

12 Month Medical Cost Savings Observed from Real Appeal Intensive Lifestyle Interventions

Real Appeal's® recent data shows its digital weight loss program helps participants improve their health and employers reduce their medical expense.

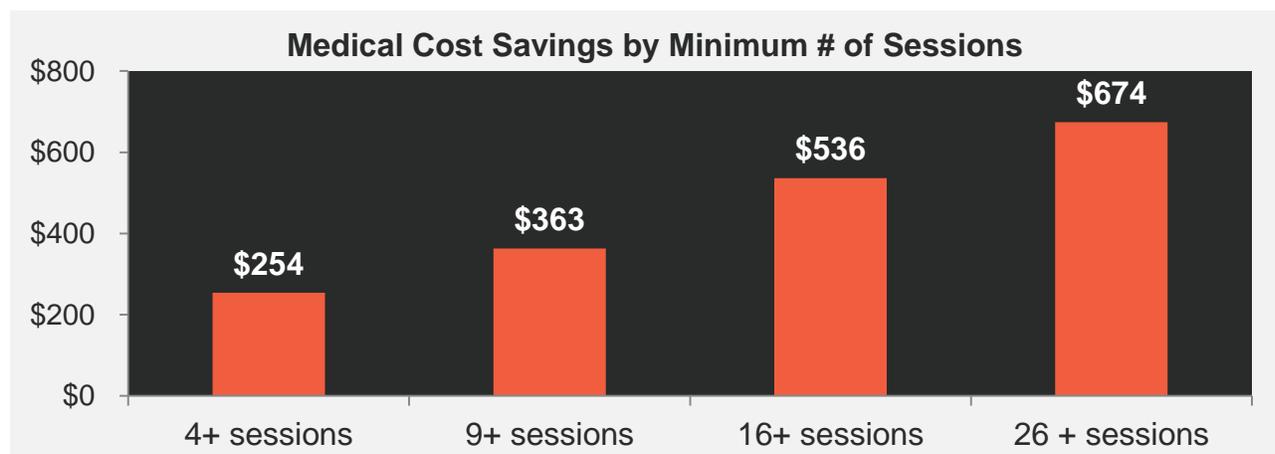
This paper summarizes the difference-in-difference analysis of the impact of Real Appeal's Intensive Lifestyle Intervention (ILI) on medical costs as described in the study sample presented below. Real Appeal participants were found to have statistically significant lower medical costs in their first year of Real Appeal as compared to non-participants.

REAL APPEAL PARTICIPANTS SAVED UP TO **16%** IN ANNUAL MEDICAL COSTS COMPARED TO NON-PARTICIPANTS.



The size of these cost savings increased with the number of coaching sessions. Real Appeal participants who attended at least four coaching sessions incurred medical costs \$254 lower than non-participants (6% cost savings); while participants who attended at least 26 sessions saw their cost savings grow to \$674 (16% cost savings).

Figure 1. Average Medical cost savings per participant



It is important to emphasize that these savings were achieved while the participants were enrolled in the Real Appeal program. Participants learned about ILI; built a strong foundation of behavior change and started to lose weight. Research shows that the benefits of ILI participation persist for years into the future¹ leading to continued savings relative to non-participation. The Real Appeal ROI is based on three-years; this study examines year one of that three year timeframe.

Real Appeal's ILI is Scientifically Based

Obesity is an ever-growing problem in the U.S. where roughly 40% of citizens are defined as obese and an additional 33% categorized as overweight.² Obese employees are estimated to cost employers 43% more than non-obese employees.³ Obesity-related costs to employers expand beyond health expenditures. The indirect costs of obesity include lost productivity, absenteeism and increased rates of disability.^{4,5} The good news is that even modest weight loss of just 5% of initial body weight has been found to improve health outcomes, reduce health care costs, and improve employee performance and attendance.^{3,4,6-9}

The Real Appeal ILI is a 52-week digital weight loss program based on science. Over the past four decades, obesity researchers have reached consensus that the most effective method to achieve modest, sustainable weight loss is through intensive lifestyle interventions (ILIs).¹⁰ These relatively inexpensive interventions achieve high levels of participant adherence – perhaps the most important element behind sustainable weight loss.¹¹ First introduced by the National Institutes of Health (NIH) with their Diabetes Prevention Program (DPP), the ILI design has been successfully utilized by the Centers for Disease Control and Prevention (CDC) with their Diabetes Prevention Recognition Program (DPRP) and the U.S. Preventive Services Task Force (USPSTF) in their work on cardiovascular disease prevention. These highly regarded and intensely studied initiatives by NIH, CDC, and USPSTF informed the design and processes of the Real Appeal ILI to maximize program effectiveness.

Multiple clinical trials^{4,6-7,10-20} have demonstrated that ILIs are highly effective at helping achieve clinically meaningful weight loss and improved health outcomes. The DPP found ILIs helped pre-diabetics achieve an average of a 7% reduction in body weight, with a 5% weight loss sustained after 3.3 years.^{12,13} The Action for Health in Diabetes (Look AHEAD) study demonstrated that overweight and obese subjects with type 2 diabetes lost significantly more weight in one year when assigned to an ILI versus controls (8.6% of initial weight compared to 0.7% for diabetes support and education). Eight years later, not only were ILI participants more likely to maintain their weight loss, these participants also exhibited significantly better health outcomes (decreased cardiovascular risk factors, depression, knee pain; partial remission of type 2 diabetes; improved mobility and health-related quality of life).^{4,6-7,14-19} Finally, the Comprehensive Assessment of Long term Effects of Reducing Intake of Energy (CALERIE) study of normal or overweight healthy adults found in comparison to a control group, ILI participation resulted in significantly greater weight loss after one year (sustained at two years) and improvement in critical health indicators (cardiovascular risk factors, quality of life, metabolic measures).²⁰

Researchers have also established that ILIs can lead to reductions in health services utilization and costs. Look AHEAD researchers found that the ILI participants had significantly lower pharmaceutical expenditures after the first year and significantly fewer hospitalizations after ten years as compared to persons in the control group.^{1,21} In addition, the Diabetes Prevention Program Outcomes Study (DPPOS) researchers concluded, based on health services utilization patterns of study subjects, that ILI was more cost effective relative to the placebo.^{13,22} These findings help illuminate the profound value of ILIs to both patients and payers by improving health outcomes while reducing healthcare utilization and costs.

INTENSIVE LIFESTYLE INTERVENTIONS (ILIS)

are a proven method for sustainable weight loss.

This paper summarizes findings from a recent Real Appeal study that examined medical expenditures in the first program year for Real Appeal participants versus a group of matched non-participant controls.

This study demonstrates that Real Appeal helps employers achieve medical cost savings even in the very short term.

Measuring the Impact of Real Appeal’s ILI on Medical Cost Savings

Study sample

This study examined whether adult participants in the Real Appeal ILI experienced a statistically significant reduction in medical costs as compared with matched controls. Using a quasi-experimental design, medical costs from a cohort of Real Appeal ILI participants were compared to those incurred by a propensity-matched cohort of controls. A difference-in-difference measurement was used to account for the upward trend in YoY medical cost, where the change from baseline to year one costs for participants was calculated then compared with that of non-participants. Eligible study subjects registered for Real Appeal between July 2015 and June 2016, were at least 18 years old and were continuously enrolled in their medical plan at least one year prior and one year following their Real Appeal registration date. Members of the participant cohort were required to have attended at least four Real Appeal coaching sessions. The non-participant cohort was comprised of people who registered for Real Appeal but chose not to enroll. Excluded from the study were persons who had been diagnosed or treated for an exclusion condition: dementia and organic disorders; HIV; inflammatory or degenerative CNS; ESRD; hemophilia; transplants; hospice care; cancer; pregnancy and birth; bariatric surgery; high cost claimant > \$100k.

Table 1 summarizes the sample determination process, resulting in 22,344 eligible participants and 16,066 eligible non-participants.

Table 1. Study sample counts by Inclusion / Exclusion Criteria

Description		Total	
Registered between July 2015 – June 2016		100,876	
Participant		Non-Participant	
Attended welcome session	69,598 (69)	Did not attend welcome session	31,278 (31)
Qualified for program	60,352 (87)		
Registrant claims enrollment history available	54,098 (90)	Registrant claims enrollment history available	28,525 (91)
Was continuously enrolled for 12 months prior to and 12 months following their registration date	40,320 (75)	Was continuously enrolled for 12 months prior to and 12 months following their registration date	19,217 (67)
Met inclusion criteria	33,667 (83)	Met inclusion criteria and eligible for study	16,066 (84)
Attended 4+ sessions eligible for study*	22,344		

*CDC definition of active participant

Examining the characteristics between participants and non-participants revealed statistically significant differences between the two groups. As shown in Table 2, the participant cohort was older, had a higher risk score, higher baseline costs, and had a higher proportion of females and people from the Midwest relative to non-participants, as shown in Table 2. Because of these significant differences in case mix, a propensity-score matching technique was required.

Table 2. Characteristics of Study Cohorts

	Participants N=22,344	Non-Participants N=16,066	p value
Risk score	1.8	1.6	<.0001
Age (mean, sd)	46.7 (10)	44.7 (10.8)	<.0001
Gender (% female)	80%	75%	<.0001
Baseline cost	\$3,863	\$3,543	<.0001
Region			
Midwest	27%	22%	<.0001
Northeast	6%	7%	
South	56%	58%	
West	12%	12%	

Propensity Score Matching

A propensity-matched technique was necessary to adjust for the differences between the two cohorts and to ensure medical cost differences stemmed from program effects as opposed to case mix. Matching also adjusted for possible selection bias in which persons who chose to participate in Real Appeal differed from non-participants in ways that may also have influenced their health care utilization patterns.

For every study subject, a propensity score was calculated using a logistic regression model of subject age, gender, geographic region, prospective health risk and medical costs in 12 months prior to Real Appeal registration. Once these propensity scores were determined, Real Appeal participants were matched 1:1 without replacement to non-participants by propensity score and baseline cost. This method helped ensure that persons in each group were comparable in their health care utilization patterns (as well as age, gender, geographic region, and risk score) in the 12 months prior to each subject's Real Appeal registration date. A standardized difference analysis validated that the groups were balanced after the matching process; a standardized difference value (stnd diff) greater than or equal to 0.1 indicates the variable is not balanced between cohorts.

Table 3 shows that prior to the matching process, the cohorts were not equally balanced with four variables (highlighted in red). After the propensity matching process, the cohorts were balanced as indicated by all standard difference values being less than the 0.1 threshold.

Table 3. Standardized Difference Table Matching Participants with 4+ Sessions to Non-participants

VARIABLE	Before Matching			After Matching		
	Participant	Non-participant	Std Diff	Participant	Non-participant	Std diff
Risk score	1.8	1.6	0.13	1.6	1.6	0.02
Age	46.7	44.7	0.19	45.5	44.7	0.08
Female	0.80	0.75	0.12	0.78	0.76	0.05
Baseline cost	\$3,863	\$3,543	0.04	\$3,568	\$3,568	0.00
Midwest	0.27	0.22	0.10	0.24	0.22	0.04
Northeast	0.06	0.07	0.04	0.06	0.07	0.02
South	0.56	0.58	0.04	0.57	0.58	0.01
West	0.12	0.13	0.04	0.12	0.13	0.01

Determination of Medical Costs

Medical claims were extracted for the 12 months following each subject's Real Appeal registration. This study defined medical costs as the total paid amount for all medical expenses (excluding pharmacy costs) inclusive of both the insurer's and the study subject's responsibility.

Real Appeal Cost Savings Results

Table 4 summarizes the medical cost savings observed in the first 12 months of the Real Appeal program for participants versus matched non-participants. Participants were clustered based on their level of engagement with the Real Appeal program: those who attended at least four coaching sessions; at least nine sessions; at least sixteen sessions; and at least 26 sessions. While pre/post differences column captures the expected YoY upward trend in medical costs for all groups, the difference-in-difference captures the impact of the Real Appeal ILI had on medical costs in the first 12 months of the program.



At all engagement levels, participants had significantly lower medical costs relative to non-participants. More importantly, the level of cost savings increased with participant engagement: participants who attended at least four coaching sessions achieved a 6% savings compared with their matched non-participant controls, while those who attended at least 26 sessions achieved a 16% savings. Real Appeal ILI delivered economic value even at low levels of participant engagement and in only 12 months.

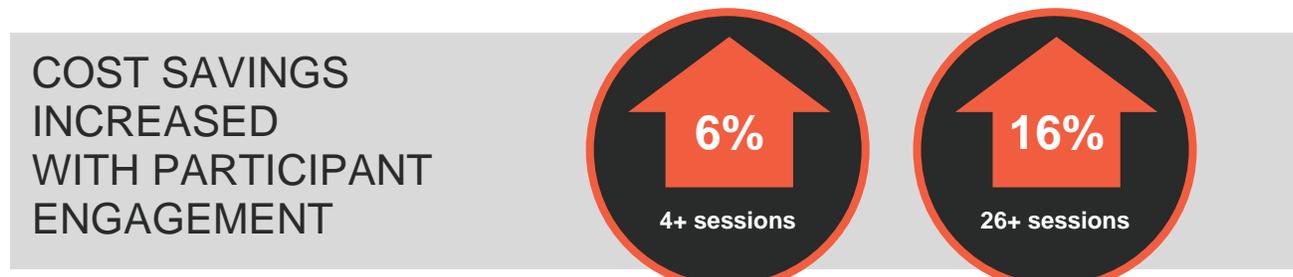


Table 4. Real Appeal ILI Difference-in-Difference Results During Year One

Level of ILI Engagement	Sample Size		Average Baseline (pre) Medical Costs	Average Year 1 (post) Medical Cost	Pre-/Post-Difference	Difference in Difference
4+ coaching sessions	31,392	Participants	\$3,568	\$3,925	\$357	\$254* 6% savings
		Non-participants	\$3,568	\$4,179	\$611	
9+ coaching sessions	26,742	Participants	\$3,351	\$4,032	\$681	\$363* 8% savings
		Non-participants	\$3,353	\$4,397	\$1,044	
16+ coaching sessions	18,768	Participants	\$3,381	\$4,096	\$715	\$536* 13% savings
		Non-participants	\$3,363	\$4,614	\$1,251	
26+ coaching sessions	10,368	Participants	\$3,349	\$4,017	\$668	\$674* 16% savings
		Non-participants	\$3,330	\$4,672	\$1,342	

*statistically significant at $p < .05$

These results represent only the direct medical costs. Employers faced additional indirect costs associated with obesity, including lost productivity, disability expenses, and absenteeism. In other words, the total financial benefit of Real Appeal participation may have been far greater when the indirect benefits of lower absenteeism, fewer disability expenses, and increased productivity are considered.

Finally, these findings are specific to the Real Appeal program and should not be generalized across all weight loss ILIs. Relative to other ILI programs, Real Appeal has two critical differences that may lead to different results. First, Real Appeal participation is not limited to only the pre-diabetic. This means a far broader population may benefit from weight loss support. Second, Real Appeal's participants experience very high levels of engagement and program persistence. Prior Real Appeal studies have found that 82% of participants attended at least four sessions, 41% of whom achieved at least 5% weight loss – the threshold that has been demonstrated to decrease disease symptoms, slow disease progression, and reduce health care expenditures.^{8,23}

Summary

As shown in this analysis, Real Appeal delivers consistent medical cost savings at all levels of participant engagement even in this very short 12 month period. Real Appeal led to a 16% reduction in medical costs among highly-engaged participants who attended 26 coaching sessions versus their matched controls. Even participants who only attended four coaching sessions incurred medical costs 6% lower than non-participants.

Learn more at RealAppeal.com

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