

Reformed Church in America

Analysis of HeartMath Experience

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Executive Summary

Introduction & Background

Since 2007, The Reformed Church in America (RCA) has offered employees the opportunity to participate in the Revitalize You program provided by HeartMath, LLC. McCarthy Actuarial Consulting, LLC (MAC) was retained by RCA to analyze their experience during 2007 and 2008 to determine what impact HeartMath has had on RCA's medical benefit costs.

RCA absorbs all associated costs, including incentives to employees who participate in the Revitalize You program. This analysis will evaluate the impact this program has had on medical and pharmacy utilization of the HeartMath participants, relative to Non-Participants. This evaluation will be used to estimate the savings, if any, that can reasonably be assumed to have resulted from this program.

Census and program participation data for this analysis was provided by RCA and claims data was provided by United Health Care, the claim administrator. This data has not been audited by MAC, but appears to be accurate for the purpose intended.

Approach

We defined two cohorts of RCA employees, those who completed the Revitalize You program prior to December 31, 2007 and those who, as of the end of 2008, had not participated in the HeartMath program. Only employees who had continuous coverage from January 1, 2007 through December 31, 2008 were included in either cohort.

For each cohort we collected claims experience incurred in calendar years 2007 and 2008. This experience was analyzed by diagnoses (medical) and therapeutic (pharmacy) categories. The key metric was covered charges per employee per year. Other metrics calculated to aid our analyses included incidence rates and cost per utilization unit.

Findings

Adjusted annual medical cost trends were dramatically lower for HeartMath Participants than for Non-Participants (-3.8% vs. +9.0%). Pharmacy cost trends were also significantly lower for HeartMath Participants than for Non-Participants (7.9% vs. 13.3%).

Total 2008 savings due to the HeartMath program are estimated at \$585 per Participant, compared to HeartMath fees of \$300, yielding a Return on Investment of 1.95:1.00. It is expected that savings will continue to grow, but no further HeartMath fees will be incurred for these Participants.

Recommendations

To build on the apparent success of the HeartMath program, the following actions are recommended.

- Continue monitoring HeartMath Participants and Non-Participants to confirm future savings expectations.
- Assess the need and cost effectiveness of initiatives to reinforce Revitalize You habits.
- Determine the amount of “crossover” between HeartMath and other wellness initiatives and evaluate the effectiveness of other wellness initiatives.
- Consider offering HeartMath to covered spouses based on analysis of medical and pharmacy data.

Actuarial Certification

This analysis has been prepared to demonstrate the financial impact of incorporation of the Revitalize You program offered by HeartMath into RCA's health benefit plan.

In conducting our analysis, we have relied on enrollment, plan design, and medical and prescription drug claim cost information supplied by RCA and United Health Care, their health plan administrator, as described in this report. We have accepted the data without audit and have relied upon the sources for the accuracy of the data.

The analysis was developed using generally accepted actuarial principles and practices and reflects reasonable expectations of anticipated plan experience. This analysis demonstrates RCA's health plan experience with the Revitalize You program. This analysis may not be appropriate for any other purpose or health plan. Documentation of the methods and assumptions used in the development of the results shown herein has been provided in this report.

I am a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. I certify that I meet the qualification standards established by the American Academy of Actuaries and have followed the practice standards established from time-to-time by the Actuarial Standards Board.

I am available to answer any questions about this analysis and report, or to provide explanations or further details, as may be appropriate.



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Results – Financial Impact

Participant Characteristics

HeartMath participants were found to be demographically similar to non-participants, as summarized in the following table:

	HeartMath Participants	Non-Participants
Number in Study Cohort	143	343
Percent Male	80.3%	79.9%
Average Age	49.5	50.2

Comparison of Cohort Costs and Trend Rates

Costs and trends were measured in terms of covered charges rather than benefits paid to avoid possibly obscuring the results due to different plan options chosen.

For 2007, before completion of the Revitalize You program, HeartMath participants were 55.9% more costly than Non-Participants, evidence that the program is attractive to individuals with medical issues, who are most likely to benefit.

Experience Data						
	HeartMath Participants			Non-Participants		
	2007 Covered Charges	2008 Covered Charges	% Change	2007 Covered Charges	2008 Covered Charges	% Change
Medical	\$3,872	\$3,518	-11.5%	\$2,542	\$2,898	14.0%
Pharmacy	\$1,476	\$1,544	4.7%	\$955	\$1,102	15.4%
Total	\$5,449	\$5,063	-7.1%	\$3,496	\$4,000	14.4%

HeartMath Participants exhibited substantially lower trend rates for 2008 than Non-participants, for both medical and pharmacy costs. Even without the Revitalize You program, it is likely that the higher cost cohort would trend lower than the lower cost cohort. This phenomenon is known as “regression to the mean” and refers to the tendency of average costs to converge to a common point. Adjusting for this expected convergence gives the following results:

Adjusted for Regression to Mean						
	HeartMath Participants			Non-Participants		
	2007 Covered Charges	2008 Covered Charges	% Change	2007 Covered Charges	2008 Covered Charges	% Change
Medical	\$3,872	\$3,824	-3.8%	\$2,542	\$2,770	9.0%
Pharmacy	\$1,476	\$1,592	7.9%	\$955	\$1,082	13.3%
Total	\$5,449	\$5,416	-0.6%	\$3,496	\$3,851	10.2%

It should be noted that for both populations one would expect a 4% to 6% annual increase in costs due to normal aging. This is a consequence of the study design, which only included individuals who were continuously covered for both years.

Estimated Savings – Year One

We measured savings by comparing adjusted 2008 costs for Participants to 2007 Participant costs trended forward at the Non-Participants’ adjusted trend rates. This comparison is provided below:

	HeartMath Participants' 2008 Costs Using Non-Participants' Adjusted Trend Rates			HeartMath Participants' Adjusted 2008 Covered Charges	Estimated Savings
	2007 Covered Charges	Non-Participant Adjusted Trend	2008 Modeled Covered Charges		
Medical	\$3,973	9.0%	\$4,330	\$3,824	\$585
Pharmacy	\$1,476	13.3%	\$1,672	\$1,592	
Total	\$5,449		\$6,002	\$5,416	

This comparison indicates a first year savings of \$585 per participant (\$6,002 – \$5,416). These savings were shared between RCA and these participants.

Notable changes in utilization rates & charges

We analyzed RCA’s experience by high level medical diagnosis and pharmacy therapeutic categories to further understand the cost dynamics under the HeartMath program. The claims experience, broken down by these categories, is shown in the

Appendix for both Participants and Non-Participants. We also looked at RCA's experience in much finer detailed categories, but found the results to have too few claims per category to be actuarially credible for the purpose at hand.

We identified 9 prescription drug classes and 4 medical diagnosis categories that would be expected to be most impacted by practicing the Revitalize You techniques. These specific categories are highlighted in the detailed experience tables given in the Appendix.

In the case of prescription drugs, in 4 out of these 9 categories HeartMath Participants had better trend metrics than Non-Participants. For medical, 3 of the 4 categories had better PMPY trends for HeartMath Participants.

One of the larger cells in the finer medical categorization was Essential Hypertension, which should be especially sensitive to HeartMath intervention. Non-Participants experienced a substantial (47%) increase in charges associated with Essential Hypertension, driven mostly by an 30% increase in incidence rate. For HeartMath Participants, however, we saw a 23% decrease in charges for this diagnosis, despite an even larger incidence rate increase (38%). For both cohorts, the increase in the incidence rates was likely driven by the fact that most RCA employees participated in a health risk appraisal (HRA) for the first time in 2008.

Expected Savings – Beyond Year One

Due to the short time period that HeartMath has been available to RCA employees, and the lack of empirical studies of HeartMath from other employers, it is impossible to accurately project future savings that may emerge.

We believe that the following scenario represents reasonable actuarial and clinical expectations, barring significant changes in the RCA healthcare benefit program and assuming that these employees continue to practice HeartMath behaviors.

- Pharmacy and medical benefits will continue to trend lower for HeartMath Participants, but that the difference in trend rates will not be as great as was seen 2008.
- At some time in the future, both pharmacy and medical trends will converge and no significant difference in trend rates will be discernable.
- From that point forward, Participant costs will be significantly lower than Non-Participants' so HeartMath savings will continue to accrue.

Other HeartMath Impact

It is not unreasonable to expect that the HeartMath program would also result in decreases in absenteeism and, over time, in short and long term disability claims. Evaluation of these issues is outside the scope of this analysis.

Return On Investment

RCA's cost for providing the HeartMath Revitalize You program is \$300 per participating employee. The savings calculated above for the first year of the program is \$585, which yields a Return on Investment of 95% by the end of the second year. This ROI does not consider any possible savings from absenteeism or disability programs.

Since there is no required additional cost for participants, ROI is expected to grow substantially. If the next year's savings are only equal to those for 2008 (estimated at \$585), the program would be returning \$3.90 for every dollar invested by the end of 2009.

Clinical Perspectives

Science and Biology of the Heart and Brain and the Intervention

Research in prestigious medical journals such as The Lancet, Circulation, The American Journal of Cardiology and the Journal of the American Medical Association has shown links between emotions and health. Some conclude that building emotional resilience and positive emotional health enhances resistance to and recovery from stress. This has led to targeted interventions aimed at promoting stress resiliency. Reformed Church of America is one employer that has made stress management a priority. In 2007, the religious organization began offering coherence training and heart focused positive emotion shifting techniques to equip employees with the skills to ward off stress and thrive in a challenging environment. The Revitalize You program uses HeartMath's self-regulation techniques and assistive technology to help individuals learn how to build resilience and empower them to bring on resistance to stress when needed.

HeartMath techniques are based on the premise that a person can justifiably have control over stress responses and the heart-brain interactions and reinforce a positive feedback cycle. Techniques take advantage of the direct pathway and reciprocal interaction between the heart and the brain. This strong relationship and two-way communication network is known as the "autonomic peripheral nervous system", the part of the nervous system that is beyond conscious control. It works to regulate the functioning of bodily organs. Hormones such as adrenaline, oxytocin and atrial natriuretic factor (ANF), are involved in stress and emotional experience, responsible for feelings of love, joy, etc., and also affect regulation of blood pressure and other key body systems.

A key aspect of the HeartMath techniques is heart rate variability (HRV). HRV is a manifestation of normal interactions between the two branches of the nervous system and can be used to indicate that the body is functioning at optimal capacity – not too fast and not too slow. The optimal balance and synchronized process of accelerating and slowing down produces a state called "coherence". Because of the direct link between the heart and brain, heart coherence can be produced by emotions such as gratitude, joy, love and appreciation and pleasure. Likewise, heart coherence can help the body produce hormones that increase these positive feelings and hormones that influence blood pressure and act directly on the brain. The systems influence each other and operate in unison.

Control over coherence can be learned and practiced and over time, like a trained athlete, can become easier and stronger. Techniques utilized in HeartMath allow one to influence coherence in order to influence certain hormones and neurons that act directly through the heart and brain pathways. With practice, one can learn how to balance the two branches of the nervous system and bring the heart rhythms into coherence, thereby further positively influencing emotions and hormone regulation manifested in bodily systems such as the digestive, muscular, immune and cardiovascular systems.

Clinical and Associated Cost Implications

Research has shown stress to be a significant driver of health care costs. According to a study by the Health Enhancement Research Organization (HERO), a not-for-profit research coalition, employees who say they are under uncontrolled stress have medical expenditures that are 46% higher than those who are not stressed. Depression, stress, anger, anxiety, insomnia are all emotions that can have manifestations as heart disease, poor digestion, high blood pressure – all chronic diseases. A large randomized controlled study of patients with coronary artery disease (CAD), showed lifestyle changes had large improvements in patients compared to 55% of those who received medication therapy alone.¹ Emotional health and heart health were studied by the Massachusetts Medical Society and in a population of over 6,000 people, followed for 15 years; emotions were directly related to coronary heart disease risk. Emotions were found to increase the risk of CHD by 81%.²

Cost of lost productivity from absenteeism and disability alone associated with the conditions above can contribute to over 50% of the total health related costs. Presenteeism, or working while an individual is ill can be anywhere from 70-85% of costs. One study reported the cost per employee associated with presenteeism to be between \$22 and \$157 annually.³ Another study found that over 50% of employees considered looking for a new job, quit their job or didn't seek advancement because of stress.⁴

Cost and clinical effectiveness of wellness related interventions is sometimes a matter of uncertainty but in this case, there was a clear medical and pharmacy difference between those that used HeartMath and those that did not. The RCA claim data shows that approximately one third of employees have a diagnosis of hypertension. A recent edition of the American Journal of Health Promotion found the cost of hypertension to be \$392.31, those related to heart disease another \$368.34 and those relating to depression to be \$348.04 per employee per year. These costs are only due to presenteeism associated with the diagnosis, not the associated medical and absenteeism costs⁵. The results here between the HeartMath cohort and the non-HeartMath cohort clearly demonstrate there is the potential for savings not only in terms of direct medical costs but in productivity costs as well.

¹ O'Donnell, Michael, Ph.D., MBA, MPH. (2007). The Heart and the Brain within the broader context of wellness. *Cleveland Clinic Journal of Medicine*. 74(1) pp.856-858.

² Kubzansky, LD et al. (2007). Emotional vitality and incident coronary heart disease. *Arch Gen Psychiatry* 64:1393.

³ The Center for Work and Health, 2003, *Journal of Occupational and Environmental Medicine*, April 2004

⁴ American Psychological Association. (2007) Accessed November 2009 from <http://www.apa.org/releases/employees0307.html>

⁵ Chapman, Larry. (2005). Presenteeism and its Role in Worksite Health Promotion. *The American Journal of Health Promotion*; March/April 2005.

Observations and Considerations

There are a number of challenges associated with evaluating health and wellness initiatives and estimating savings they may generate. When interpreting and applying the results of this analysis for RCA, the following issues should be borne in mind.

- It is difficult to assess the extent to which individuals actually practice HeartMath techniques after completion of the Revitalize You program. One would expect that without additional reinforcement, many participants revert back to old behavior patterns over time.
- The cohorts of HeartMath Participants and Non-Participants were constructed to be stable populations with continuous coverage throughout the two year study period. Since there were no new participants, and no participants exited due to termination, retirement or death, the average age of each cohort increased by exactly one year. Thus, normal aging would be a much larger factor in the cost trends for these cohorts than would be the case for the entire RCA covered population. The trends reported herein should not be considered as representative or indicative of trends for RCA's healthcare benefits in general.
- Although care has been taken to select cohorts in a manner that limits extraneous influences, healthcare benefits are subject to random variance from underlying mean costs due to the nature of the risks being managed. This is especially true for short study periods involving small populations (less than 1,000).
- RCA has made a large commitment to wellness programs for the benefit of employees. During the study period there were multiple wellness initiatives available, supported by significant financial and other incentives to participate. Due to time, data and resource restraints, no attempt was made to determine the extent of crossover there may be between programs, nor how much other programs may have contributed to HeartMath's apparent savings.
- As noted in the Results section, self selection for the program appears to have resulted in sicker, more costly individuals in the HeartMath cohort. While this is positive in the sense that the program was successful in reaching the population most in need of it, trend analysis is complicated by the need to recognize the phenomenon known as "regression to the mean."

Recommendations

This analysis shows that there are very positive indicators that the HeartMath Revitalize You program, as implemented by RCA, has resulted in significant healthcare benefit savings and that there is good reason to believe that additional savings will continue to emerge in the years ahead. In order to build on the apparent success of the HeartMath program, we recommend the following actions.

- Continue to monitor HeartMath Participant and Non-Participant cohort cost to confirm the future savings expectations.
- Assess the extent to which HeartMath techniques continue to be practiced as time from participation increases. Depending on these findings, determine if it would be cost effective to implement initiatives to reinforce Revitalize You habits.
- Determine the amount of “crossover” between HeartMath and other wellness initiatives.
- Evaluate the effectiveness of other wellness initiatives, perhaps using a multivariate approach to identify the most efficient combination of programs.
- Study medical and pharmacy data for spouses to determine if the HeartMath offer should be extended to them.

Methodology

Study Populations & Cohort Definition

The study population was limited to those employees who had continuous healthcare coverage from January 1, 2007 through December 31, 2008.

Two cohorts of RCA employees were extracted from this study population.

- The first cohort, referred to as HeartMath Participants, is composed of employees who completed the Revitalize You program prior to December 31, 2007
- The second cohort, referred to as Non-Participants, is composed of employees who, as of the end of 2008 had not participated in the HeartMath program.

Covered Charges

For each cohort we collected claims experience incurred in calendar years 2007 and 2008. This experience was extracted from RCA's data by UHC and provided to MAC using a Microsoft Excel format. The data was provided by detailed diagnostic and therapeutic categories and subsequently summarized into higher level categories by MAC.

All analyses were performed using covered charges after provider discounts, but before application of cost sharing provisions such as deductibles, copays and coinsurance.

Metrics

The key metric used in this analysis is covered charges per employee per year. It is calculated as the total covered charges incurred during a year divided by the number of employees included in the respective cohort.

Other metrics calculated to aid our analyses included:

- Charges per Utilization Unit = [total covered charges] / [# utilization units]
- Incidence Rate = [# utilization units] / [# ees] X 1,000
- Charges per Employee per Year = [total covered charges] / [# ees]
- Charges per Script = [total covered charges] / [# of prescriptions]
- Scripts per Utilization Unit = [# of prescriptions] / [# utilization units]

Data Sources

Census and program participation data for this analysis was provided by RCA. Claims data, with detailed diagnoses and therapeutic classifications was provided by United Health Care, the claim administrator. This data has not been audited by MAC, but appears to be accurate for the purpose intended.

Appendices

Authors' Bios

L.J. (Mac) McCarthy, FSA, MAAA, FCA

Mac is the President of McCarthy Actuarial Consulting, combining the discipline of actuarial science with extensive experience and a reputation for integrity to help employers, health plans and researchers find innovative solutions to health and welfare issues.

He has over 30 years of health and welfare actuarial experience, with over 20 years advising employers and plans on the development and financial management of innovative programs. His specialties include consumer driven healthcare, wellness and disease management programs, multi-option benefit programs, post-retirement medical and disability plans.

Mac currently serves as a member of an American Academy of Actuaries committee on consumer driven health plans, and an American Academy of Actuaries committee evaluating certain aspects on national health reform. He also chairs the Conference of Consulting Actuaries' healthcare reform taskforce.

Experience

Before founding McCarthy Actuarial Consulting, Mac was a principal and national resource at Mercer Health & Benefits. Before that he held a variety of group actuarial positions at two regional insurance companies.

Education

Mac received a BS in mathematics from the Illinois Institute of Technology. He is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries.

Michelle Mudge-Riley, D.O., MHA

Dr. Michelle Mudge-Riley provides innovative health improvement and strategic consulting for businesses and individuals. She works with each client to analyze current methods and assist with prevention, care coordination and health promotion strategies. Her advice is based on unique organizational or individual needs and utilizes an evidence and results oriented approach. Her goal is to help clients decrease their costs and increase their short and long term quality of life.

Dr. Mudge-Riley received her medical degree from Des Moines University Osteopathic Medical School and her Masters Degree in Health Administration from Virginia Commonwealth University. She completed a medical internship in Virginia Commonwealth University Hospital System (VCUHS) and a business residency under the CEO of the hospital system. She has been directly responsible for planning, implementation, communication, and evaluation of programs involving healthcare wellness, safety, and quality within a variety of industries.

Dr. Mudge-Riley has conducted seminars on topics related to change management, motivation, wellness and health education. She has been involved in the process of peer review for these topics. She has also been published in a variety of journals including Physicians Practice Magazine and The D.O.

A partial client list includes Citi Smith Barney, United Benefit Advisors, Ferrazzi Greenlight, University of Connecticut, Managed Benefits, Dominion Virginia Power, The YMCA, Anthem Blue Cross Blue Shield, Center of Integrative Medicine, The Central Virginia Foodbank, Virginia Commonwealth University Health System (VCUHS) and Greater Richmond Transit Company (GRTC). She has spoken at The Association of University Programs in Health Administration (AUPHA) Annual Meeting, The Society for Human Resources (SHRM) and SEAK Conference for Physicians.

Cohort Comparisons – number of participants by age & gender

HeartMath Participants							Non-Participants						
Age Range		Male	Female	Total			Age Range		Male	Female	Total		
<	25	-	2	2	1.4%		<	25	-	2	2	0.6%	
25 -	29	2	3	5	3.5%		25 -	29	3	3	6	1.7%	
30 -	34	12	-	12	8.5%		30 -	34	19	7	26	7.6%	
35 -	39	9	1	10	7.0%		35 -	39	21	6	27	7.9%	
40 -	44	9	-	9	6.3%		40 -	44	35	5	40	11.7%	
45 -	49	22	3	25	17.6%		45 -	49	36	7	43	12.5%	
50 -	54	19	9	28	19.7%		50 -	54	55	12	67	19.5%	
55 -	59	22	7	29	20.4%		55 -	59	70	18	88	25.7%	
60 -	64	19	3	22	15.5%		60 -	64	26	6	32	9.3%	
65 +		-	-	-	0.0%		65 +		9	3	12	3.5%	
Total		114	28	142			Total		274	69	343		
		80%	20%						80%	20%			
Average Age		49.5	49.4	49.5			Average Age		50.6	48.8	50.2		

HeartMath Participants – Medical Costs by Diagnosis Category

HeartMath Participants		# in Cohort	144		Exp. Period (Inc.):		2008	Change from Prior Year		
Diagnosis Chapter	Utilization Units	Covered Amount	Plan Net Paid	Charges Per Util. Unit	Incidence Rate (per 1,000)	PMPY (Charges)	Charges Per Util. Unit	Incidence Rate (per 1,000)	PMPY (Charges)	
BLOOD & BLOOD FORM ORGANS	4	\$ 387	\$ 298	\$ 97	27.8	\$ 2.69	-88.5%	-20.0%	-90.8%	
CIRCULATORY SYSTEM	96	\$ 131,516	\$ 118,590	\$ 1,370	666.7	\$ 913.30	4.9%	41.2%	48.1%	
CONGENITAL ANOMALIES	0	\$ -	\$ -	\$ -	0.0	\$ -	-100.0%	-100.0%	-100.0%	
DIGESTIVE SYSTEM	47	\$ 63,357	\$ 50,001	\$ 1,348	326.4	\$ 439.98	-17.0%	27.0%	5.5%	
ENDOCRINOL METABOLIC IMMUNE	84	\$ 16,160	\$ 10,724	\$ 192	583.3	\$ 112.22	13.0%	27.3%	43.8%	
GENITOURINARY SYSTEM	53	\$ 39,941	\$ 34,682	\$ 754	368.1	\$ 277.37	57.6%	-3.6%	51.9%	
INFECTIOUS & PARASITIC DIS	59	\$ 17,102	\$ 12,766	\$ 290	409.7	\$ 118.76	-34.3%	3.5%	-32.0%	
INJURY AND POISONING	31	\$ 10,374	\$ 7,487	\$ 335	215.3	\$ 72.04	-78.1%	-31.1%	-84.9%	
MUSCULOSKELETAL TISSUE	92	\$ 56,150	\$ 35,162	\$ 610	638.9	\$ 389.93	51.9%	10.8%	68.3%	
NEOPLASMS	38	\$ 28,716	\$ 22,680	\$ 756	263.9	\$ 199.42	-79.5%	18.8%	-75.7%	
NERVOUS SYSTEM SENSE ORGANS	73	\$ 48,436	\$ 41,401	\$ 664	506.9	\$ 336.36	12.6%	17.7%	32.6%	
OTHER CONDITIONS	156	\$ 53,194	\$ 44,150	\$ 341	1083.3	\$ 369.41	-5.6%	13.9%	7.5%	
PREGNANCY CHILDBIRTH PUERPERAL	5	\$ 2,238	\$ 1,983	\$ 448	34.7	\$ 15.54	-23.3%	400.0%	283.6%	
RESPIRATORY SYSTEM	70	\$ 12,735	\$ 9,417	\$ 182	486.1	\$ 88.44	8.9%	9.4%	19.1%	
SKIN & SUBCUTANEOUS TISSUE	24	\$ 6,561	\$ 5,004	\$ 273	166.7	\$ 45.56	38.2%	-20.0%	10.6%	
UNKNOWN	34	\$ 19,772	\$ 9,896	\$ 582	236.1	\$ 137.31	-31.0%	-12.8%	-39.8%	
Total	866	\$ 506,638	\$ 404,240	\$ 585	6,013.9	\$ 3,518.32	-19.9%	10.6%	-11.5%	

HeartMath Participants – Pharmacy Costs by Therapeutic Category

HeartMath Participants	Number in Cohort: 144				Exp. Period (Inc.) 2008				Change from Prior Year			
	FDB Generic Class	Utilization Units	Number of Scripts	Covered Amount	Total Net Paid	Charges Per Script	Scripts per Util. Unit	Incidence Rate (per 1,000)	PMPY (Charges)	Charges Per Script	Scripts per Util. Unit	Incidence Rate (per 1,000)
ANALGESICS	25	45	\$ 9,030	\$ 8,094	\$ 201	1.8	173.6	\$ 62.71	131.2%	-8.7%	-28.6%	50.8%
ANESTHETICS	2	2	\$ 16	\$ 13	\$ 8	1.0	13.9	\$ 0.11	23.6%	0.0%	-33.3%	-17.6%
ANTIARTHRITICS	11	14	\$ 435	\$ 354	\$ 31	1.3	76.4	\$ 3.02	3.2%	2.8%	-47.6%	-44.4%
ANTIASTHMATICS	7	14	\$ 3,795	\$ 3,205	\$ 271	2.0	48.6	\$ 26.35	30.1%	14.3%	-41.7%	-13.3%
ANTIHISTAMINE AND DECONGESTANT (0	0	\$ -	\$ -	\$ -	-	-	\$ -	-100.0%	-100.0%	-100.0%	-100.0%
ANTIHISTAMINES	7	13	\$ 1,091	\$ 873	\$ 84	1.9	48.6	\$ 7.58	-23.1%	-35.4%	-12.5%	-56.6%
ANTIINFECTIVES	68	78	\$ 1,487	\$ 1,190	\$ 19	1.1	472.2	\$ 10.33	-24.4%	-6.4%	-15.0%	-39.8%
ANTIINFECTIVES/MISCELLANEOUS	40	99	\$ 31,334	\$ 29,842	\$ 317	2.5	277.8	\$ 217.60	-15.1%	-15.8%	21.2%	-13.3%
ANTINEOPLASTICS	2	13	\$ 241	\$ 193	\$ 19	6.5	13.9	\$ 1.67	-68.6%	420.0%	-50.0%	-18.3%
ANTIPARKINSON DRUGS	0	0	\$ -	\$ -	\$ -	-	-	\$ -	n/a	n/a	n/a	n/a
AUTONOMIC DRUGS	23	84	\$ 2,160	\$ 1,728	\$ 26	3.7	159.7	\$ 15.00	-11.5%	8.0%	9.5%	4.7%
BLOOD	8	38	\$ 9,716	\$ 8,536	\$ 256	4.8	55.6	\$ 67.47	9.1%	175.0%	-27.3%	118.1%
CARDIAC DRUGS	18	57	\$ 2,636	\$ 2,109	\$ 46	3.2	125.0	\$ 18.31	-43.3%	31.9%	20.0%	-10.2%
CARDIOVASCULAR	113	360	\$ 45,775	\$ 38,514	\$ 127	3.2	784.7	\$ 317.88	-13.2%	-4.9%	31.4%	8.5%
CNS DRUGS	12	50	\$ 5,263	\$ 4,452	\$ 105	4.2	83.3	\$ 36.55	15.5%	-12.3%	50.0%	51.9%
CONTRACEPTIVES	2	12	\$ 776	\$ 621	\$ 65	6.0	13.9	\$ 5.39	30.0%	140.0%	0.0%	212.0%
COUGH/COLD PREPARATIONS	13	17	\$ 463	\$ 375	\$ 27	1.3	90.3	\$ 3.21	50.6%	-34.6%	8.3%	6.7%
DIAGNOSTIC	10	21	\$ 4,255	\$ 3,853	\$ 203	2.1	69.4	\$ 29.55	-26.2%	26.0%	11.1%	3.3%
DIURETICS	16	56	\$ 505	\$ 404	\$ 9	3.5	111.1	\$ 3.51	-11.4%	-21.3%	77.8%	24.0%
EENT PREPS	30	74	\$ 6,121	\$ 4,922	\$ 83	2.5	208.3	\$ 42.50	-5.1%	9.2%	-3.2%	0.3%
ELECT/CALORIC/H2O	14	25	\$ 522	\$ 418	\$ 21	1.8	97.2	\$ 3.63	-34.7%	-10.7%	133.3%	36.1%
GASTROINTESTINAL	41	85	\$ 12,650	\$ 10,822	\$ 149	2.1	284.7	\$ 87.85	-28.9%	-9.1%	28.1%	-17.2%
HORMONES	20	54	\$ 5,249	\$ 4,538	\$ 97	2.7	138.9	\$ 36.45	-28.7%	12.0%	17.6%	-6.1%
HYPOGLYCEMICS	35	97	\$ 26,571	\$ 23,449	\$ 274	2.8	243.1	\$ 184.52	17.5%	7.6%	6.1%	34.1%
IMMUNOSUPPRESANT	0	0	\$ -	\$ -	\$ -	-	-	\$ -	n/a	n/a	n/a	n/a
MISC MEDICAL SUPPLIES, DEVICES, NON	8	28	\$ 849	\$ 679	\$ 30	3.5	55.6	\$ 5.90	-16.4%	86.7%	0.0%	56.1%
MUSCLE RELAXANTS	4	5	\$ 137	\$ 109	\$ 27	1.3	27.8	\$ 0.95	-53.3%	25.0%	-50.0%	-70.8%
PRE-NATAL VITAMINS	0	0	\$ -	\$ -	\$ -	-	-	\$ -	n/a	n/a	n/a	n/a
SEDATIVE/HYPNOTICS	17	45	\$ 5,111	\$ 4,195	\$ 114	2.6	118.1	\$ 35.49	-20.0%	4.3%	30.8%	9.1%
SKIN PREPS	18	27	\$ 2,723	\$ 2,495	\$ 101	1.5	125.0	\$ 18.91	76.1%	-2.7%	-25.0%	28.5%
SMOKING DETERRENTS	0	0	\$ -	\$ -	\$ -	-	-	\$ -	n/a	n/a	n/a	n/a
THYROID PREPS	5	24	\$ 522	\$ 418	\$ 22	4.8	34.7	\$ 3.63	-30.0%	60.0%	25.0%	39.9%
UNCLASSIFIED DRUG PRODUCTS	30	63	\$ 10,322	\$ 8,417	\$ 164	2.1	208.3	\$ 71.68	-5.3%	-11.7%	3.4%	-13.5%
UNKNOWN	62	193	\$ 32,632	\$ 28,803	\$ 169	3.1	430.6	\$ 226.61	-9.0%	-9.7%	26.5%	3.9%
VITAMINS	1	1	\$ 6	\$ 5	\$ 6	1.0	6.9	\$ 0.04	-89.9%	-66.7%	0.0%	-96.6%
Total	662	1694	\$ 222,394	\$ 193,626	\$ 131	2.6	4,597.2	\$ 1,544.40	-6.4%	5.9%	5.6%	4.7%

Non-Participants – Medical Costs by Diagnosis Category

Non-Participants	# in Cohort	343		Exp. Period (Inc.):		2008	Change from Prior Year		
Diagnosis Family	Utilization Units	Covered Amount	Plan Net Paid	Charges Per Util. Unit	Utilization Rate (per 1,000)	PMPY (Charges)	Charges Per Util. Unit	Utilization Rate (per 1,000)	PMPY (Charges)
BLOOD & BLOOD FORM ORGANS	5	\$ 651	\$ 268	\$ 130	14.6	\$ 1.90	-42.0%	150.0%	44.9%
CIRCULATORY SYSTEM	180	\$ 156,486	\$ 129,966	\$ 869	524.8	\$ 456.23	19.7%	36.4%	63.2%
CONGENITAL ANOMALIES	4	\$ 2,209	\$ 1,672	\$ 552	11.7	\$ 6.44	54.8%	100.0%	209.5%
DIGESTIVE SYSTEM	88	\$ 86,266	\$ 68,223	\$ 980	256.6	\$ 251.51	18.5%	8.6%	28.7%
ENDOCR METABOLIC IMMUN	166	\$ 31,183	\$ 16,235	\$ 188	484.0	\$ 90.91	-8.6%	27.7%	16.7%
GENITOURINARY SYSTEM	101	\$ 25,654	\$ 20,527	\$ 254	294.5	\$ 74.79	-52.9%	-8.2%	-56.8%
INFECTIOUS & PARASITIC DIS	106	\$ 8,628	\$ 5,575	\$ 81	309.0	\$ 25.15	17.5%	12.8%	32.5%
INJURY AND POISONING	91	\$ 33,843	\$ 24,393	\$ 372	265.3	\$ 98.67	-10.2%	7.1%	-3.8%
MUSKULO SKELETAL TISSUE	165	\$ 129,723	\$ 101,627	\$ 786	481.0	\$ 378.20	39.0%	1.9%	41.5%
NEOPLASMS	100	\$ 121,833	\$ 97,831	\$ 1,218	291.5	\$ 355.20	-25.1%	-12.3%	-34.3%
NERVOUS SYS SENSE ORGANS	157	\$ 74,179	\$ 57,223	\$ 472	457.7	\$ 216.27	-9.9%	4.7%	-5.7%
OTHER CONDITIONS	373	\$ 123,233	\$ 106,487	\$ 330	1087.5	\$ 359.28	5.8%	22.3%	29.4%
PERINATAL PERIOD	1	\$ 143	\$ -	\$ 143	2.9	\$ 0.42	1832.4%	0.0%	1832.4%
PREGNANCY CHILDBIRTH PUERP	16	\$ 10,430	\$ 8,502	\$ 652	46.6	\$ 30.41	-66.6%	166.7%	-11.0%
RESPIRATORY SYSTEM	191	\$ 64,181	\$ 44,854	\$ 336	556.9	\$ 187.12	15.4%	33.6%	54.2%
SKIN & SUBCUTANEOUS TISSUE	68	\$ 37,347	\$ 30,003	\$ 549	198.3	\$ 108.88	164.2%	-8.1%	142.7%
UNKNOWN	74	\$ 87,981	\$ 56,902	\$ 1,189	215.7	\$ 256.51	22.3%	19.4%	46.0%
Total	1,886	\$ 993,970	\$ 770,288	\$ 527	5,498.5	\$ 2,897.87	-0.1%	14.1%	14.0%

Non-Participants – Pharmacy Costs by Therapeutic Category

Non-Participants FDB Generic Class	Number in Cohort: 343				Exp. Period (Inc.) 2008				Change from Prior Year			
	Utilization Units	Number of Scripts	Covered Amount	Total Net Paid	Charges Per Script	Scripts per Util. Unit	Incidence Rate (per 1,000)	PMPY (Charges)	Charges Per Script	Scripts per Util. Unit	Incidence Rate (per 1,000)	PMPY (Charges)
ANALGESICS	65	152	\$ 11,377	\$ 10,371	\$ 75	2.3	189.5	\$ 33.17	18.2%	5.3%	-4.4%	19.0%
ANESTHETICS	6	6	\$ 40	\$ 32	\$ 7	1.0	17.5	\$ 0.12	-19.2%	0.0%	200.0%	142.5%
ANTIARTHRITICS	46	82	\$ 3,156	\$ 2,575	\$ 38	1.8	134.1	\$ 9.20	-0.4%	-5.1%	39.4%	31.8%
ANTIASTHMATICS	30	79	\$ 9,801	\$ 8,071	\$ 124	2.6	87.5	\$ 28.57	-6.2%	0.1%	57.9%	48.2%
ANTIHISTAMINE AND DECONGESTANT (3	3	\$ 40	\$ 32	\$ 13	1.0	8.7	\$ 0.12	-81.6%	-54.2%	-72.7%	-97.7%
ANTIHISTAMINES	26	65	\$ 4,165	\$ 3,334	\$ 64	2.5	75.8	\$ 12.14	-12.9%	25.0%	-18.8%	-11.5%
ANTIINFECTIVES	178	217	\$ 4,640	\$ 3,819	\$ 21	1.2	519.0	\$ 13.53	-15.0%	-3.7%	28.1%	4.8%
ANTIINFECTIVES/MISCELLANEOUS	75	110	\$ 25,851	\$ 24,380	\$ 235	1.5	218.7	\$ 75.37	4.0%	-0.3%	7.1%	11.1%
ANTINEOPLASTICS	3	21	\$ 6,448	\$ 6,079	\$ 307	7.0	8.7	\$ 18.80	112.5%	75.0%	-25.0%	178.9%
ANTIPARKINSON DRUGS	2	5	\$ 1,603	\$ 1,423	\$ 321	2.5	5.8	\$ 4.67	12.2%	-37.5%	100.0%	40.2%
AUTONOMIC DRUGS	54	229	\$ 9,955	\$ 8,379	\$ 43	4.2	157.4	\$ 29.02	-5.0%	29.7%	3.8%	28.0%
BLOOD	11	43	\$ 8,730	\$ 7,715	\$ 203	3.9	32.1	\$ 25.45	4.1%	62.9%	-26.7%	24.4%
CARDIAC DRUGS	33	131	\$ 8,601	\$ 7,377	\$ 66	4.0	96.2	\$ 25.08	-34.7%	14.6%	17.9%	-11.8%
CARDIOVASCULAR	255	927	\$ 94,092	\$ 78,240	\$ 102	3.6	743.4	\$ 274.32	-10.5%	-4.1%	26.2%	8.3%
CNS DRUGS	12	36	\$ 6,439	\$ 5,733	\$ 179	3.0	35.0	\$ 18.77	-58.8%	12.5%	100.0%	-7.4%
CONTRACEPTIVES	8	38	\$ 1,975	\$ 1,580	\$ 52	4.8	23.3	\$ 5.76	-12.3%	9.6%	33.3%	28.2%
COUGH/COLD PREPARATIONS	37	46	\$ 1,061	\$ 856	\$ 23	1.2	107.9	\$ 3.09	2.6%	-8.2%	19.4%	12.3%
DIAGNOSTIC	14	31	\$ 5,698	\$ 4,975	\$ 184	2.2	40.8	\$ 16.61	-2.6%	-5.1%	16.7%	7.8%
DIURETICS	28	105	\$ 911	\$ 729	\$ 9	3.8	81.6	\$ 2.66	-20.6%	23.5%	3.7%	1.7%
EENT PREPS	98	212	\$ 19,112	\$ 15,458	\$ 90	2.2	285.7	\$ 55.72	4.1%	9.7%	-5.8%	7.7%
ELECT/CALORIC/H2O	23	44	\$ 558	\$ 446	\$ 13	1.9	67.1	\$ 1.63	-24.4%	7.6%	155.6%	108.0%
GASTROINTESTINAL	82	216	\$ 27,065	\$ 22,779	\$ 125	2.6	239.1	\$ 78.91	-7.8%	1.4%	22.4%	14.5%
HORMONES	47	85	\$ 4,396	\$ 3,765	\$ 52	1.8	137.0	\$ 12.82	4.2%	3.8%	34.3%	45.2%
HYPOGLYCEMICS	63	234	\$ 38,033	\$ 33,711	\$ 163	3.7	183.7	\$ 110.88	-2.2%	16.2%	12.5%	27.9%
IMMUNOSUPPRESSANT	3	9	\$ 13,137	\$ 12,797	\$ 1,460	3.0	8.7	\$ 38.30	39.5%	38.5%	-50.0%	-3.4%
MISC MEDICAL SUPPLIES, DEVICES, NON	14	30	\$ 1,727	\$ 1,471	\$ 58	2.1	40.8	\$ 5.04	79.3%	24.1%	27.3%	183.1%
MUSCLE RELAXANTS	19	43	\$ 563	\$ 451	\$ 13	2.3	55.4	\$ 1.64	-0.4%	6.1%	26.7%	33.9%
PRE-NATAL VITAMINS	1	8	\$ 346	\$ 277	\$ 43	8.0	2.9	\$ 1.01	-0.3%	100.0%	0.0%	99.4%
SEDATIVE/HYPNOTICS	16	39	\$ 1,917	\$ 1,534	\$ 49	2.4	46.6	\$ 5.59	-9.9%	18.6%	-11.1%	-5.1%
SKIN PREPS	67	85	\$ 3,880	\$ 3,260	\$ 46	1.3	195.3	\$ 11.31	-1.5%	-5.4%	42.6%	32.9%
SMOKING DETERRENTS	2	3	\$ 322	\$ 258	\$ 107	1.5	5.8	\$ 0.94	~	~	~	~
THYROID PREPS	17	86	\$ 1,038	\$ 830	\$ 12	5.1	49.6	\$ 3.03	-16.3%	9.1%	54.5%	41.2%
UNCLASSIFIED DRUG PRODUCTS	56	158	\$ 23,664	\$ 19,400	\$ 150	2.8	163.3	\$ 68.99	10.9%	-3.3%	16.7%	25.2%
UNKNOWN	89	337	\$ 37,211	\$ 31,762	\$ 110	3.8	259.5	\$ 108.49	2.9%	37.6%	-11.9%	24.8%
VITAMINS	7	13	\$ 365	\$ 292	\$ 28	1.9	20.4	\$ 1.06	-59.2%	-38.1%	133.3%	-41.0%
Total	1490	3928	\$ 377,916	\$ 324,194	\$ 96	2.6	4,344.0	\$ 1,101.80	-6.1%	6.4%	15.5%	15.4%