decrease sufficiently to offset the increases in Doctor and Administration costs. Furthermore, the percentages of total expenditures by each cost category would also be redistributed in favor of Doctor and Administrative costs, even in the case where inflation is abated. Moreover, it is the strategic investment in physicians, patients and the MedEncentive Program that produces better health and less hospitalization. To test this hypothesis required the data to be compiled by the following cost categories for both the Baseline and Intervention years:

Hospital
Doctor
Pharmacy
Administration
Other

By sorting the claims data sets using the data elements of Provider Type, CPT Code, Modifier, Provider Name, and Place of Service, we were able to compile expenditures for Hospital⁵⁰, Doctor⁵¹, and Other⁵². Pharmacy and Administration⁵³ expenditures for the Baseline and Intervention years were supplied as fixed costs by Kempton in a separate spreadsheet report and treated in the same manner.

2. **Defensive Medicine** - Based on the consensus of opinion among a variety of surveyed physicians, the amount of radiology services could serve as a good surrogate for defensive medicine. In other words, physicians tend to order radiology as a means to manage their risk against medical malpractice. It is hypothesized that MedEncentive's EBM treatment guidelines and Ix prescriptions serve as a means to manage medical malpractice risk and would reduce the need to order certain types of radiological tests. Therefore, a decrease or variance in the amount of radiology services relative to the other medical specialties measured from the Baseline Year to the Intervention Year would be a means to confirm this hypothesis.

In order to test the defensive medicine hypothesis, the Doctor expenditure category was sorted for both the Baseline and Intervention years into the following medical specialty sub-categories using the CPT (code) data element:

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

3. **Unit Pricing** - Claims data was used to quantify the change in unit price between the Baseline and Intervention years by summing the number of service units by cost element and dividing this sum into the total Net Charges by cost element. This analysis was abandoned because the mix of service, which would have a significant impact on this calculation, was not readily available. Additional information would need to be obtained to complete the unit price calculation and analysis.

Unit pricing was examined for Hospital services by sampling claims costs for similar services in both years. Physician units pricing was examined using the method described in the previous paragraph and by analyzing the most frequently billed office visit code. (Refer to Hospital and Physician Unit Pricing in the Analysis section, below.)

⁵⁰ Hospital expenditures include surgery center charges

⁵¹ Doctor expenditures includes chiropractic charges

⁵² Other expenditures include supplies, medications, physical therapy, home health, nursing home, and ambulance charges

⁵³ Administration expenditures include reinsurance, utilization review, administrative fees, PPO fees, and brokerage fees

City's Perspective versus Global Perspective

It was determined that the data could be analyzed two different perspectives, 1) from the City's cost perspective and 2) from a global (the City plus the employees) cost perspective. In both cases, health care costs decreased from the Baseline Year to the Intervention Year. Since the purpose of the study was to determine if and to what degree the MedEncentive Program impacted total healthcare expenditures, it became clear that the global perspective is the most appropriate method of analysis. With the assistance of Kempton Group Administrators, it was concluded that the best metric to measure global expenditures was "Net Charges."⁵⁴ This cost element includes both the City's expenditures as well as the plan members' expenditures, thus taking into account the shifting of costs back and forth between the City and the health plan members. According to Kempton, Net Charges also helped mitigate variances due to pricing and claims adjudication between the Baseline and Intervention years.

Participation Levels

The participation statistics were initiated from claims submitted for payment by physicians and captured by the City's re-pricers⁵⁵ and transfer to MedEncentive. Pertinent information was extracted from these claims by MedEncentive's computer system to create "opportunities" for the submitting physicians. MedEncentive notified physicians of these "opportunities" by e-mail. The compilation participation statistics was performed by MedEncentive's web-based software applications from physicians' responses and non-responses to "opportunities", plus the initiation of information therapy (Ix) "prescriptions" by physicians or by the MedEncentive computer system, plus the subsequent patient responses and non-responses to "Ix prescriptions." The total number of physician and patient responses and non-responses was measured against the total number of "opportunities" and "Ix prescriptions" which occurred during the Intervention Year created one set of participation statistics. Another participation statistic was derived by identifying the twenty plan members with the highest cumulative costs for both the Baseline and Intervention years and determining the number of these members who responded to at least one prescription during the Intervention Year. The participation statistics compiled by the MedEncentive system were subsequently compared against annual claims costs and activity compiled by Kempton Group Administrator.

⁵⁴ The terms "Net Charges" and "Global Costs" are synonymous and will be used interchangeably throughout this report.

⁵⁵ The City of Duncan's initial claims re-pricer was Claimshop of Dallas, Texas. Claimshop was replaced in June 2005 by CareVue of Lubbock, Texas.