

# Analysis of the State of Oklahoma's HealthChoice-Mutual Accountability Program Pilot Project's First-Year Results

By Jeff Greene in consultation with the Validation Institute<sup>1</sup>

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## Abstract

The Mutual Accountability Program (MAP) Pilot Project is a three-year study to test the cost-containment capabilities of the program in a study that compares the healthcare financial outcomes of two groups of state agencies, school districts and local governments (employers) covered by the HealthChoice health plan.

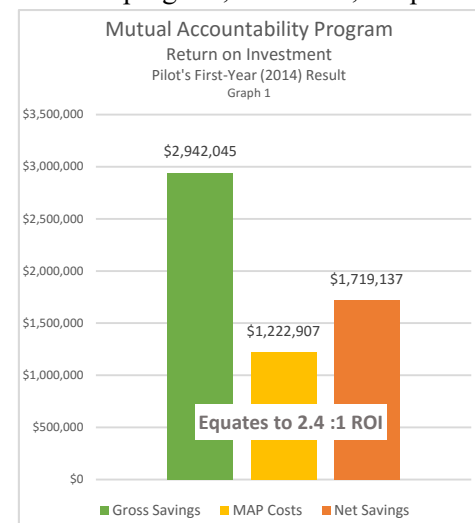
This is an analysis of the pilot's first-year (2014) results. It has been prepared in response to a memorandum analysis of the pilot's results (Exhibit 1), published by Aon Hewitt ("Aon") actuaries at the request of the State of Oklahoma's Employees Group Insurance Department (EGID), and a presentation by EGID Administrator, Frank Wilson, at a public hearing before a group of state representatives at the Oklahoma Capitol.

By applying a statistical technique recommended by experts in the fields of population health and health economics to the outcomes data from the Aon memorandum and Frank Wilson's presentation, it was determined that the total per-member-per-year (PMPY) healthcare expenditures for health plan members in a group of employers covered by the MAP (the "intervention group") were 2.5% less than the plan members in a group of employers not covered by the program (the "control group"). This difference in per-member-per-year expenditures computes to a savings of over \$1.73 million in 2014, net of the cost of the program, for the 16,168 people who comprised the intervention group (refer to Graph 1). These net savings imply that there was a 2.4:1 return on investment in the MAP for the year (refer to Attachment C).

If the MAP had been deployed with the full HealthChoice population, then the net savings would project to approximately \$13.3 million for the year (refer to Attachment C).

Using the same methodology, hospitalizations and emergency room visits per 1,000 also improved 10.5% and 4.7%, respectively.

These findings generally contradict the Aon memorandum's conclusions about the MAP's effectiveness. Experts who have reviewed the Aon memorandum explain that this contradiction is attributable to Aon's failure to adjust for the inherent differences between the intervention and control groups that existed before the pilot was launched. These experts confirm that the "difference-in-differences" or "DID" statistical technique, used in this analysis to measure the MAP's impact, is the correct method for analyzing the results. However, they caution that the findings in this analysis are limited by both the accuracy of the source data and the minimal quantity of data that was available to study. Therefore, this report concludes by describing the limitations of the analyses and what should be done to address these limitations, so the pilot can meet a universally accepted standard of validity.



## Background

The MedEncentive Mutual Accountability Program (MAP) is a web-based system designed to improve health

<sup>1</sup> The Validation Institute is a not-for-profit joint venture of General Electric and Intel involved in providing services to corroborate claims and assertions by organizations involved in population health, who wish to adhere to the highest standards of validity.

and healthcare in a manner that lowers healthcare costs by incorporating the following behavioral sciences:

1. Health Literacy - Studies have shown that one of the strongest determinants of life expectancy, well-being and healthcare utilization (costs) is health literacy. Other studies have shown that people are more prone to be adherent when they are empowered with the “how” and “why” (the knowledge-adherence response).
2. Doctor-Patient Relationship – Studies have found that patient adherence is positively influenced by physician involvement (the Hawthorne Effect), and that provider performance is positively influenced by health literate and discriminating patients (customer and image psychology).
3. Financial Incentives - The study of behavioral economics teaches that financial incentives work best when they are made shortly after a good deed, and on a frequency that conditions a desired behavior (Pavlovian conditioning).

By combining these behavioral sciences with human factors and systems engineering and web-technology, MedEncentive developed a system that achieved impressive results in a series of small-scale trials. These successful trials prompted Oklahoma state legislative leaders to ask MedEncentive if it would be willing to put the program to the test in a public trial. MedEncentive agreed to the test, provided it was conducted in a fair and appropriate manner.

With this understanding, a statute was enacted in 2011 (Oklahoma State HB1062) that directed a pilot be conducted to test the cost-containment capabilities of the “mutual accountability program,” involving a statistically significant comparison (i.e., a cohort study) among beneficiaries of the State of Oklahoma’s HealthChoice health plan. The statute stipulated that the program would be deemed effective if it could generate enough savings during the pilot to reach a point of self-funding.

A critical part of establishing statistical significance involves carefully designing a real-world experiment that fairly and appropriately determines the program’s true effect on the pilot’s outcomes. This includes evaluating the pilot’s results using the proper statistical methods.

At the request of the Employees Group Insurance Department (EGID), administrator of the HealthChoice health plan, MedEncentive submitted an experimental design in May of 2014 that met the required criteria. This design included a description of the “difference-in-differences” or “DID” statistical technique. This method of analysis is commonly used in cohort studies, like the MAP pilot, to mitigate the inherent differences between two or more groups of people, in order to more accurately measure the impact of an intervention.

On September 21, 2015, MedEncentive received a copy of a report from EGID. The report had been prepared by a team of Aon actuaries at the direction of EGID. It presents an analysis of the MAP pilot’s first-year (2014) economic and utilization results (Exhibit 1).

On September 23, 2015, a meeting was held at the EGID office to review the report. In attendance were Frank Wilson, EGID Administrator, plus the four members of the EGID leadership team, the three Aon actuaries who authored the report (via telephone), and Jeff Greene and Jim Dempster of MedEncentive.

During the meeting, Aon’s principal actuary walked the attendees through the report, while answering questions.

Noting that Aon’s analysis had not accounted for the historical dissimilarities between the intervention and control groups, MedEncentive asked the Aon actuaries if they were familiar with the difference-in-differences statistical technique. They acknowledged they were unfamiliar with DID, but agreed they would look into it.

As a result of attendees’ input, the Aon actuaries agreed to make changes and resubmit their report. EGID and MedEncentive agreed to postpone publicizing any pilot results until everyone had an opportunity to critique Aon’s revised report.

Since the September 23<sup>rd</sup> meeting, MedEncentive, referred to as “we” and “our” herein, consulted with Linda Riddell, a population health scientist associated with the Validation Institute. Ms. Riddell confirmed that the DID analytical method MedEncentive recommended in 2014 was the proper approach for evaluating the pilot. She also confirmed that we applied DID correctly in our analysis.

On October 28<sup>th</sup>, Frank Wilson presented the pilot’s first-year results to a group of Oklahoma legislators in a public hearing held at the State Capitol. The data presented (refer to Exhibit 2) was reported to have been compiled by Aon.

On November 4, a meeting was held at EGID’s offices to review Aon’s revised report, which MedEncentive received on November 2. We sent a draft of this report the day before, which became the primary topic of discussion. EGID provided more detailed program cost data at the meeting, which have been incorporated into this report.

In light of the issues raised by this report concerning analytical methods, evaluation expertise, and access to data, MedEncentive once again requested access to utilization source data. In reference to the contradictory findings of Aon’s reports, Frank Wilson acknowledged that EGID had never conducted a study like the MAP pilot before. With reference to the requested data, he said that the promised control-group, de-identified data is still pending, and that the balance of the intervention group’s data is a legal matter.

What follows is MedEncentive’s analysis of the pilot’s 2014 results based on the data from the Aon memorandum and Frank Wilson’s presentation, which contains the updates from Aon’s revised report.

## Source of Data

The principal source of data used in our analysis is the pilot’s year-over-year percent net change values from the Aon memorandum (Exhibit 1) and the pilot’s 2014 results from Frank Wilson’s presentation to the state legislators. These data were reconciled with Aon’s revised report. Both Aon and EGID attested to the accuracy of these results.

In computing savings and return on investment outcomes, we relied on data published, supplied, and/or reconciled by EGID. The specific publications and data sources are identified in the footnotes of Attachment C.

## Experimental Design and Analytical Approach

The MAP pilot experiment is designed to test the cost containment capabilities of the program over a three-year period, by comparing the overall per capita healthcare costs of two groups of HealthChoice health plan members, in which one group is covered by the program (“intervention group”), and the other group is not (“control group”). The hypothesis of the pilot is that the MAP will cause the intervention group’s per capita healthcare expenditures (including the cost of the program), to be less than or equal to the control group’s per capita expenditures, during the pilot. Appropriate experimental design and statistical methods are to be employed to facilitate measuring the impact of the MAP accurately.

What follows is an excerpt from the Experimental Design and Analytical Approach description (refer to Attachment A for the complete description).

**Pilot Size and Group Selection** – The total HealthChoice enrollment prior to the pilot was approximately 120,000 plan members. To achieve statistical significance, the size of the pilot’s intervention (MAP) group was established by statute to be at least 15,000 plan members. The remaining HealthChoice population serves as the pilot’s control group.

The intervention group's average annual enrollment for 2014 (the first year of the pilot) was 16,168 plan members (refer to the table in Attachment B). Based on Frank Wilson's presentation (Exhibit 2), the control group's 2014 enrollment was 114,500 plan members.

To replicate real-world conditions, plan members were assigned to the intervention and control groups by employer. In other words, full school districts and state agencies were assigned to either the intervention or control group. This approach helps prevent cross-contaminating plan member experiences, and helps to utilize employer influence on plan member behavior.

With this in mind, employers were assigned to the intervention and control groups on the basis of plan member age and gender, which were nearly identical in both groups at the beginning of the pilot. A degree of socio-economic matching was achieved by further assigning the employers to the intervention and control groups on a proportionate basis from the health plan's three employer types (school districts, state agencies, and local governments).

To encourage provider participation, the intervention group employers were further selected to be generally concentrated in seven of the state's seventy-seven counties. These counties represent a proportionate cross section of urban, suburban and rural populations.

**Participant Enrollment** – Refer to Attachment A.

**Participation Events** - Refer to Attachment A.

**Provider Compensation and Patient Rewards** - Refer to Attachment A.

**Supporting Studies and Literature** – Refer to Attachment A

**Economic Outcome Analysis** - To appropriately determine the program's ability to control costs, the total per capita healthcare expenditures (hospitalizations, pharmacy, surgeries, lab, x-rays, office visits, cost of the program, etc.) of all the intervention group's enrolled plan members are taken into account, whether they and their healthcare providers actively participated in the program or not. In other words, there is no participant bias in calculating the intervention group's outcomes.

As previously mentioned, appropriate experimental design and statistical methods must be employed to eliminate bias, account for the two groups' historical differences, and to establish a proper confidence interval. After applying these statistical methods, if it is determined that the net change in the total annual per capita healthcare expenditures of the intervention group, relative to its baseline period expenditures (prior to the introduction of the MAP), inclusive of the cost of the program, is equal to or less than the control group's net change from its baseline expenditures during the pilot, then the MAP will be judged to be effective at controlling healthcare costs.

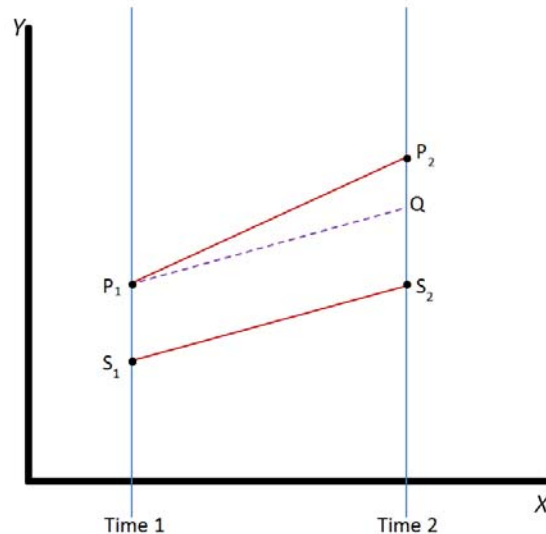
**Analytical Approach** – Aon's memorandum (Exhibit 1) examines the percent net change of seventeen separate metrics from 2012 and 2013 to 2014 (the first year of the pilot), for both the intervention and control group, based on claims data deemed accurate by both EGID and Aon. Aon reported that an adequate claims adjudication run-out period was observed in a manner such that medical services were accounted in the year in which the services occurred.

In reviewing the Aon 2012 to 2014 and 2013 to 2014 year-over-year percent net change results, it is apparent that the intervention and control groups demonstrate consistent variability, namely, the intervention group has a history of higher utilization in nearly all of the calculated metrics.

This consistency in variability between the intervention and control groups lends itself to be mitigated by employing the difference-in-differences (“DID”) statistical technique, commonly used in cohort studies for this purpose.

An Internet search reveals the following definition of DID, with bracketed insertions for clarity:

*Difference in differences requires data measured at two or more different time periods [before and after the introduction of the MAP]. In the example pictured, the treatment [intervention] group is represented by the line P and the control group is represented by the line S. Both groups are measured on the outcome (dependent) variable [metric] at Time 1 [2012 to 2013 baseline] before either group has received the treatment [MAP] (i.e., the independent or explanatory variable), represented by the points P<sub>1</sub> and S<sub>1</sub>. The treatment group then receives or experiences the treatment [MAP] and both groups are again measured after this at Time 2 [2013 to 2014]. Not all of the difference between the treatment [intervention] and control groups at Time 2 [2013 to 2014] (that is, the difference between P<sub>2</sub> and S<sub>2</sub>) can be explained as being an effect of the treatment [MAP], because the treatment group and control group did not start out at the same point at Time 1 [2012 to 2013 baseline]. DID therefore calculates the “normal” difference in the outcome variable [metric] between the two groups (the difference that would still exist if neither group experienced the treatment [MAP]), represented by the dotted line Q. (Notice that the slope from P<sub>1</sub> to Q is the same as the slope from S<sub>1</sub> to S<sub>2</sub>.) The treatment [MAP] effect is the difference between the observed outcome [2014 outcome of the metric] and the “normal” outcome (the difference between P<sub>2</sub> and Q).<sup>2</sup>*



According to the definition of DID, the MAP pilot’s 2012 to 2013 baseline percent net change values for both the intervention and control groups must be compared to the results of the pilot’s first year (2013 to 2014 percent net change values.) Since Aon did not report 2012 to 2013 percent net change baseline values per se, we were able to compute these baseline values from data found in the Aon memorandum and Frank Wilson’s presentation (Exhibit 2).

## Calculations and Observations

**Difference-in-Differences** - Since the objective of the pilot is to test the cost-containment capabilities of the MAP on total health expenditures, we have focused our difference-in-differences technique on the Total Medical and Pharmacy Expenditures Per-Member-Per-Year (PMPY).

In order to perform the difference-in-differences comparison, the baseline percent net change values for both the intervention and control groups in the year prior to the introduction of the MAP (2013) must be known. Aon’s analysis and Frank Wilson’s presentation did not provide these baseline values per se, but did provide enough information so that these values could be computed arithmetically. These computations are described in this section.

<sup>2</sup> [https://en.wikipedia.org/wiki/Difference\\_in\\_differences](https://en.wikipedia.org/wiki/Difference_in_differences)  
[https://commons.wikimedia.org/wiki/File:Illustration\\_of\\_Difference\\_in\\_Differences.png#/media/File:Illustration\\_of\\_Difference\\_in\\_Differences.png](https://commons.wikimedia.org/wiki/File:Illustration_of_Difference_in_Differences.png#/media/File:Illustration_of_Difference_in_Differences.png)>Illustration of Difference in Differences</a> by <a title="User:Danni Ruthvan (page does not exist)" class="new">

Establishing the baseline values begins with known data. The following values are taken from Frank Wilson's presentation to the legislative committee (Exhibit 2):

Table 1		
Description	Intervention Group	Control Group
2014 medical and pharmacy expenditures PMPY	\$6,019	\$5,729
2014 over 2013 medical and pharmacy expenditures PMPY % Net Change	4.5%	1.4%

The following values are taken from the Aon memorandum (Exhibit 1):

Table 2		
Description	Intervention Group	Control Group
2014 over 2012 medical and pharmacy expenditures PMPY % Net Change	12.3%	3.3%

By applying the formula

$$2014 \text{ medical and pharmacy expenditures PMPY} \div (1 - 2014 \text{ over 2013 medical and pharmacy expenditures PMPY \% Net Change})$$

to the known values for the intervention group, above, or  $\$6,019 \div (100\% + 4.5\%)$ , we are able to compute the intervention group's 2013 medical and pharmacy expenditures PMPY of \$5,760. Using the same formula to compute the intervention group's 2012 medical and pharmacy expenditures PMPY, or  $\$6,019 \div (100\% + 12.3\%)$ , produces a value of \$5,360.

By knowing the intervention group's 2012 and 2013 medical and pharmacy expenditures PMPY, we are able to compute the 2013 over 2012 medical and pharmacy expenditures PMPY % Net Change, or  $(\$5,760 - \$5,360) \div \$5,360$ , which equals a 7.5% increase in 2013 over 2012. We applied the same formulas to the control group's known values.

The results of these known values and calculations are represented in the following table:

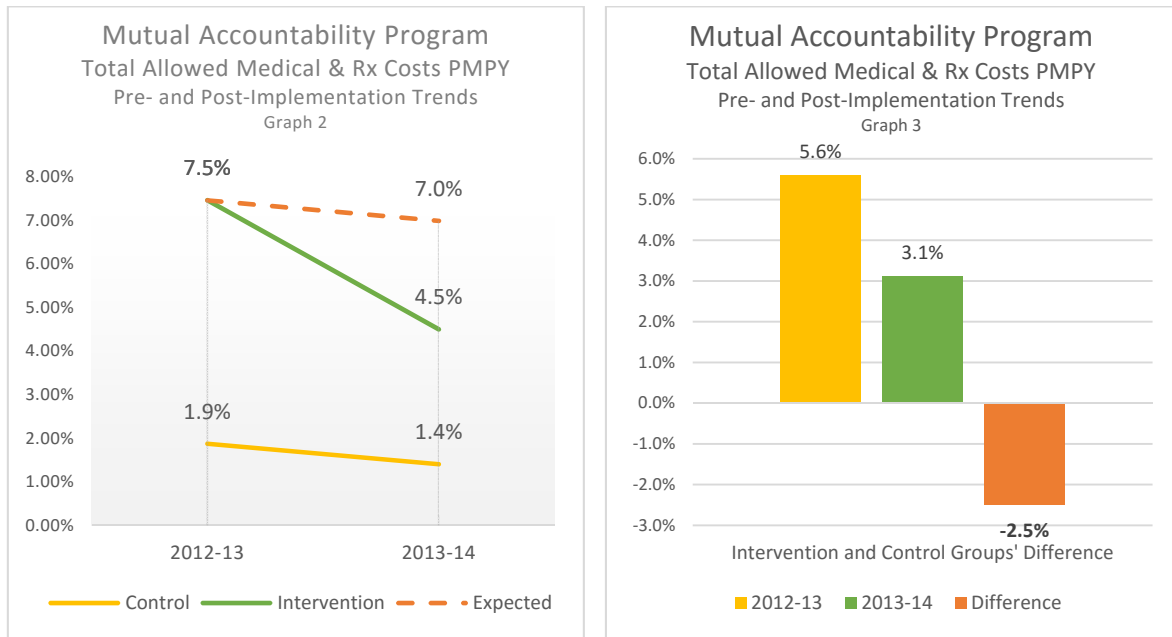
Table 3		
Description	Intervention Group	Control Group
2014 medical and pharmacy expenditures PMPY	\$6,019	\$5,729
2013 medical and pharmacy expenditures PMPY	\$5,760	\$5,650
2012 medical and pharmacy expenditures PMPY	\$5,360	\$5,546
2014 over 2013 medical and pharmacy expenditures PMPY % Net Change	4.5%	1.4%
2013 over 2012 medical and pharmacy expenditures PMPY % Net Change	7.5%	1.9%

Applying the difference-in-differences statistical technique to adjust for the variance in utilization that existed between the intervention and control groups, produces the following table:

Table 4			
Year over year medical and pharmacy expenditures PMPY % net change	Intervention Group	Control Group	Difference
2014 over 2013	4.5%	1.4%	3.1%
2013 over 2012	7.5%	1.9%	5.6%
Change	-3.0%	-0.5%	-2.5%

Using the difference-in-differences results from the Table 4, above, the percent net change results for the baseline period (2013 over 2012) for both the intervention and control groups are plotted on the left of Graph 2, below. Lines are drawn from these points on the graph to the corresponding 2014 results for both the intervention and control groups. A dotted line is drawn from the intervention group baseline point to the “expected” or “normal” result, which represents what the intervention group result would have been, had it behaved like the control group.

The differences in the percent net change values between the two groups for the baseline period and the pilot’s first year, and the difference of these differences, are illustrated in Graph 3.



As this graph indicates, the difference between the two groups narrowed from the baseline year (2013) to the pilot’s first year (2014) in favor of the intervention group by an amount equal to 2.5%<sup>E</sup> of the total medical and pharmacy PMPY expenditures.

Since the MAP was introduced in 2014 as the intervention, it can be inferred, *ceteris paribus* (i.e., all else being equal), that the difference between the expected (normal) and intervention group results could be attributable to the MAP.

As a result, it could be implied that the MAP caused a 2.5% reduction in total medical and pharmacy PMPY expenditures compared to the control group in the first year of the pilot (the statistical significance of this finding is subject to confidence interval testing).

A search of the literature regarding the correlation between health literacy and healthcare expenditures supports this finding (refer to the Supporting Studies and Literature section of Attachment A). This search also reveals a correlation between health literacy and hospitalizations and emergency room use. Therefore, hospitalizations and emergency room visits should demonstrate a similar pattern of decline in favor of within the intervention group.

What follows is an examination of the hospitalizations and emergency room visits results based on Aon’s two reports and the Frank Wilson presentation.

From the hospitalization data found in the Aon memorandum and revised report, and the Wilson presentation, the following table has been constructed.

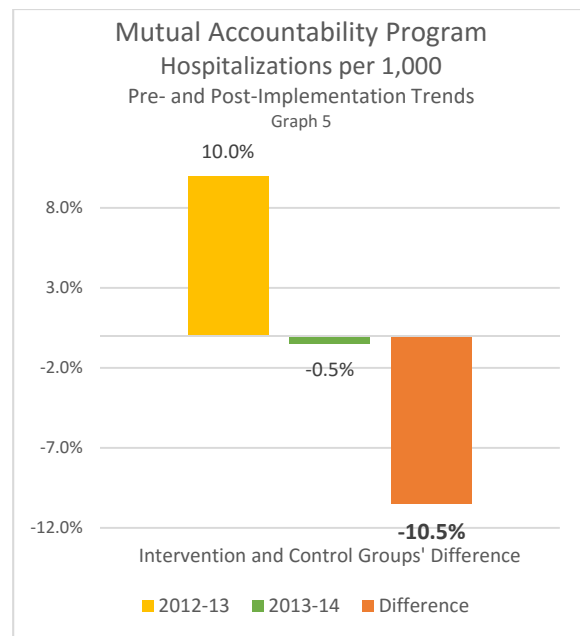
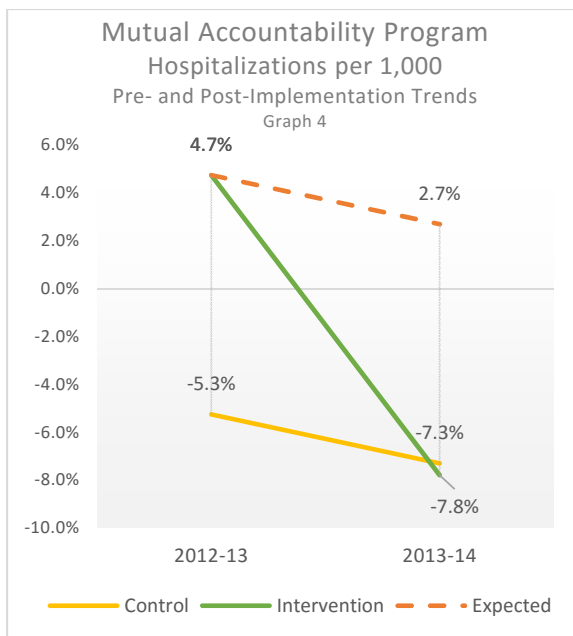
Table 5		
Description	Intervention Group	Control Group
2014 hospitalizations per 1,000	68.7	72.6
2013 hospitalizations per 1,000	74.6	78.3
2012 hospitalizations per 1,000	71.2	82.6
2014 over 2013 hospital per 1,000 % Net Change	-7.8%	-7.3%
2013 over 2012 hospital per 1,000 % Net Change	4.7%	-5.3%

Applying the difference-in-differences statistical technique to the values in Table 5, we are able to produce the following table:

Table 6			
Year over year hospitalizations per 1,000 % net change	Intervention Group	Control Group	Difference
2014 over 2013	-7.8%	-7.3%	-0.5%
2013 over 2012	4.7%	-5.3%	-10.0%
Change	-12.5%	-2.0%	-10.5%

Using the difference-in-differences results from Table 6, above, the percent net change results for the baseline period (2013 over 2012) for both the intervention and control groups are plotted on the left of Graph 4, below. As before, lines are drawn from these points on the graph to the corresponding 2014 results for both the intervention and control groups. A dotted line is drawn from the intervention group baseline point to the “expected” or “normal” result, which represents what the intervention group result would have been, had it behaved like the control group.

The differences in the percent net change values between the two groups for the baseline period and the pilot’s first year, and the difference of these differences, are illustrated in Graph 5.





As the graph above indicates, the intervention group's percent net change for hospitalizations per 1,000 was better than the control, outright, which amounted to a 10.5% improvement in 2014 relative to the 2013 baseline, in favor of the intervention group.

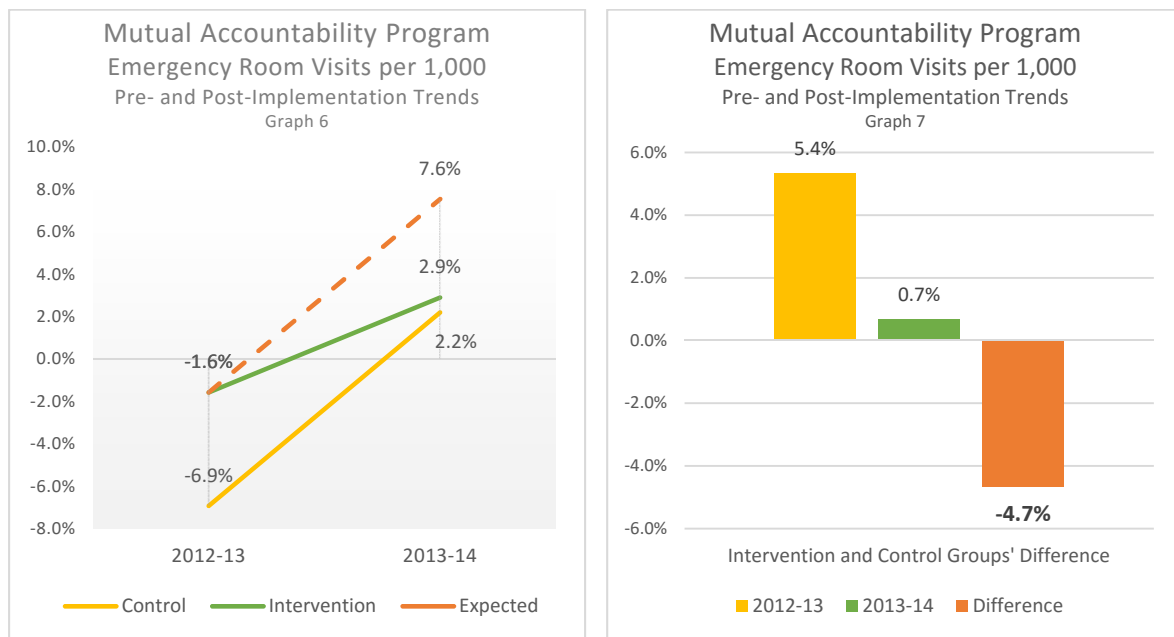
With regard to emergency room visits, we used the Aon and Wilson data to create the following table. (Missing values were derived by applying the formulas presented, above, to the known Aon and Wilson data.)

Description	Intervention Group	Control Group
2014 emergency room visits per 1,000	231.8	245.2
2013 emergency room visits per 1,000	225.1	239.8
2012 emergency room visits per 1,000	228.7	257.7
2014 over 2013 emergency room visits per 1,000 % Net Change	2.9%	2.2%
2013 over 2012 emergency room visits per 1,000 % Net Change	-1.6%	-6.9%

Applying the difference-in-differences statistical method to the values in Table 7, yields the following table:

Year over year emergency room visits per 1,000 % Net Change	Intervention Group	Control Group	Difference
2014 over 2013	2.9%	2.2%	0.7%
2013 over 2012	-1.6%	-6.9%	-5.4%
Change	4.5%	9.1%	-4.7%

The difference-in-differences results from Table 8 are plotted on the following graphs.



Since studies have correlated health literacy to lower hospitalizations, emergency room visits and overall costs (refer to the Supporting Studies and Literature section of Attachment A); and since health literacy is one of the principal active components of the MAP; and since the intervention group's hospitalizations and emergency room visits per 1,000 improved relative to the control group after the MAP was introduced in 2014, it can be inferred, *ceteris paribus*, that the intervention group's reduction in overall percent net change in PMPY total

expenditures, relative to the control group in 2014, could be attributable to the MAP (the statistical significance of this finding is subject to confidence interval testing).

**Cost Savings and Return on Investment** – Data from the Aon memorandum, Frank Wilson’s presentation and other reconciled sources (refer to the footnotes in Attachment D) are used to determine the cost savings and return on investment resulting from the 2.5% reduction in total medical and pharmacy PMPY expenditures found in the difference-in-differences analysis, above.

To determine costs savings, the average annual enrollment in the program (Attachment B) is multiplied by the 2014 medical and pharmacy expenditures PMPY from Frank Wilson’s presentation (Exhibit 2) and the percent reduction in total expenditures from the difference-in-differences analysis, or  $16,168 \text{ members} \times \$6,019 \text{ PMPY} \times 2.5\%$ . This equates to \$2,432,817.

Since this figure includes the program’s provider compensation and patient rewards, Gross Savings are determined by adding 2014 incentive payments of \$509,208 to the figure, above, or  $\$2,432,817 + \$509,228$ . This equates to a Gross Savings of \$2,942,045.

The Net Savings for 2014 is determined by subtracting the full cost of the program from Gross Savings. The full cost of the program is the sum of the paid incentives, plus the fees paid to MedEncentive, plus Hewlett Packard’s implementation costs, plus check processing fees, or  $\$509,228 \text{ (paid incentives)} + \$652,949 \text{ (MedEncentive fees)} + \$22,517 \text{ (HP start-up)} + \$38,214 \text{ (HP check fees)}$ . This equates to a 2014 Cost of the Program of \$1,222,907.

The 2014 Net Savings is found by subtracting the Cost of the Program from the Gross Savings, or  $\$2,942,045 - \$1,222,907$ . This equates to a Net Savings of \$1,719,137.

Return on investment in the MAP is determined by dividing the Net Savings by the Cost of the Program, or  $\$1,719,137 \div \$1,171,183$ . This equates to a 141% rate of return or 2.4:1 return on investment.

These net savings and return on investment calculations and data sources are presented in Attachment C.

## Conclusions and Discussion

The Aon analysis (Exhibit 1) establishes the fact that the intervention group has a higher rate of healthcare utilization relative to the control group, during the accounting periods. This is borne out by the fact that almost all of the fifteen cost- and utilization-related metrics Aon measured were higher for the intervention group, relative to the control group, when 2014 was compared to 2013 and 2012. This higher level of utilization was further confirmed by the data presented by Frank Wilson to the state legislators.

The fact that the intervention group had a higher initial level of healthcare utilization and a higher absolute rate of year-over-year net change in healthcare utilization relative to the control group, demonstrates that these two groups are different. In the Aon memorandum, the authors imply that this difference in utilization was an indication that the MAP was ineffectual at controlling costs in 2014.

Experts in the fields of population health and health economics reviewed Aon’s analytical approach and determined that their findings were a measure of the difference between the two groups, but did not measure the impact of the MAP.

These experts further advised that a consistent difference in utilization behavior between the two groups indicates the need to adjust (normalize) for this difference to determine the impact of the MAP. As previously stated, Linda Riddell, a population health scientist with the Validation Institute, recommended the “difference-in-differences” or “DID” statistical technique for this purpose. Ms. Riddell also reviewed this report, and confirmed that we had applied the difference-in-differences method correctly in our analysis.

By applying the DID method to the data from the Aon memorandum and Frank Wilson's presentation, the intervention group's total PMPY health expenditures were 2.5% less than the control group's expenditures in the pilot's first year (2014).

A search of the literature reveals a correlation between health literacy and lower hospitalizations, emergency room visits and overall healthcare costs. Since the advancement of health literacy is one of the principal objectives of the MAP, we tested for improvements in hospitalizations and emergency room visits as a means to attribute the 2.5% reduction in total PMPY health expenditures to the MAP.

After applying the difference-in-differences statistical technique to the data from the Aon reports and Frank Wilson's presentation, the intervention group's hospitalizations and emergency room visits per 1,000 improved relative to the control group by 10.5% and 4.7%, respectively.

Using the data sources and calculations described above and presented in Attachment C, it was determined that the total PMPY healthcare expenditure percent difference between the groups computes to a savings of over \$1.77 million in 2014, net of the cost of the program, for the 16,168 people who comprised the intervention group. This implies the return on investment in the MAP was 2.4:1 for 2014, the first year of the pilot.

If the MAP had been deployed with the full HealthChoice population, the projected savings based on these results would be approximately \$13.6M for the year (refer to Attachment C).

It is fair and appropriate to state that these results are a positive indication of the cost-containment capabilities of the MAP. However, it must be added that, even though our analysis is more valid than Aon's, it does not meet the universally accepted standard of validity because of the lack of data. This and other limitations of the analyses and the pilot's experimental design are discussed in the following section.

## **Limitations of the Analyses and the Pilot with Recommendations**

Though the cost savings and return on investment are positive outcomes, we believe they could have been even better. Initially, the claims data MedEncentive needed to operate the program were delayed, so the pilot actually started around mid-February of 2014. This means that the reported savings were achieved in only 10 ½ months.

Another impediment has been the lack of access to data. The MAP is designed to be adjusted based on data analysis by the program's developers (MedEncentive). Now that positive outcomes have been found in the pilot's first year, MedEncentive's access to data is an issue that we hope will be resolved in the near future.

We noted some inconsistencies in the results that warrant more in-depth analysis and continued observation as the pilot continues. These inconsistencies, coupled with the fact that Aon's analytical methods and findings differ significantly from ours, underscore the need to allow MedEncentive and independent experts to have access to claims and pharmacy utilization data to verify computations, reconcile variances, and confirm findings. We continue to strongly suggest that the evaluation of the pilot should be a collaborative exercise among all the parties who can make a constructive contribution to the process.

Since the MAP Pilot Project is a relatively large public sector experiment, it can be expected that interested experts will want to scrutinize all aspects of the pilot. Therefore, we believe it is imperative that the pilot's experimental design and evaluative processes meet at least a "peer-review" standard. More appropriately, the pilot's experimental design and evaluation should meet the Validations Institute's rules of validation<sup>3</sup>, which can be found on the Institute's website.

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<sup>3</sup> The Validations Institute's rules of validation can be found online at: <http://www.validationinstitute.com/rules/rules-validation/>

By definition, the MAP pilot is a cohort study in the field of population health. It involves testing a hypothesis by measuring the impact of a variable (the MAP) that is offered to a group of people, against a similar group of people who are not offered the variable, over an extended period of time (longitudinal study). In order for the pilot to be credible, it should be evaluated by an independent and reputable health economist or population health analyst with experience in analyzing and assessing pilots like this one.

Therefore, a limitation of both Aon's and our analyses is that neither of us is truly qualified. Furthermore, MedEncentive cannot be the evaluator of its own program. The best way to resolve this limitation is for the parties to appoint an evaluator that meets the qualifications described above.

To this end, MedEncentive has engaged the Validation Institute, one of the country's leading organizations in the field of population health evaluation, to review this analysis and offer recommendations on who and how the pilot should be evaluated. Linda Riddell, population health scientist with the Validation Institute, and her colleagues, are preparing a set of recommendations on how to appropriately evaluate the pilot and who is qualified to conduct the evaluation.

Another important limitation of these analyses is the lack of detail. The Aon memorandum only presents annual percent net change values without any of the dollar amounts and counts used to compute these percentages. Frank Wilson's presentation contains limited dollar figures and counts for 2014 only. Aon's revised report (not attached) provided some additional dollar amounts and counts for 2013 and 2014, but nothing for 2012. This analysis is based on this limited quantity of data, and its validity is limited by the quality and quantity of its source data.

MedEncentive has not only been prevented access to pilot data, but was not privy to the 2014 results until late September 2015. Even then, the amount of detailed information made available has been very limited. This prevents MedEncentive from being able to make adjustments to the program to optimize results, or consult with experts on how to improve the pilot.

The Aon analysis and conclusions have been communicated by EGID to state officials and legislators since May. These preliminary disclosures of incomplete results introduce confounding variables that could bias the outcomes.

No credible analysis can be conducted without testing the statistical significance of the analytical findings. Neither Aon's nor our analysis has had its respective findings tested for statistical significance, a null hypothesis or alternative hypotheses. To perform this type of statistical testing will most likely require access to the medical and pharmacy utilization data, which we strongly recommend.

As mentioned throughout this analysis, relevant baseline data must be established to make the necessary adjustments to measure the impact of the MAP. To simply measure results from the end of 2013 to the end of 2014 does not adjust for the dissimilarities between the intervention and control groups that existed before the pilot began. As of this date, the requested 2013 over 2012 results have not been provided, per se. These values had to be arithmetically computed from the 2014 over 2012 data. This made the process of analysis more difficult and time-consuming.

In light of the issues raised by this report concerning analytical methods, evaluation expertise, and access to data, steps need to be taken to supply MedEncentive with the requested data on an ongoing basis, and an independent expert in the field of population health needs to be engaged to conduct the pilot's evaluation. It is also recommended that the process of pilot analysis be as collaborative as possible to produce the best results. It is also recommended that year-over-year analyses be conducted on a quarterly basis so adjustments to the program can be implemented to optimize outcomes.

## Attachment A

### Experimental Design and Analytical Approach

The MAP pilot experiment is designed to test the cost-containment capabilities of the program over a three-year period, by comparing the overall per capita healthcare costs of two groups of HealthChoice health plan members, in which one group is covered by the program (“intervention group”), and the other group is not (“control group”). The hypothesis of the pilot is that the MAP will cause the intervention group’s per capita healthcare expenditures, relative to its baseline (and including the cost of the program), to be less than or equal to the control group’s per capita expenditures, relative to its baseline, during the pilot.

To properly test this hypothesis, the appropriate normalization and statistical methods must be employed to account for the groups’ dissimilarities, mitigate the impact of confounding variables, and establish an appropriate confidence interval. To be a fair and unbiased experiment, the pilot must also be conducted as close to a real-world installation as possible in terms of how the MAP is administered and operated.

Finally, the pilot evaluation must be conducted appropriately by an independent expert who is experienced with evaluating studies of this nature.

**Pilot Size and Group Selection** – The total HealthChoice enrollment prior to the pilot was approximately 120,000 plan members. To achieve statistical significance, the size of the pilot’s intervention (MAP) group was established by statute to be at least 15,000 plan members. The remaining HealthChoice population serves as the pilot’s control group.

The intervention group’s average annual enrollment for 2014 (the first year of the pilot) was 16,168 plan members (refer to the table in Attachment B). Based on Frank Wilson’s presentation (Exhibit 2), the control group enrollment was 114,500 plan members.

To replicate real-world conditions, plan members were assigned to the intervention and control groups by employer. In other words, full school districts and state agencies were assigned to either the intervention or control group. This approach helps prevent cross-contaminating plan member experiences, and helps to utilize employer influence on plan member behavior.

With this in mind, employers were assigned to the intervention and control groups on the basis of plan member age and gender, which were nearly identical in both groups at the beginning of the pilot. A degree of socio-economic matching was achieved by further assigning the employers to the intervention and control groups on a proportionate basis from the health plan’s three employer types (school districts, state agencies, and local governments).

To encourage provider participation, the intervention group employers were further selected to be generally concentrated in seven of the state’s seventy-seven counties. These counties represent a proportionate cross-section of urban, suburban and rural populations.

**Participant Enrollment** - As is the case in real-world MAP installations, all intervention group plan members were automatically enrolled in the program as part of their health plan benefit. Provider enrollment in the program is on a voluntary basis as a result of MedEncitive, health plan, health system, and patient recruitment efforts.

**Participation Events** - Opportunities to participate in the program occur for both providers and plan members with each medical office visit. Participation by either party is voluntary on an office visit-to-office visit basis. Non-participation by either party with any given office visit does not affect the opportunity of the other party to participate, or to earn financial rewards offered by the program.

**Provider Compensation and Patient Rewards** - When a medical provider (doctor) successfully completes a program opportunity on the MAP website that results in an information therapy prescription to the patient (plan member), the provider earns the extra compensation for that office visit offered by the program. This extra compensation is \$15 per office visit if the provider participates in a timely fashion, and \$7.50 if MedEncentive must remind the provider of the opportunity after a covered office visit.

The program administrator informs patients of their opportunity to participate after each office visit via postal or email notification. Patients earn a \$15 refund of their office visit co-payments when they access the MAP website and successfully complete their information therapy prescriptions.

**Supporting Studies and Literature** – In the Aon memorandum, there were suppositions made about how the MAP achieved cost containment effectiveness that were not entirely correct. One such comment was:

*By encouraging members to utilize physician office visits, the goal would be to realize a decrease in emergency room visits for which the cost is considerably higher.*

And another comment was:

*According to recent health care studies, medical literature suggests encouraging members to see physicians can result in higher utilization and higher costs in the short term. The mix of services performed and prescription drugs could increase costs in the various populations.*

Aon also reported the following:

*In 2014, there were 7,529 members that participated in this program, which is approximately 48% of the members in the intervention group.*

Though these comments may be partially correct, they are inaccurate enough vis-à-vis the mechanisms underpinning the program's effectiveness, that the program could be misanalyzed. Therefore, a brief description of the scientific foundation of the MAP is warranted.

As mentioned above, the Mutual Accountability Program derives its cost-containment effectiveness by combining three motivators: 1) behavior economics; 2) the knowledge-adherence response associated with health literacy; and 3) the Hawthorne Effect (patient) and customer service/image (provider) interpersonal relationship psychologies. What follows is an abbreviated summary of the studies and literature that support the theoretical effectiveness of the MAP.

In the program, financial incentives are used to stimulate participation. According to a study that examined the use and influence of employee incentives on participation in care management programs<sup>4</sup>, “cash incentives and communication play a significant role in rates of participation and program completion.” The types of communications recommended included emails, text messages, letters and health fairs, all of which are integral to the MAP.

The MAP's financial incentives are structured to maximize participation in the program by incorporating methods that studies have proven to be most effective for this purpose. Examples include loss aversion<sup>5</sup> by

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<sup>4</sup> Wilhite C, Hayes JR, Farah JR. The use and influence of employee incentives on participation and throughput in a telephonic disease management program. *Population Health Management*. 2008;4:197-202.

<sup>5</sup> Dixon-Fyle S, Gandhi S, Pellathy T, Spatharou A. Changing patient behavior: the next frontier in healthcare value. *Health International*. 2012;12:64-73.

means of the program's final notices and expiration dates, and Pavlovian conditioning by means of the program's frequent and immediate rewards for "SMART"<sup>6</sup> objectives.

The MAP incentives are also intended to invoke the behavior-improvement aspects of the program: information therapy to advance health literacy; mutual accountability to induce the Hawthorne Effect (i.e., authority-adherence response); and customer/image psychology.

With regard to health literacy, a number of studies demonstrate its correlation to hospitalizations and the use of emergency services.<sup>7,8,9,10</sup> Still other studies associate lower levels of health literacy with higher healthcare costs.<sup>11,12,13,14</sup>

As previously mentioned, the program requires patients to read and understand health articles relevant to their diagnoses, with each office visit, to earn the program's financial reward. With each of these "information therapy sessions," patients are asked to rate how beneficial an article was in helping them self-manage their health. In 2014, the composite of over 40,000 responses to this question among patients in the pilot was 4.13 out of 5, which is a strong consensus that the knowledge patients gained through the program was considered valuable.

With regard to the mutual accountability aspect of the program, a study that tested the impact of the doctor-patient relationship found that patients who perceived a higher quality of interpersonal exchange with their physicians, including greater out-of-office contact, were more likely to monitor their blood pressure, exercise five days a week and adhere to medication regimens, among other healthy behaviors.<sup>15</sup> Part of this patient activation could be associated with the Hawthorne Effect, a psychological phenomenon that produces an improvement in human behavior as a result of increased attention from a person in a position of authority and trust, i.e., the doctor.

To test for the presence of the Hawthorne Effect in the program, patients are asked how important it is that their doctor is aware that they are trying to accomplish, or are accomplishing, health objectives. On a scale of 1 to 10, with 10 being of highest importance, the composite of over 40,000 responses by patients in 2014, was 8.94. This implies that patient compliance with healthy behaviors is being influenced in the vast majority of instances by the perceived involvement of the physician.

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<sup>6</sup> S.M.A.R.T. is an acronym for an organized approach to behavior change outcome objectives that stands for Specific, Measurable, Achievable, Relevant, and Time-specific.

<sup>7</sup> Baker DW, Parker RM, Williams MV, Clark WS. The relationship of patient reading ability to self-reported health and use of health services. *American Journal of Public Health*. 1997;87(6):1027-1030.

<sup>8</sup> Baker DW, Parker RM, Williams MV, Clark WS. Health literacy and the risk of hospital admission. *Journal of General Internal Medicine*. 1998;13(12):791-798.

<sup>9</sup> Baker DW, Gazmararian JA, Williams MV, Scott T, Parker RM, Green D, Ren J, Peel J. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *American Journal of Public Health*. 2002;92(8):1278-1283.

<sup>10</sup> Gordon MM, Hampson R, Capell HA, Madhok R. Illiteracy in rheumatoid arthritis patients as determined by the Rapid Estimate of Adult Literacy (REALM) score. *Rheumatology*. 2002;41(7):750-754.

<sup>11</sup> Friedland R. New estimates of the high costs of inadequate health literacy. In *Proceedings of Pfizer Conference "Promoting Health Literacy: A Call to Action."* 1998 October 7-8; Washington, DC: Pfizer, Inc.; 6-10.

<sup>12</sup> Howard DH, Gazmararian J, Parker RM. The impact of low health literacy on the medical costs of Medicare managed care enrollees. *The American Journal of Medicine*, 2005;118:371-377.

<sup>13</sup> Vernon JA, Trujillo A, Rosenbaum S, DeBuono B. Low health literacy: Implications for national health policy. Washington, DC: Department of Health Policy, School of Public Health and Health Services, The George Washington University [http://publichealth.gwu.edu/departments/healthpolicy/CHPR/downloads/LowHealthLiteracyReport10\\_4\\_07.pdf](http://publichealth.gwu.edu/departments/healthpolicy/CHPR/downloads/LowHealthLiteracyReport10_4_07.pdf)

<sup>14</sup> Eichler K, Wieser S, Brügger U. The costs of limited health literacy: a systematic review. *International Journal of Public Health*. 2009;54(5):313-324.

<sup>15</sup> Alexander J, Heard L, Mittler J, Harvey J. Patient-Physician Role Relationships and Patient Activation among Individuals with Chronic Illness. *Health Service Research*. 2012;47 (3 Pt 1):1201-1223.

It is important to note that the Hawthorne Effect seems to be present even when a doctor is not currently participating in the program. Our data show that patient responses to the program questions related to physician influence on patient compliance, are nearly as high in instances when the doctors do not participate in the program for the associated office visits, as when doctors do participate. This seems to be the case because patients are made aware that their doctors will have access to the historical patient health literacy and adherence (or non-adherence) responses at any time in the future.

The comments and statistics in the Aon memorandum and Frank Wilson's presentation about the number and percentage of doctors and patients who participated in the program warrant clarification.

As mentioned above, Aon reported that 7,529 plan members or approximately 48% of enrollees participated in the program in 2014. Frank Wilson's presentation reported patient participation at 50% and 10% for physicians. While the number of patients and physicians who participate in the program are important figures, they are not as important as "success rate." This statistic measures the number of program sessions (information therapy sessions) that are successfully completed relative to the total number of session opportunities that occurred in the covered population over a period of time. Arithmetically, this statistic is expressed as follows:

$$\text{successfully completed information therapy sessions} \div \text{information therapy opportunities}$$

Since information therapy opportunities are analogous to office visits, success rate can be expressed as:

$$\text{successfully completed information therapy sessions} \div \text{office visits of covered plan members}$$

In ten years of testing the program in numerous real-world trials, a return on investment in the program was realized in each instance in which the "patient success rate" reached 55% or better. These trials also found that "physician success rates," ranging from 5% to 40%, did not seem to make an appreciable difference on ROI. (The impact of provider success rates in excess of 40% on ROI is yet to be determined.) Therefore, the focus of attention in the pilot's first year was to reach the 55% patient success rate threshold.

Similar to a 90-day claims run-out to account for all incurred medical services for a given period of time, patient success rates are calculated after the end of a quarter for the year-ending as of the previous quarter.

Using this accounting method, the pilot's patient success rate for 2014 was 57.18%.

Even though the 55% patient success rate goal was achieved in 2014, it should be noted that there was a 45-day initial delay in receiving claims from the health plan's administrator, Hewlett-Packard. This, along with the normal ramping associated with a start-up, caused the impact of the program to be somewhat suppressed in 2014.

Since the program participation is voluntary with each office visit, a note about patient self-selection is worthwhile.

By design, the program focuses on plan members with severe, acute conditions or chronic health issues, while not discriminating against healthy people. According to our studies, a healthy plan member who may only see the doctor once a year, is less likely to participate in the program than a person who has several visits during the year. Obviously, high-frequency patients are more motivated to participate because they have more out-of-pocket expenses to recover. These patients may also be motivated to participate by the need to gain knowledge through the program because of pain or fear associated with their medical condition. So the process of patient self-selection into the program is designed to be constructive.

**Economic Outcome Analysis** - To appropriately determine the program's ability to control costs, the total per capita healthcare expenditures (hospitalizations, pharmacy, surgeries, lab, x-rays, office visits, cost of the program, etc.) of all the intervention group's enrolled plan members are taken into account, whether they and their



healthcare providers actively participated in the program or not. In other words, there is no participant bias in calculating the intervention group's outcomes.

As previously mentioned, appropriate statistical methods must be used to account for the two groups' historical differences, and to establish a proper confidence interval. After applying these statistical methods, if it is determined that the net change in the total annual per capita healthcare expenditures of the intervention group, relative to its baseline period expenditures (prior to the introduction of the MAP), inclusive of the cost of the program, is equal to or less than the control group's net change from its baseline expenditures during the pilot, then the MAP will be judged to be effective at controlling healthcare costs.

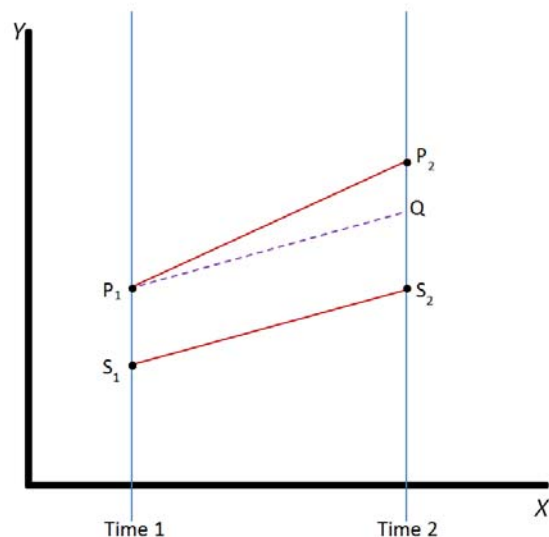
**Analytical Approach** – The Aon memorandum (refer to Exhibit 1) examines the percent net change of seventeen separate metrics (refer to Exhibit 1) from 2012 and 2013 to 2014 (the first year of the pilot), for both the intervention and control group, based on claims data deemed accurate by both EGID and Aon. Aon reported that an adequate claims adjudication run-out period was observed in a manner such that medical services were accounted in the year in which the services occurred.

In reviewing the Aon 2012 to 2014 and 2013 to 2014 year-over-year percent net change results, it is apparent that the intervention and control groups demonstrate consistent variability, namely, the intervention group has a history of higher utilization in nearly all of the calculated metrics.

This consistency in variability between the intervention and control groups lends itself to be mitigated by employing the difference in differences ("DID") statistical technique, commonly used in cohort studies for this purpose.

An Internet search reveals the following definition of DID, with bracketed insertions for clarity:

*Difference in differences requires data measured at two or more different time periods [before and after the introduction of the MAP]. In the example pictured, the treatment [intervention] group is represented by the line P and the control group is represented by the line S. Both groups are measured on the outcome (dependent) variable [metric] at Time 1 [2012 to 2013 baseline] before either group has received the treatment [MAP] (i.e., the independent or explanatory variable), represented by the points P<sub>1</sub> and S<sub>1</sub>. The treatment group then receives or experiences the treatment [MAP] and both groups are again measured after this at Time 2 [2013 to 2014]. Not all of the difference between the treatment [intervention] and control groups at Time 2 [2013 to 2014] (that is, the difference between P<sub>2</sub> and S<sub>2</sub>) can be explained as being an effect of the treatment [MAP], because the treatment group and control group did not start out at the same point at Time 1 [2012 to 2013 baseline]. DID therefore calculates the "normal" difference in the outcome variable [metric] between the two groups (the difference that would still exist if neither group experienced the treatment [MAP]), represented by the dotted line Q. (Notice that the slope from P<sub>1</sub> to Q is the same as the slope from S<sub>1</sub> to S<sub>2</sub>.) The treatment [MAP] effect is the difference between the observed outcome [2014 outcome of the metric] and the "normal" outcome (the difference between P<sub>2</sub> and Q).<sup>16</sup>*



<sup>16</sup> [https://en.wikipedia.org/wiki/Difference\\_in\\_differences](https://en.wikipedia.org/wiki/Difference_in_differences)

According to the definition of DID, the MAP pilot's 2012 to 2013 baseline percent net change values for both the intervention and control groups must be compared to the results of the pilot's first year (2013 to 2014 percent net change values.) Since Aon did not report 2012 to 2013 baseline values per se, we were able to compute the baseline values for four of Aon's metrics from the data in Frank Wilson's presentation (Exhibit 2).

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[https://commons.wikimedia.org/wiki/File:Illustration\\_of\\_Difference\\_in\\_Differences.png#/media/File:Illustration\\_of\\_Difference\\_in\\_Differences.png](https://commons.wikimedia.org/wiki/File:Illustration_of_Difference_in_Differences.png#/media/File:Illustration_of_Difference_in_Differences.png)>Illustration of Difference in Differences</a>" by <a title="User:Danni Ruthvan (page does not exist)" class="new"

## Attachment B

Description	Invoice Date	Invoice #	Plan Members	Member-ship Cards	Price per Item	Total Fee
Ix Access Fees with POSI Real-Time Version	03/14/2014	613	16,029		3.33	53,376.57
Member ID Card	03/14/2014	613		13,202	1.00	13,202.00
Ix Access Fees with POSI Real-Time Version	03/20/2014	623	16,091		3.33	53,583.03
Member ID Card	03/20/2014	623		100	1.00	100.00
Ix Access Fees with POSI Real-Time Version	04/15/2014	633	16,159		3.33	53,809.47
Member ID Card	04/15/2014	633		202	1.00	202.00
Ix Access Fees with POSI Real-Time Version	05/13/2014	643	16,185		3.33	53,896.05
Member ID Card	05/13/2014	643		151	1.00	151.00
Ix Access Fees with POSI Real-Time Version	06/17/2014	654	16,205		3.33	53,962.65
Member ID Card	06/17/2014	654		122	1.00	122.00
Ix Access Fees with POSI Real-Time Version	07/25/2014	664	16,164		3.33	53,826.12
Member ID Card	07/25/2014	664		113	1.00	113.00
Ix Access Fees with POSI Real-Time Version	08/14/2014	674	16,087		3.33	53,569.71
Member ID Card	08/14/2014	674		124	1.00	124.00
Ix Access Fees with POSI Real-Time Version	09/16/2014	684	15,916		3.33	53,000.28
Member ID Card	09/16/2014	684		349	1.00	349.00
Ix Access Fees with POSI Real-Time Version	10/15/2014	694	16,238		3.33	54,072.54
Member ID Card	10/15/2014	694		757	1.00	757.00
Ix Access Fees with POSI Real-Time Version	11/20/2014	705	16,291		3.33	54,249.03
Member ID Card	11/20/2014	705		241	1.00	241.00
Ix Access Fees with POSI Real-Time Version	12/18/2014	717	16,308		3.33	54,305.64
Member ID Card	12/18/2014	717		201	1.00	201.00
Ix Access Fees with POSI Real-Time Version	01/16/2015	722	16,338		3.33	54,405.54
Member ID Card	01/16/2015	722		132	1.00	132.00

**Totals**

**194,011**

**15,694**

**\$661,750.63**

**Annual Average Plan Members**

**16,168**

Hewlett Packard Fees					
Mailing Fees				Implementation Fee	Total
Price per mailing		\$1.05			
	Mailings		Paid		
January	36		\$37.80	\$67,550.08	
February	1,660		\$1,743.00		
March	2,621		\$2,752.05		
April	3,950		\$4,147.50		
May	2,271		\$2,384.55		
June	2,169		\$2,277.45		
July	5,869		\$6,162.45		
August	2,150		\$2,257.50		
September	2,471		\$2,594.55		
October	4,620		\$4,851.00		
November	4,398		\$4,617.90		
December	3,179		\$3,337.95		
<b>Sub-total</b>	<b>35,394</b>		<b>\$37,163.70</b>	<b>\$67,550.08</b>	
<b>Total</b>					<b>\$104,713.78</b>

## Attachment C

### State of Oklahoma HealthChoice Mutual Accountability Program Pilot First Year (2014) Return on Investment Analysis

2014 Average Number of Lives in Intervention Group <sup>A</sup>	16,168		
2014 Medical & Pharmacy Expenditures PMPY <sup>B</sup>	\$6,019		
Total 2014 Claims Expenditures for Intervention Group <sup>C,D</sup>		\$97,312,684	
2014 Intervention Group Savings % Relative to Control <sup>E</sup>		<u>2.5%</u>	
2014 Intervention Group Savings			\$2,432,817
2014 MedEncentive Patient Reward (Success) Count <sup>F</sup>	30,548		
MedEncentive Patient Reward per Success	<u>\$15.00</u>		
Total 2014 Patient MedEncentive Rewards Paid		\$458,220	
2014 MedEncentive Provider Real-Time Rewards Count <sup>G</sup>	1,062		
MedEncentive Provider Real-Time Reward per Success	<u>\$15.00</u>		
Total 2014 MedEncentive Provider Real-Time Rewards Paid		\$15,930	
2014 MedEncentive Provider After-the-Fact Rewards Count <sup>H</sup>	4,677		
MedEncentive Provider After-the-Fact Reward per Success	<u>\$7.50</u>		
Total 2014 MedEncentive Provider After-the-Fact Rewards Pd		<u>\$35,078</u>	
Total 2014 MedEncentive Patient and Provider Rewards Paid			<u>\$509,228</u>
2014 Gross Savings w/MedEncentive Rewards Removed (A)			<b>\$2,942,045</b>
2014 Gross Savings % with MedEncentive Rewards Removed			<b>3.02%</b>
Total 2014 MedEncentive Fees (from paid invoices) <sup>I</sup>		\$661,751	
Divided by Length of Pilot in Years	\$13,202		
Multiplied by Years Remaining in the Pilot	3		
Start-up ID Card Expenses Amortization Credit	<u>2</u>		
Divided by Length of Pilot in Years		-\$8,801	
2014 MedEncentive Patient Rewards (Success) Count <sup>J</sup>	36,394		
Hewlett-Packard Admin Fee per Printed Check <sup>K</sup>	<u>\$1.05</u>		
Total 2014 Hewlett-Packard Admin Fee		\$38,214	
Hewlett-Packard Implementation Fee <sup>L</sup>	\$67,550		
Length of Pilot in Years	<u>3</u>		
Hewlett-Packard Implementation Fee per Year		<u>\$22,517</u>	
Total 2014 MedEncentive Admin Expenditures \$			\$713,680
Total 2014 MedEncentive Patient and Provider Rewards \$			<u>\$509,228</u>
Total 2014 MedEncentive Program Expenditures \$ (B)			<b>\$1,222,907</b>
2014 MedEncentive Program ROI = (A-B)/B		<b>140.6%</b>	<b>2.4:1</b>
2014 Gross Savings w/MedEncentive Rewards Removed (A)			\$2,942,045
Total 2014 MedEncentive Program Expenditures \$ (B)			<u>\$1,222,907</u>
2014 Intervention Group Net Savings (A-B)			<b>\$1,719,137</b>
2014 Intervention Group Net Savings %			<b>1.77%</b>

# State of Oklahoma

## HealthChoice Mutual Accountability Program Pilot

### First Year (2014) Return on Investment Analysis - Full HealthChoice Deployment Projection

2014 Control Group Active Member Enrollment <sup>M</sup>	114,500	
2014 Control Group Total PMPY Expenditures <sup>N</sup>	<u>\$5,729</u>	
2014 Control Group Total Expenditures		\$655,970,500
2014 Intervention Group Active Member Enrollment <sup>A</sup>	16,168	
2014 Intervention Group Total PMPY Expenditures <sup>B</sup>	<u>\$6,019</u>	
2014 Intervention Group Total Expenditures		\$97,312,684
2014 Total Expenditures		\$753,283,184
2014 Intervention Group Net Savings %		<u>1.77%</u>
2014 Projected Savings if Deployed with Full HealthChoice Active Members		<b>\$13,307,590</b>

<sup>A</sup> 2014 Average Number of Lives in Intervention Group is derived from the Employees Group Insurance Department's (EGID's) official monthly MAP enrollment sent to MedEncentive for invoicing purposes (refer to Attachment B).

<sup>B</sup> 2014 Intervention Group Active Medical & Pharmacy Expenditures PMPY from Frank Wilson presentation (refer to Exhibit 2)

<sup>C</sup> Total 2014 Claims Expenditures for Intervention Group is assumed to be the same as Total 2014 Medical and Rx Expenditures.

<sup>D</sup> Total 2014 Claims Expenditures for Intervention Group includes the provider compensation and patient rewards associated with the MAP.

<sup>E</sup> 2014 Intervention Group Savings % Relative to Control Group, computed in this analysis from Aon and Wilson data (refer to Exhibits 1 & 2).

<sup>F</sup> 2014 MedEncentive Patient Rewards Count from MedEncentive reports submitted and reconciled by EGID.

<sup>G</sup> 2014 MedEncentive Provider Real-Time Rewards Count from MedEncentive reports reconciled by EGID.

<sup>H</sup> 2014 MedEncentive Provider After-the-Fact Rewards Count from MedEncentive reports reconciled by EGID.

<sup>I</sup> Total 2014 MedEncentive Fees from paid invoices and report supplied by EGID (refer to Attachment B).

<sup>J</sup> 2014 MedEncentive Patient Rewards (Success) Count from report supplied by EGID (refer to Attachment B).

<sup>K</sup> Hewlett-Packard Admin Fee per Printed Check from report supplied by EGID (refer to Attachment B).

<sup>L</sup> Hewlett-Packard Implementation Fee from report supplied by EGID (refer to Attachment B).

<sup>M</sup> 2014 Control Group Active Member Enrollment from Frank Wilson presentation (refer to Exhibit 2)

<sup>N</sup> 2014 Control Group Active Combined Medical and Pharmacy PMPY from Frank Wilson presentation (refer to Exhibit 2)

## Exhibit 1



To: Frank Wilson

From: Aon Hewitt

Cc: Frank Lawler  
Diana O'Neal  
Joe McCoy  
Carol Bowman  
Dana Dale

**Subject: MedEncentive Mutual Accountability Program**

### Background

MedEncentive, a web-based “doctor-patient mutual accountability” (MAP) incentive system, was implemented January 1, 2014, for HealthChoice plan members and providers to control healthcare costs by rewarding providers and plan members for adhering to best clinical practices and healthy behaviors. The MedEncentive program is based on the principle that health literacy and medication adherence will control costs. The program is intended to be in place for a 3-year pilot study. The program will compare two matched groups total cost of care, one covered by the MAP, referred to as the intervention group herein, and the other not covered, referred to as the control group herein, to determine if a level of savings could be achieved.

The program is expected to produce a positive return on investment (ROI), or result in the intervention groups total cost of care to be less than the control group's total cost of care plus the cost of the MedEncentive program. HealthChoice incurred the following expenses associated with the MedEncentive program in 2014:

- Administrative fee of \$3.33 per pilot member per month, not dependent on participation in the program; approximately \$646,000,
- MedEncentive charges \$1.00 for every ID card produced; \$16,000,
- HP administrative charge of \$1.05 for every check processed for the MedEncentive program; \$38,000, and
- HP implementation fee of \$68,000.
- The total fixed expenses associated with this program in 2014 were \$768,000.

The above figures do not include the \$501,000 that was paid to members and providers in 2014 in incentive payments.

## Review

Employees Group Insurance Department (EGID) requested Aon Hewitt, referred to as ‘we’ herein, to perform a review of the first year of the 3-year pilot study results. The remainder of this memo details our findings of our review of the intervention group compared to the control group for the first year of the 3-year pilot study relative to the two baseline periods.

## Data Reliance

Aon Hewitt relied on medical and pharmacy claims data from Verisk, the data warehouse system used by EGID through March 2015, for all Active members. No actuarial adjustments were made to the data. The data was checked for reasonableness, but not audited.

## Approach

The measurement period is being compared to the baseline period for both the intervention and control groups. Given fluctuation in claims utilization, two plan years are being used for the baseline period to determine if any anomaly occurred. The first baseline year included claims incurred January 1, 2012 through December 31, 2012 paid through March 31, 2013 and the second baseline year included claims incurred January 1, 2013 through December 31, 2013 paid through March 31, 2014. The measurement period included claims incurred January 1, 2014 through December 31, 2014 paid through March 31, 2015.

The following metrics were deemed reasonable measures as part of assessing the total cost of care between the intervention and control groups. The metrics are used to compare the change from the measurement period to the baseline period, separately, for the intervention group, control group, and in total. All of the metrics listed are standard in the industry and considered common in the marketplace.

Given the number of metrics analyzed, the success of this program should be evaluated in aggregate, not driven by a select few results.

- Total annual allowed medical expenditures
- Plan members – average headcount
- Total annual allowed medical expenditures per member per year (PMPY)
- Number of Large claims (greater than \$100,000)
- Total large claim case expenditures
- Total annual allowed pharmacy expenditures
- Total annual allowed pharmacy expenditures PMPY
- Number of prescriptions
- Number of emergency room (ER) visits
- Number of office visits
- Number of hospitalizations
- Number of hospitalizations per 1,000 members
- Hospitalization length of stay



In 2014, there were 7,529 members that participated in this program, which is approximately 48% of the members in the intervention group. Therefore, Aon Hewitt feels the claims experience is credible given the participation level.

### **Observations**

Comparing the measurement period to the 2013 baseline period, the intervention medical and pharmacy allowed claims per member per year (PMPY) increased 5%, while the control group experienced a 1% increase. In 2014, the intervention group experienced an increase in almost all metrics. The large claim and hospitalization metrics are the only measures for which a reduction was observed for the intervention group.

Comparing the measurement period to the 2012 baseline period, the intervention medical and pharmacy allowed claims PMPY increased 12%, while the control group experienced a 3% increase. Similarly, the intervention group experienced an increase in almost all metrics.

### **Large Claims**

Comparing the measurement period to the 2013 baseline period:

- The number of large claim cases decreased 5% for the control group and 19% for the intervention group
- The total large case expenditures decreased 1% for the control group and 19% for the intervention group

Similar results are observed in comparing the measurement period to the 2012 baseline period.

### **Medical & Pharmacy Expenditures**

Neutralizing for large claimants, the total allowed medical & pharmacy expenditures PMPY for the measurement period compared to both baseline periods realized a larger increase for the intervention group compared to the control group. While there is no actuarial risk or demographic adjustment, the large claims (>\$100,000) have been removed from the expenditures in order to negate outlier claims amounts skewing the overall results.

- 2014 compared to 2013
  - 6% increase for the intervention group
  - 2% increase for the control group
- 2014 compared to 2012
  - 12% increase for the intervention group
  - 3% increase for the control group

### **Pharmacy Expenditures & Prescriptions**

In reviewing pharmacy expenditures PMPY, for the measurement period relative to the 2013 baseline period, the intervention group increased 9%, while the control group increased 7%. Comparing the measurement period to the 2012 baseline period, the intervention group increased 28%, while the control group increased 12%.

In addition, comparing the number of prescriptions in the measurement period to the 2013 baseline period, the intervention group's number of prescriptions increased 6%, while the control group number of prescriptions increased 3%. Comparing the measurement period to the 2012 baseline period, the number of prescriptions for the intervention group increased 23%, while the control group increased 11%.

Both comparisons, the pharmacy expenditures and prescriptions filled, show the intervention group increasing higher than the control group.

### ***Emergency Room & Office Visits***

By encouraging members to utilize physician office visits, the goal would be to realize a decrease in emergency room visits for which the cost is considerably higher.

In reviewing emergency room visits for the intervention group, increases over both baseline period comparisons are observed.

- 10% increase for the measurement period compared to the 2013 baseline period (this was 6% for the control group)
- 19% increase for the measurement period compared to the 2012 baseline period (this was 4% for the control group)

The number of office visits increased for the intervention group over the two time periods. This was expected given one of the goals of the MedEncentive program is increased member to physician relationship. The intervention group observed larger increases versus the control group. Comparing the measurement period to the 2013 baseline period, the intervention group office visits increased 9%, while the control group increased 6%. Comparing the measurement period to the 2012 baseline period, the intervention group office visits increased 24%, while the control group increased 13%.

### ***Hospitalizations***

Comparing the measurement period to the 2013 baseline period:

- The number of hospitalizations decreased 4% for the control group and 2% for the intervention group
- The number of hospitalizations per 1,000 decreased 7% for the control group and 8% for the intervention group

Similar results are observed in comparing the measurement period to the 2012 baseline period.

See the exhibits in the appendix for further details regarding the measurement period compared to the two baseline periods.



### ***Recommendations***

According to recent healthcare studies, medical literature suggests encouraging members to see physicians can result in higher utilization and higher costs in the short term. The mix of services performed and prescription drugs could increase costs in the various populations.

While this pilot program is in place, Aon Hewitt recommends continuing to monitor the intervention group's claims experience to understand the impact the MedEncitive program is having on the intervention group and the ability to control healthcare costs.

If you need further information or have any questions about the review or observations, please do not hesitate to contact us.

Thank you,

Aon Hewitt

## Appendix

### MAPA Statistics: Comparing the 1<sup>st</sup> Measurement period to the 2<sup>nd</sup> Baseline Period Provided by Aon Hewitt with No Actuarial Adjustments

	2014 Over 2013			
	Control (A)	Intervention (B)	Total	Difference (B)-(A)
Plan members (total annual average headcount)	4.2%	6.1%	4.4%	2.0%
Total allowed medical expenditures	4.0%	9.7%	4.7%	5.7%
Total allowed medical expenditures PMPY	-0.2%	3.4%	0.3%	3.6%
Number of large claim cases (>\$100K)	-4.9%	-19.0%	-6.7%	-14.1%
Total large claim case expenditures	-0.6%	-18.8%	-2.6%	-18.3%
Average per case	4.6%	0.3%	4.5%	-4.3%
Total allowed pharmacy expenditures	11.6%	16.0%	12.2%	4.4%
Total allowed pharmacy expenditures PMPY	7.1%	9.3%	7.4%	2.2%
Total Allowed PMPY	1.4%	4.8%	1.9%	3.3%
Total Prescriptions	3.3%	5.7%	3.6%	2.4%
Number of emergency room visits	6.5%	9.5%	6.9%	3.0%
Number of office visits	5.7%	8.8%	6.1%	3.2%
Number of hospitalizations	-3.5%	-2.0%	-3.3%	1.4%
Number of hospitalizations per 1000	-7.3%	-7.7%	-7.4%	-0.4%
Hospitalization length of stay	12.0%	13.3%	2.2%	1.3%
Total allowed medical & pharmacy expenditures with large claims removed	6.0%	12.6%	6.9%	6.6%
PMPY with large claims removed	1.8%	6.1%	2.3%	4.3%

### Observations:

The only metrics for which a reduction is observed in comparing the measurement period to the baseline period for the intervention group and the control group

- Number of large claim cases; down 4.9% for the control group and down 19.0% for the intervention group
- Total large case expenditures; down 0.6% for the control group and down 18.8% for the intervention group
- The number of hospitalizations; down 3.5% for the control group and down 2.0% for the intervention group
- Number of hospitalizations per 1,000: down 7.3% for the control group and down 7.7% for the intervention group

**MAPA Statistics: Comparing the 1<sup>st</sup> Measurement period to the 1<sup>st</sup> Baseline Period  
Provided by Aon Hewitt with No Actuarial Adjustments**

	<b>2014 Over 2012</b>			
	Control	Intervention	Total	Difference
Plan members (total annual average headcount)	9.5%	17.5%	10.5%	8.0%
Total allowed medical expenditures	10.6%	26.9%	12.5%	16.3%
Total medical expenditures PMPY	1.0%	8.0%	1.9%	7.0%
Number of large claim cases (>\$100K)	12.5%	54.5%	16.0%	42.0%
Total large claim case expenditures	20.0%	53.4%	22.5%	33.4%
Average per case	6.7%	-0.8%	5.5%	-7.4%
Total allowed pharmacy expenditures	22.1%	50.8%	25.4%	28.8%
Total allowed pharmacy expenditures PMPY	11.5%	28.3%	13.5%	16.9%
Total Allowed PMPY	3.3%	12.3%	4.4%	9.0%
Total Prescriptions	10.6%	22.9%	12.1%	12.3%
Number of emergency room visits	4.2%	19.1%	5.8%	14.9%
Number of office visits	12.5%	23.7%	13.9%	11.2%
Number of hospitalizations	-3.8%	13.4%	-2.0%	17.2%
Number of hospitalizations per 1000	-12.2%	-3.5%	-11.3%	8.6%
Hospitalization length of stay	18.9%	11.9%	7.5%	-7.0%
Total allowed medical & pharmacy expenditures with large claims removed	12.7%	31.4%	15.0%	18.6%
PMPY with large claims removed	3.0%	11.8%	4.1%	8.8%

**Observations:**

- The only metrics for which a reduction is observed in comparing the measurement period to the baseline period for the intervention group and the control group
  - Average expenditure per large claim case; down 0.8% for the intervention group
  - Number of hospitalizations per 1,000: down 12.2% for the control group and down 3.5% for the intervention group
  - Number of hospitalizations observed a reduction in the total results of 2.0%, as the control group observed a reduction of 3.8% while the intervention group observed an increase of 13.4%

## Exhibit 2

### First Year Metrics

#### 2014 Health Costs

Measure	Intervention Group	Control Group	\$ Difference
Plan members	16,800	114,500	
Medical expenditures PMPY	\$4,561	\$4,396	\$165
Pharmacy expenditures PMPY	\$1,458	\$1,333	\$125
Medical and pharmacy combined PMPY	\$6,019	\$5,729	\$290

#### Percent Difference of 2014 Over 2013

Measure	Intervention Group	Control Group
Medical expenditures PMPY	3.2%	(.2)%
Pharmacy expenditures PMPY	9.0%	7.0%
Medical and pharmacy combined PMPY	4.5%	1.4%
Number of hospitalizations per 1,000	(7.8%)	(7.3%)
Number of office visits per 1,000	2.3%	1.4%
Number of emergency room visits per 1,000	2.9%	2.2%

### Utilization of Incentives

Incentive Type	Unique Individuals	Units Paid	\$ Paid	% Participation
Member	10,583	63,721	\$955,813	50%
Provider	325	12,724	\$111,570	10%
Total	10,908	76,445	\$1,067,383	

Total cost of the program through September 30, 2015 is \$2,391,983. This could be estimated at \$1.36 million per year for a projected total program cost for three years of \$4.1 million.