

# Implementing an Online Weight-Management Intervention to an Employee Population: Initial Experience with Real Appeal

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**Objective:** Given the disease burden and economic costs of obesity in the United States, scalable approaches to weight loss and weight management are needed. This study evaluated self-reported weight-loss outcomes associated with a commercial intensive lifestyle intervention marketed to employers and delivered electronically to employees.

**Methods:** Data were collected for participants who enrolled in an online intensive lifestyle intervention weight-loss program from July 2015 through June 2016. An intent-to-treat analysis of participants who attended at least one session is reported.

**Results:** Ninety-six companies, with approximately 437,215 eligible adult beneficiaries, launched Real Appeal in July 2015. In the first 12 months of the program, 69,598 adults enrolled and 87% met at-risk criteria for prediabetes, diabetes, or cardiovascular disease. The intent-to-treat cohort ( $n=52,461$ ), all of whom attended at least one session, lost an average of 2.8% body weight, with 23% achieving 5% or more weight loss. Active participants ( $n=38,836$ ) lost an average of 3.5% body weight, with 29% achieving 5% weight loss. Program completers ( $n=27,164$ ) lost an average of 4.3% body weight, with 36% of the cohort achieving 5% weight loss.

**Conclusions:** This study demonstrated that an employer-offered, online, behavioral weight-loss program was an effective, scalable solution for engaging more than 50,000 participants with overweight and obesity.

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## Introduction

There is a great need for effective and scalable weight loss and weight-loss maintenance interventions that can be implemented over a wide geographic area. Among US adults, it is currently estimated that 36.5% have a BMI of 30 kg/m<sup>2</sup> or more (1). The obesity epidemic has significant negative health and economic consequences (2-4). Intensive multicomponent behavioral interventions produce average weight losses of 4 to 7 kg and lead to improvements in glucose tolerance and other cardiovascular risk factors (5-7). Given the evidence of the beneficial effects of behavioral interventions, several task force reports now provide recommendations regarding weight-loss programs. The 2013 obesity guidelines (2) recommend comprehensive

lifestyle interventions, including diet, physical activity, and behavior therapy, with at least 14 sessions over 6 months and follow-up for 1 year. Likewise, the US Preventive Services Task Force recommends that clinicians screen for obesity and offer or refer patients with BMI > 30 for intensive behavioral therapy for obesity (8). The Centers for Medicare and Medicaid Services announced that it will reimburse providers for these services (9).

A major barrier to implementing intensive behavioral counseling is one of scale; there are not enough individuals trained in intensive behavioral therapy for obesity to effectively treat the many individuals who need these services. Real Appeal is a commercial program providing online delivery of intensive lifestyle intervention targeting employees, thus

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addressing an unmet need for wider delivery of behavioral counseling for obesity and removing common barriers associated with participating in work-site health promotion programs, including access, convenience, and cost. This paper provides data on the recruitment of the initial population over the first year as well as the effectiveness of delivering the Real Appeal intensive lifestyle intervention program online and to a wide geographic population.

## Methods

### Rationale for the approach

Real Appeal was launched in July 2015 as a 52-week program that could be accessed online from any location. In developing the program, the goal was to utilize evidence-based principles of intensive behavioral therapy and deliver the intervention in ways that would appeal to a large audience and promote engagement. Several approaches were used to maximize participation. Whereas traditional diabetes prevention programs (DPPs) limit enrollment to people with prediabetes (10), less than 11% (11-13) of the estimated 79 million US adults with prediabetes (14) are aware of their condition. Thus, the Real Appeal program was designed to include not only participants with prediabetes but also others who would receive demonstrable medical benefits and those primarily focused on weight loss. By creating a broad base of participation, it was hoped that colleagues could enroll in the program together, regardless of the presence or absence of comorbid disease conditions, maximizing the potential for coworker support (15). The program also sought to remove common barriers associated with participating in work-site health promotion programs, including access, convenience, and cost. To increase access and convenience, the program was made accessible online via any mobile device at any time from any location. Employers cover the cost of the program, removing the cost barrier associated with enrolling in commercial weight-loss programs. In addition, to decrease cost to the employer, companies paid only per session attended and only when a participant was on track for 5% weight loss.

### Accessing the program

The Real Appeal program was marketed to human resource departments as an employee health benefit covered through health insurance. These departments invited their employees to enroll via informational emails and work-site events. Employees who registered were instructed to upload the application for the program via the internet and schedule an online welcome session with a health coach. During their welcome session, employees provided their height, weight, and brief medical history, received an overview of the program, and selected a convenient time and day to attend an online weekly group session. Employees who enrolled received a personalized tool kit containing a body weight scale, food scale, blender, nutrition guide containing recipes and meal plans, exercise aids, and the Real Success Guide containing written materials for the initial 16-week core curriculum.

### Program components

The Real Appeal curriculum is based on the Centers for Disease Control and Prevention (CDC) DPP curriculum (10) and teaches the importance of physical activity and overcoming barriers to activity, healthy eating through meal planning, savvy food shopping and home preparation, conquering hunger and emotional eating, managing stress, the importance of sleep, problem solving, and staying motivated. The

52-week curriculum is divided into the following two phases: the core phase, which includes the initial 16 weeks of the program, and the maintenance phase from weeks 17 through 52. During both phases of the program, participants attended a weekly, online, 30-minute group class led by a health coach. Classes, averaging 30 participants, were formed based on day and time preferred by participant and included participants from a variety of geographic locations and employers. Participants were able to view and hear the coach exclusively and interact with other participants via an online chat system. Makeup sessions were available, and participants were able to meet with their health coach for individual sessions. The coaches had degrees or certificates in the health and wellness field and received additional training by Real Appeal.

An entertaining television-like series targeting healthy lifestyle was developed and shown during the weekly online class. The videos, 10 to 15 minutes in length, were developed using intensive lifestyle intervention methodology from the Real Appeal curriculum by writers specializing in audience engagement and delivered by professional actors in an educational and entertaining format. After viewing the video during class, participants could rewatch the videos at their convenience.

Participants received instruction on setting daily calorie goals during their first coaching session and used an in-dashboard tracker via their Real Appeal application to track food, water, exercise, weight, blood pressure, moods, and emotions. All data were self-reported, except that the exercise tracker synchronized with participants' Fitbit or Jawbone activity tracker. Participants self-reported additional measurements, such as body measurements, resting heart rate, hours of sleep, and number of steps taken.

### Data analysis

The analysis for this study was conducted using existing program data, which had been anonymized, from participants who voluntarily participated in the Real Appeal program. The anonymized data were examined after participants completed the program, and the researchers did not have any interaction with participants. The analysis examined, retrospectively, program participation and self-reported weight loss. Study investigators did not have access to personal information or personal health information on individuals in the study; therefore, in compliance with 45 CFR §46.102(f) (*Fed Regist* 1991;56:28012-28022), an Institutional Review Board waiver was not obtained. Data were analyzed on the first cohort of participants who enrolled from July 2015 through June 2016. Participant age, gender, region, date of enrollment, dates of sessions attended, height, starting weight, starting BMI, and subsequent weights reported were merged using a unique identifier. Weight data were analyzed, and 115 records with errors or implausible weight loss were deleted from analysis. Starting weight, height, and medical history were collected during the one-on-one welcome session. Subsequent self-reported weights were entered electronically. Entering subsequent weights was not mandatory for program participation. Participants who had a starting weight recorded but did not record any subsequent weight were assigned zero weight loss. For the purpose of this analysis, the last weight observation recorded was carried forward and used to measure weight loss from start of program to program completion. An intent-to-treat approach was used, and participants who attended at least one session were retained for analysis. Two additional approaches were used to compare outcomes to standards established by the CDC Diabetes Physician Recognition Program (DPRP) (10). Standard definitions employed by CDC DPRP included

active participant, a person who attended a minimum of four sessions, and program completer, a participant who attended nine or more sessions. Additional analyses were conducted on participants meeting the CDC DPRP definitions of active participant and program completer.

## Results

Between July 2015 and June 2016, Real Appeal was launched to 96 companies providing health coverage to 633,645 adults. Given that approximately 70% of the adult population is overweight (16), an estimated 437,215 of these adults would be considered candidates for the program. Of those, 100,876 (23% of those eligible) registered for the program, and of those who registered, 69,598 (69% of those registered) enrolled and attended a one-on-one welcome session. Thus, in the first year that the program was offered, 16% of the eligible population enrolled and attended at least one introductory session. Enrollment rates varied by employer; employers implementing marketing best practices achieved higher enrollment rates compared with employers who marketed via other methods. Employers who sent their employees an email containing program-specific details and included a registration link achieved enrollment rates up to 30%. Lower enrollment rates were experienced by employers who provided program details within a lengthier general email, via a newsletter or notices in a break room, or at a health fair. The remaining 31,278 (31%) individuals did not attend a one-on-one welcome session with a coach.

### Characteristics of enrollees

Of those who enrolled, 60,652 (87%) were considered at risk for prediabetes, diabetes, or cardiovascular disease (based on age, BMI, and medical history), and 52,461 (86%) of the at-risk individuals attended at least one session (Figure 1). Participants not at risk for prediabetes, diabetes, or cardiovascular disease were offered access to the online materials but did not receive coaching support. As shown in Table 1, 77% of the at-risk participants were female; the average age was 45.2 years, and mean BMI was 35.5. All geographic regions of the United States were represented, with fewest proportionally from the Northeast.

### Retention and participation

Of all enrolled at-risk participants, 87% attended at least one session, and, of those, 73% attended at least four sessions (active participants)

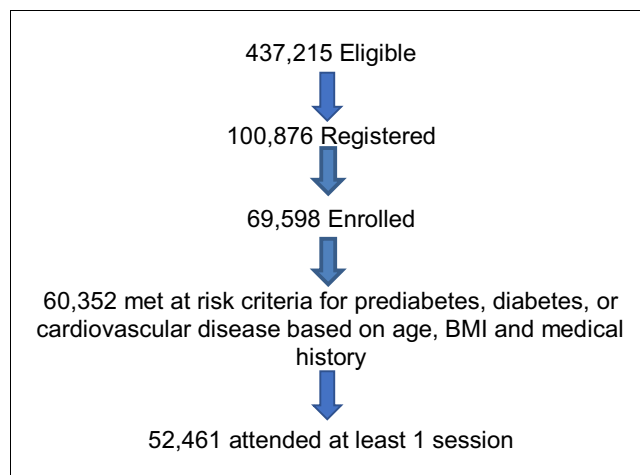


Figure 1 Real Appeal engagement.

and 52% attended nine or more sessions (program completers). The average number of sessions attended by participants was 13 sessions (SD, 12). The average number of sessions attended was highest for the program completers, 22 sessions (SD, 12), compared with the active participants who attended an average of 17 sessions (SD, 12) (Table 2).

### Weight-loss outcomes

The intent-to-treat cohort ( $n=52,461$ ), all of whom attended at least one session, lost an average of 2.8% body weight, with 23% achieving 5% weight loss. Program completers, participants who attended at least nine sessions, had the best outcomes when compared with active participants and the intent-to-treat cohorts. Program completers ( $n=27,164$ ) lost an average of 4.3% body weight, with 36% of the cohort achieving 5% weight loss. Active participants ( $n=38,836$ ), those who attended four or more sessions, lost an average of 3.5% body weight, with 29% achieving 5% weight loss. While higher weight loss produces greater health benefit, even a small amount of weight loss can benefit individuals at risk for obesity-related conditions. Fourteen percent ( $n=7,536$ ) of the participants lost between 3% and 4.9% of their body weight. Research

TABLE 1 Characteristics of study sample

	Intent-to-treat analysis, attended 1+ sessions, $n=52,461$	CDC DPRP analysis, attended 4+ sessions, $n=38,836$	Completers analysis, attended 9+ sessions, $n=27,164$
<b>Gender (female)</b>	40,588 (77%)	30,159 (78%)	20,867 (77%)
<b>Age</b>	45.2 ± 10.6	46.6 ± 10.4	47.4 ± 10.1
<b>Starting BMI</b>	35.5 ± 7.4	35.5 ± 7.3	35.4 ± 7.4
<b>Region</b>			
<b>Midwest</b>	13,865 (26%)	10,563 (27%)	7,666 (28%)
<b>Northeast</b>	2,911 (6%)	2,176 (6%)	1,578 (6%)
<b>South</b>	28,276 (54%)	20,409 (52%)	13,655 (50%)
<b>West</b>	7,409 (14%)	5,688 (15%)	4,265 (16%)

Data given as mean + SD or n (%).

**TABLE 2** Key outcomes based on analysis type

	Intent-to-treat analysis, attended 1+ sessions, <i>n</i> = 52,461	CDC DPRP analysis, attended 4+ sessions, <i>n</i> = 38,836	Completers analysis, attended 9+ sessions, <i>n</i> = 27,164
<b>Total kg lost</b>	152,006 kg	139,917 kg	117,770 kg
<b>Weight loss, mean (SD)</b>	-2.9 kg (5.0)	-3.6 kg (5.4)	-4.3 kg (5.8)
<b>Percent body weight loss, mean (SD)</b>	-2.8% (4.6)	-3.5% (5.0)	-4.3% (5.4)
<b>Achieved 5% or higher weight loss, <i>n</i> (%)</b>	11,989 (23)	11,251 (29)	9,775 (36)
<b>Sessions attended, mean (SD)</b>	13 (12)	17 (12)	22 (12)

has shown that blood glucose levels begin to lower and triglycerides decrease when people lose at least 3% of their weight, which potentially could delay or prevent the onset of costly chronic diseases (5).

### Predictors for achieving 5% weight loss

A key metric for measuring weight-loss success is reporting on the number of people who lost 5% or more of their starting weight. During the first year of program implementation, 11,989 participants achieved this benchmark. As expected, attendance was the best predictor of achieving 5% weight loss. Participants who attended nine or more sessions were 3.8 times more likely to achieve 5% weight loss, and active participants (attending four or more sessions) were 2.5 times more likely to achieve 5% weight loss compared with participants who attended fewer sessions (Table 3). When comparing the geographic regions, participants from the South were 12% less likely to achieve the 5% weight-loss goal. There was not a statistically significant difference in the probability of achieving 5% weight loss between participants from the Midwest, West, and Northeast. Starting BMI and age were also significant predictors associated with achieving the 5% weight-loss goal. Participants with obesity were 14% more likely to achieve the 5% weight-loss target. Participants ages 50 or older were 10% more likely to achieve the 5% weight loss than younger participants.

### Discussion

This study demonstrated that a digital weight-loss program provided by trained health coaches could successfully be delivered across a wide geographic region with high engagement, retention, and participation rates. Our data shows that 16% of the eligible population enrolled in Real Appeal during the first year of the program. However, employers typically send their employees information about registering for the program via email, implying that covered dependents who are not employed by the company may not receive notification of their access to the program. As such, engagement rates may be understated, as they include total covered adult beneficiaries in the denominator, yet not all beneficiaries may have knowledge of the program.

More than 70% of the participants attended at least four sessions, and more than 50% attended at least nine sessions. The participation rates are reflected in the weight-loss outcomes. Among the 52,461 who attended at least one session, average weight loss was 2.8% body weight. This amount of weight loss has been associated with improvement in some cardiovascular risk factors (2,5). Also, in this group, 23% achieved 5% weight loss. Perhaps most striking is that more than half of the participants attended at least nine sessions with a mean weight loss

**TABLE 3** Logistic regression: characteristics influencing the likelihood of achieving 5% and higher weight loss (*n* = 52,461)

	$\beta$	SE	<i>P</i>	OR	CI	
					Lower	Upper
<b>Intercept</b>	-2.7377	0.0646	<0.0001			
<b>Female</b>	-0.2403	0.026	<0.0001	0.786	0.75	0.83
<b>Active participant</b>	0.9316	0.047	<0.0001	2.539	2.32	2.78
<b>Program completer</b>	1.3327	0.0308	<0.0001	3.791	3.57	4.03
<b>Midwest<sup>a</sup></b>	-0.0339	0.0501	0.4991	0.967	0.88	1.07
<b>South<sup>a</sup></b>	-0.1275	0.0482	0.0081	0.88	0.80	0.97
<b>West<sup>a</sup></b>	-0.0136	0.0536	0.8001	0.987	0.89	1.10
<b>Obesity (BMI <math>\geq</math> 30)</b>	0.1383	0.0267	<0.0001	1.148	1.09	1.21
<b>Age <math>\geq</math> 50</b>	0.1092	0.0227	<0.0001	1.115	1.07	1.17

<sup>a</sup>Based on US Census regions.



that was associated with clinical benefits; persons who attended nine or more sessions ( $n=27,164$ ) lost an average of 4.3% body weight, with 36% of the cohort achieving 5% weight loss. These weight losses, while often modest, are sufficient to produce health benefits on a population basis because as little as 3% weight loss has been shown to improve dysglycemia and high triglycerides, and 5% weight loss can benefit high-density lipoprotein cholesterol and blood pressure (5).

The present data represent the first iteration of the Real Appeal program. These initial results suggest that it is possible to design and market weight-loss interventions that will attract large numbers of individuals who have overweight or obesity. In fact, we are not aware of any research studies to date that have reported on a population of over 50,000 participants enrolling in a weight-loss program within a 12-month timeframe. The finding that older individuals were more likely to lose 5% or more of their body weight than younger individuals confirms prior studies with face-to-face interventions (17) and suggests that the virtual format was not a deterrent to this population.

The virtual format allowed participants to attend online coaching sessions, access educational resources, and track progress at their convenience. Challenges arise when comparing commercial weight-loss programs, including selection bias, small sample sizes, and varying types of analyses used (18). Some programs may limit outcomes to participants who attended four or more sessions or nine or more sessions, following CDC DPRP standards (10).

The ability of Real Appeal to engage with 52,461 weight-loss participants during a 12-month period was remarkable. These participants had outcomes similar to those reported by other commercial weight-loss programs (19,20) and digital DPP programs (21). When assessing the effectiveness of a DPP program, the CDC examines the average number of sessions attended by program participants, with an average of nine sessions required to achieve full CDC DPRP recognition (10). This digital program exceeded the CDC session requirement in all three cohorts. Depending on the type of cohort analyzed, 23% to 36% of the participants lost 5% or more of their body weight, which is similar to the range of 18% to 34% reported by O'Neil et al. who examined the impact of adding telephonic and email counseling from a diabetes educator alongside an in-person commercial weight-loss program (19). The participants in Real Appeal also had similar results reported in a digital DPP program (21), with the major difference being the size of the study samples being compared. Many studies examining the effectiveness of commercial weight-loss programs (18-20) or digital DPP programs (21) have reported on samples of less than 500 participants. This analysis had 38,836 active participants and 27,164 program completers compared with 187 active participants and 155 program completers examined by Sepah et al., who measured weight loss on 220 participants from a digital DPP-based weight-loss program (20). This study sample, which is 100 to 200 times larger than other published study samples, presents similar outcomes, demonstrating the effectiveness of implementing Real Appeal in an employee population.

There are several limitations to this study, including the use of self-reported data, absence of a control group, and nonrandomization. The data were self-reported on the program website, and the last data entered was used as the final weight. Research has shown that self-reported data is reliable with a minimal difference of 1.6 lb between self-reported weight loss and actual weight loss when measured in a clinic setting (22). Using the last-observation-carried-forward method

is one approach to missing data, but it does not correct for the fact that participants may regain some weight after the program. This analysis focuses only on the amount of weight loss. Examining other outcomes, such as improvement in overall health status as described by laboratory values and reductions in the incidence of diseases such as type 2 diabetes, is also relevant. Employers and payers are also interested in the impact weight loss has on health care costs and absenteeism in participants. Future studies should examine how digital weight-loss programs impact health status, health care expenditures, and employee absenteeism. **O**

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