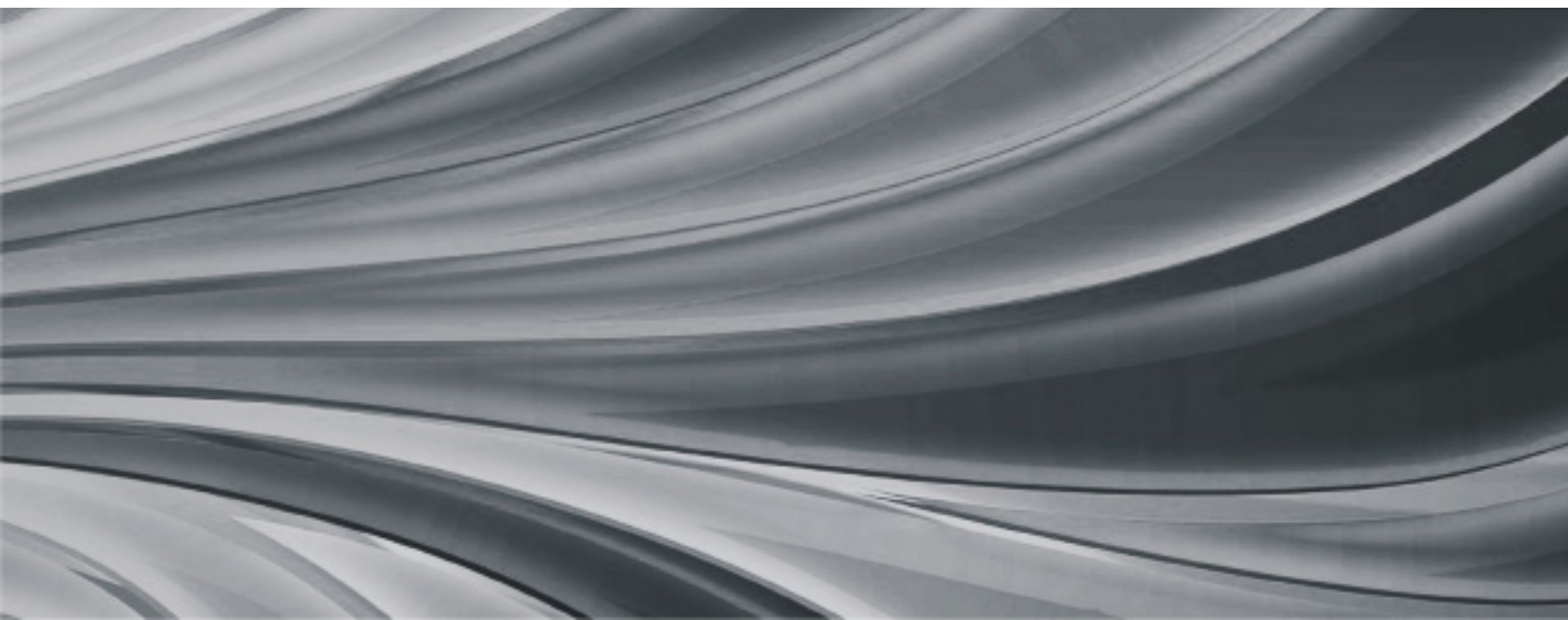
ROBUST CLINICAL DECISION SUPPORT PROGRAM

HELPS PATIENTS ACHIEVE BEST-EVIDENCE CARE AND AVOID UNNECESSARY SURGERIES

A WHITE PAPER BASED ON THE HONEYWELL CASE STUDY



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SUMMARY

Honeywell has offered a benefit to address high cost, highly variable diagnoses, such as cancer, musculoskeletal conditions, and complex medical conditions, through ConsumerMedical (CM). The program's aims include improving employee and family health status, supporting informed decision-making, improving outcomes and satisfaction, managing costs, and rigorously evaluating program outcomes. The program was expanded in 2003 to include a surgical decision support (SDS) component to address high musculoskeletal costs. Initially, the SDS program was voluntary; beginning in 2006 Honeywell offered a $500 incentive. In 2011, the incentive was discontinued, to be replaced in 2013 by a penalty of $1,000 for non-participation. Not unexpectedly, program participation tracks with the incentive and disincentive payments. In 2003, SDS participation was 35 patients; this increased to 227 in 2006, the first year of the incentive. Following the discontinuation of the incentive the SDS participation dropped, rising to 360 participants in 2013, the first year of the penalty. Results show that the information received by the patients helps to inform better decision-making: of 679 patients who participated in the program from 2009 through 2013, 251 (37%) changed their initial decision and avoided unnecessary surgery. (27 patients underwent surgeries of lower severity and cost, and 224 patients avoided surgery entirely.) Participants reported a high degree of satisfaction with the program as well.

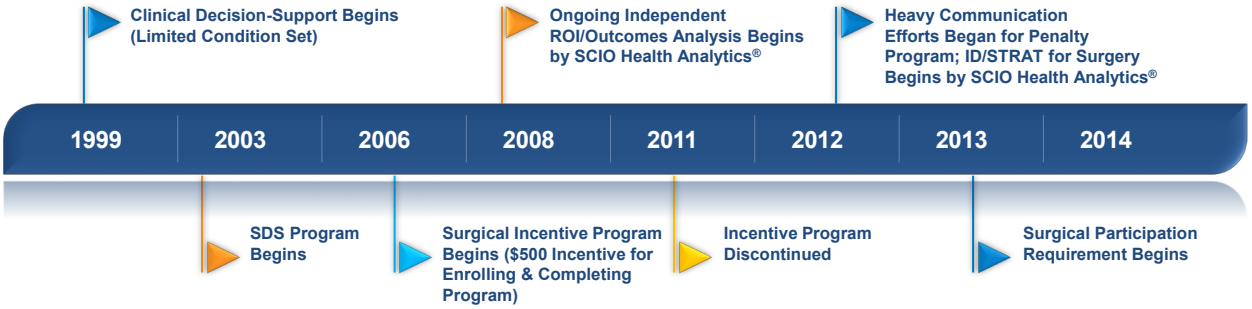
Take-away Messages for Readers:

- The SDS program serves an important need in the patient population for information on treatment alternatives.
- Participants are very satisfied with the program.
- The plan sponsor enjoyed considerable savings, as did participants, when surgery was avoided. When program participation is high, savings can be considerably more.
- When patients are well informed about options, they make better and different decisions.
- Timely identification and participation by those contemplating surgery is challenging, and Honeywell has tried different approaches. The most successful approach is multi-channel: a penalty for non-participation, coupled with extensive marketing and a data-driven identification/stratification process to find and motivate at-risk patients.
- It is important to evaluate and constantly enhance engagement techniques to improve program performance.

BACKGROUND

Honeywell and CM began their partnership in 1999 to address high cost, highly variable diagnoses, such as cancer, complex diseases, and other serious medical conditions, where many patients do not receive evidence-based care. For example, when a participant with low back pain is referred to a surgeon, the recommendation is often surgery, possibly because of the training of the surgeon. The two companies aimed to improve employee and family health status, support informed decision-making, and improve outcomes and satisfaction. The program was expanded to include a surgical decision support (SDS) component in 2003 to address high musculoskeletal costs. Over time the program has grown and evolved as illustrated in Figure 1.

Figure 1: Milestones in Honeywell's Clinical Decision Support Program



Initially the program addressed Knee Replacement, Hip Replacement, Lower-back Surgery and Hysterectomy. Beginning in 2006, an incentive of $500 was paid to participants who sought clinical decision support from CM. Despite the incentive, participation by eligible members was low (and fell, following a reduction in communication). In 2012, in an attempt to increase participation, Honeywell partnered with SCIO Health Analytics® to perform identification and stratification (ID/Strat) of eligible members, who were then contacted by CM staff, beginning in 2013. This initiative increased participation by identifying patients most likely to be at risk of undergoing a targeted surgery.

Also in 2013, Honeywell moved to a penalty-based system: a penalty of $1,000 now applies to eligible members who undergo these surgeries without completing coaching and education with CM. The penalty, combined with the ID/Strat process, has significantly improved participation. Further, the ID/Strat process is being fine-tuned to reduce timing issues, restrictions on who could be contacted and poor contact information.

CONSUMERMEDICAL PROGRAM MODEL

CM offers a robust clinical decision support service, first developed for cancer 19 years ago, using leading physicians from America's Top 5 medical schools in conjunction with Decision Support Specialists (RNs) and Researchers who are assigned to each patient and family to help them become well informed, active participants in their care.

CM's model provides current, comprehensive, objective, and personalized information about a participant's diagnosis and treatment options beginning on the first day of engagement. CM markets itself as "Your GPS for health care" helping each participant navigate the system and answer the five most important questions in health care: What do I have? What do I need? Where do I go? What does it cost? How do I connect? ©

The program also includes concierge services, expert second opinion capabilities, comprehensive information kits, and assistance in understanding hospital quality and leveraging Centers of Excellence programs to get participants who need surgery to the highest quality specialists and hospitals within their networks. Participants engage with the CM team for as long as they need or desire assistance and follow up is ongoing.

PRIOR STUDIES OF SIMILAR PROGRAMS

Second Surgical Opinion Programs have been used since 1972 to improve patient information and decision-making process. A 1990 review by Lindsey and Newhouse [1] reviewed a number of studies of these programs but concluded that the results were open to question, in part because of shortcomings in methodology. Another study by McSherry et al [2] reporting the analysis of an employer program, found that 490 procedures out of 5,601 (for a wide range of conditions) (8.7%) were not confirmed. A study by Wagner and Wagner in Health Affairs (1999) [3] found that, with the increase in managed care, Second Surgical Opinion programs had largely been replaced by quality improvement programs. Perhaps for this reason there have been fewer studies of general programs in the recent literature, with more focus on programs targeted at specific conditions (particularly cancers).

A few examples of non-cancer studies also exist, such as a qualitative study of knee surgery conducted by Hoffman et al [4] who found that information provided in a decision aid can affect patients' choices. Kennedy et al [5] studied the provision of decision aids for women suffering from menorrhagia and found that the intervention group had costs that were 43% lower than the control group. More recent versions of these programs include "Shared Decision-making," and a number of studies have been published and there is growing evidence showing favorable results of targeted outreach and coaching [6-8], [9]. The absence of studies, however, is consistent with the apparent focus on other types of interventions. As we suggest in this study, patients and employers both miss a significant opportunity as a result.

INCENTIVES, DISINCENTIVES AND PREDICTIVE MODELING

As the 2003-2005 data show, the program had a relatively slow start until Honeywell provided a $500 incentive in 2006. Participation fell after the subsidy was withdrawn in 2011-2012 rising again in 2013 with the introduction of a penalty for non-participation.

Table 1: Participation 2003-2008

	Intake Year							Avoided Unneeded Surgeries[1]
	<---- Communication Only ---->			<--------- $500 Incentive --------->				
Conditions	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**	
Low Back Pain	27	71	39	103	61	30	331	39
Hip/Knee Osteoarthritis	8	28	25	85	39	29	214	27
Uterine Fibroids/ Endometriosis	0	20	10	39	37	53	159	7
Grand Total	**35**	**119**	**74**	**227**	**137**	**112**	**704**	**73**

[1] "Avoided Unneeded Surgeries" is defined as the complete avoidance of a surgical procedure or choice of an alternative less-invasive, aggressive or costly treatment.

Table 2: Participation 2009-2013

	<------ $500 Incentive ------>		<--- No incentive/Penalty ---->		<---- $1000 Penalty---->	
Conditions	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Low Back Pain	39	36	21	16	105	217
Knee Osteoarthritis	36	35	15	23	146	255
Hip Osteoarthritis	22	17	7	11	50	107
Uterine Fibroids / Endometriosis	22	14	1	4	59	100
Grand Total	119	102	44	54	360	679
Eligible Members	73,531	75,088	70,541	69,755	63,596	352,511
Participants per 1000 Eligible Members	**1.62**	**1.36**	**0.62**	**0.77**	**5.66**	**1.93**

IDENTIFICATION AND STRATIFICATION OF ELIGIBLE MEMBERS

The ID/Strat program was applied to surgical decisions beginning in 2013 as a way of finding members earlier who may be at risk of undergoing the target surgeries, so that CM would be able to provide coaching and education to more patients prior to surgery. To perform ID/Strat, SCIO Health Analytics® is provided with a monthly claims and eligibility feed by Honeywell. SCIO's algorithms then identify and rank those members most at risk of the target surgeries. Because of the number of members identified, SCIO® provides lists of the top one-third of the identified members to CM, and CM attempts to contact and engage these members (although the one-third limitation is being lifted, prospectively, in order to better serve Honeywell members).

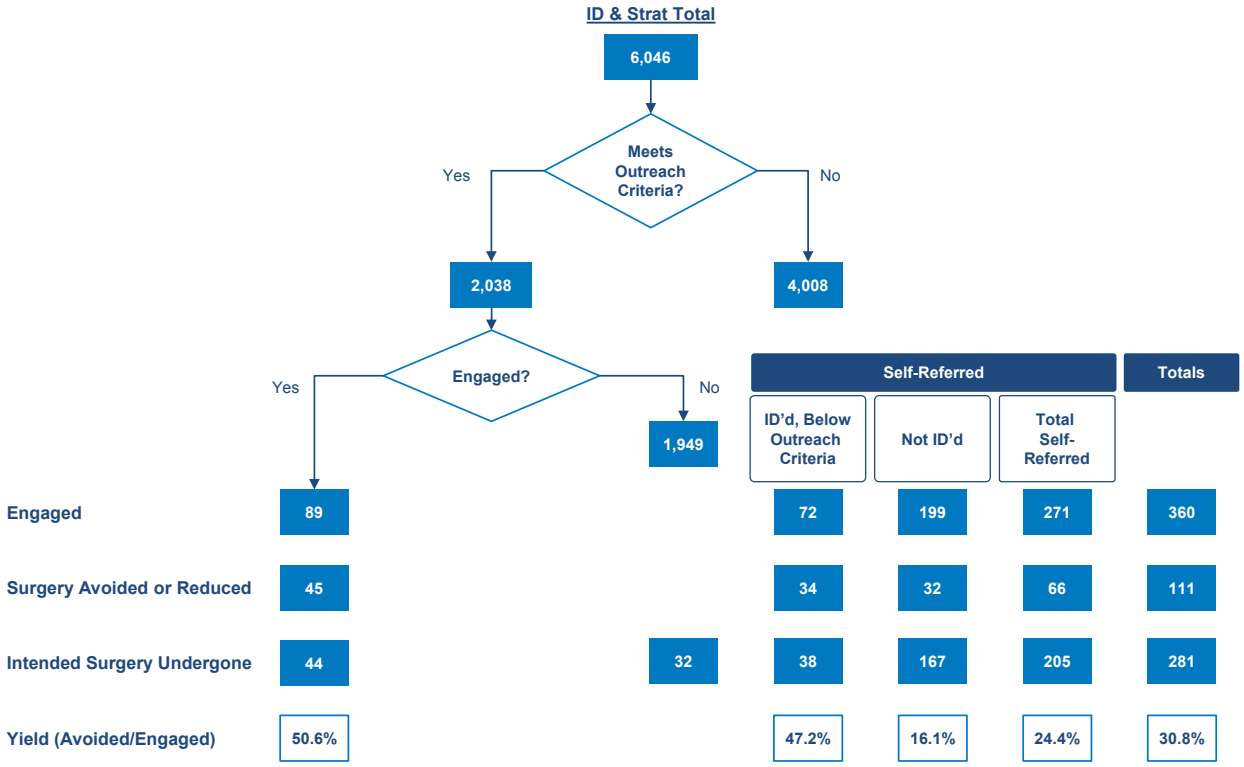
Figure 2 provides an analysis of members who were identified as being at risk of surgery in 2013 (6,046); of these members, 2,038 met eligibility requirements for CM outreach, and 89 (4.4%) patients were engaged in the program. An additional 271 members who were not identified as being at high risk self-referred; of the self-referring patients, 72 had been identified (but did not score high enough to be contacted by CM) and 199 (55% of all engaged members) were not identified by the SCIO® algorithm.

As with many outbound calling programs, engagement is made more difficult by the inability to reach and engage the target patients. Analysis of 2013-2014 results shows that of the outbound calling targets, 44% could not be reached because of invalid contact information, and a further 43% while reached, did not respond. Of the remaining 13% of patients who were reached, one-third actively engaged and two thirds declined.

Looking at different sub-populations, 45 (50.6%) of the identified group who engaged avoided unnecessary surgery or chose a lesser intensity treatment, while 34 (47.2%) from the group who were identified but not contacted but who self-referred avoided surgery. Of the self-referrals who were not identified, 32 (16.1%) avoided surgery. Although the ID/Strat process has not yielded a high number of engaged participants, those who do engage are far more likely to change their behavior than those who self-refer.

IDENTIFICATION AND STRATIFICATION OF ELIGIBLE MEMBERS (CONT'D)

Figure 2: ID/Stratification and Program Participation



Honeywell's outreach and engagement strategy continues to evolve. Honeywell and SCIO® have conducted extensive analysis to identify why some members were missed and to find ways to improve the efficiency of the model. A sample analysis of the surgeries that were "missed" shows that there were often valid reasons for this: 11.7% were due to members having had no prior procedure codes or claims that would have identified them as being at risk for surgery; 21.3% were members who had no prior claims at all; and 67.0% were missed because of data or timing issues (for example some members who were identified by the algorithm proceeded rapidly to surgery from their first encounter).

This is an area that continues to receive attention to improve the efficiency of outreach and the ID/Strat process.

OUTCOMES

The original study, which was for the period 2003-2008, found that out of a total of 704 patients that participated, savings were estimated at $1.9 million from 73 avoided unneeded surgeries. Savings were calculated as the difference between the cost of the originally contemplated treatment as reported by the patient (pre-intent) and the actual treatment (post-intent). Changes in the program led to the introduction of a refined savings methodology for the subsequent study of the period 2009-2013. The refined methodology, which is described in the Appendix, includes a 12-month post-intent validation to ensure that the revised intent was not reversed and the patient did not have the procedure during this period.

Table 3: Avoided Unneeded Surgeries 2009-2013 (12-month Validated)

Conditions	2009	2010	2011	2012	2013	Total
Low Back Pain	25	21	11	10	43	112
Knee Osteoarthritis	12	6	7	4	31	60
Hip Osteoarthritis	6	2	4	4	8	24
Uterine Fibroids / Endometriosis	18	5	0	3	29	55
Grand Total	**63**	**34**	**22**	**21**	**111**	**251**

Low back pain had the highest number of avoided procedures (44.6% of avoided surgeries) and the highest overall savings (slightly less than 50% of total savings). Low back pain and uterine fibroid/endometriosis had the highest savings per avoided surgery, followed by knee osteoarthritis and hip osteoarthritis. The mix of procedures changed between 2003-2008 and 2009-2013 as a result of the significant increase in uterine fibroid/endometriosis education (from 9.6% to 21.9% of avoided surgeries). Hip and Knee replacements, which remained flat at about one-third of all avoided procedures, have the lowest savings per procedure.

Table 4: Avoided Unneeded Surgeries 2009-2013

Conditions	Participants	Avoided Unneeded Surgeries	% Surgeries Avoided
Low Back Pain	217	112	51.6%
Knee Osteoarthritis	255	60	23.5%
Hip Osteoarthritis	107	24	22.4%
Uterine Fibroids/Endometriosis	100	55	55.0%
Grand Total	**679**	**251**	**37.0%**

OUTCOMES (CONT'D)

Table 5: Financial Results 2009-2013 (with 12-month Post-intent Validation)[2]

Conditions	2009		2010		2011		2012		2013		Total	
	#	Savings	#	Savings	#	Savings	#	Savings	#	Savings	#	Savings
Low Back Pain	25	$518,178	21	$492,946	11	$256,356	10	$251,301	43	$1,118,202	112	$2,636,984
Knee Osteoarthritis	12	$253,490	6	$131,452	7	$136,312	4	$78,534	31	$651,954	60	$1,251,742
Hip Osteoarthritis	6	$61,451	2	$23,368	4	$72,882	4	$67,210	8	$145,270	24	$370,182
Uterine Fibroids	18	$386,244	5	$120,284	0	$0	3	$65,997	29	$722,953	55	$1,295,478
Grand Total	**63**	**$1,219,364**	**34**	**$768,051**	**22**	**$465,550**	**21**	**$463,043**	**111**	**$2,638,379**	**251**	**$5,554,386**

[2] "Savings" are calculated as the difference between the cost of the original treatment (pre-intent) and the actual (post-intent) treatment.

Table 6: Savings Per Procedure (with 12-month Post-intent Validation)

Conditions	#	Savings Per Procedure
Low Back Pain	112	$23,545
Knee Osteoarthritis	60	$20,862
Hip Osteoarthritis	24	$15,424
Uterine Fibroids / Endometriosis	55	$23,554
Grand Total	**251**	**$22,129**

Overall, the program avoided an average cost per procedure of $22,129 between 2009 and 2013. Total savings over the last 5 years amounted to $5.6 million, although savings were considerably reduced during the period when Honeywell removed the incentive and program advertising. The significant increase in numbers of avoided procedures in 2013 resulted in a five-fold increase in savings from 2012 to 2013. In 2013 alone, savings totaled $2.6 million. There is potential to further increase savings as engagement strategies are further refined and improved and participation increases.

PROGRAM SATISFACTION

A key feature of the program has been high patient satisfaction. Participants are asked at the end of the program to rate the service overall using one of five choices (Excellent, Very Good, Average, Below Average, Poor). From 2009 - 2013, 97% of all participants in the program have rated the service as either "Excellent" or "Very Good". The survey completion rate during this period was 88%. In addition, the Honeywell Medical Benefits team has regularly received letters of appreciation from their employees about the CM program. Comments from these letters have included:

- ***"I would recommend this service to any of my co-workers if they are thinking about getting a knee replacement."***
- ***"I was impressed with the level of professionalism, the depth of information and resources that I received, and the thoroughness of the services extended by Nancy and the other medical professionals at ConsumerMedical."***
- ***"It absolutely did help me decide on my treatment. It opened up more information other than just what the surgeon is telling you – because, of course – they just want to operate. The service was fabulous – you were wonderful."***
- ***"I was to have knee replacement surgery in August but am now able to put it off due to the success of alternate therapies and life-style changes."***

CONCLUSION

The CM clinical decision support program is one of the few programs available to employers with demonstrated and credible savings and improvements in clinical outcomes. The program pays for itself while improving quality and helping participants to achieve best-evidence care. Honeywell, SCIO® and CM are continuing to improve and expand the program, for example, by changing incentives, improving contact information, and refining the predictive models, so as to maximize program impact and results in the future.

APPENDIX: SAVINGS METHODOLOGY

The methodology utilized by SCIO Health Analytics® is a 12-month validated, pre-intent/post-intent comparison methodology for calculating savings. The 12 month validation period begins with the closure of the engagement period between the patient and CM. The intended procedure of all patients who present with a physician recommendation is recorded; these procedures are stratified into three severity groups.

An average annual cost per grouped procedure is then calculated, based on national procedure costs from SCIO's extensive database. Savings are then calculated 12 months after the patient completes the engagement, as the difference between the average grouped procedure costs, pre-intent and actual. If the patient proceeds with the proposed surgery or has a more severe level of surgery, no savings are recorded.

If the patient has no surgery or a lower-intensity procedure, savings are recorded. Finally the patient's eligibility status is checked: if the patient is no longer a Honeywell member, the patient is excluded from the savings calculation. Note that the savings reported in this study only include direct, hard dollar savings and do not include indirect savings from increased productivity, lower disability and absence costs and costs associated with medical complications often associated with these surgeries.

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