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## Benefits of adding Small Financial Incentives or Optional Group Meetings to a Web-based Statewide Obesity Initiative

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### Abstract

**Objective**—To examine whether adding either small, variable financial incentives or optional group sessions improves weight losses in a community-based, Internet behavioral program.

**Design and methods**—Participants (N=268) from Shape Up Rhode Island 2012, a 3 month Web-based community wellness initiative, were randomized to: Shape Up+Internet behavioral program (SI), Shape Up+Internet program+Incentives (SII), or Shape Up+Internet program +Group sessions (SIG).

**Results**—At the end of the 3 month program, SII achieved significantly greater weight losses than SI (SII:6.4% [5.1-7.7]; SI:4.2% [3.0-5.6]; P=.03); weight losses in SIG were not significantly different from the other two conditions (SIG: 5.8% [4.5-7.1], P's .10). However, at the 12 month no treatment follow-up visit, both SII and SIG had greater weight losses than SI (SII: 3.1% [1.8-4.4]; SIG: 4.5% [3.2-5.8]; SI: 1.2% [-0.1-2.6]; P's .05). SII was the most cost-effective approach at both 3 (SII: \$34/kg; SI: \$34/kg; SIG: \$87/kg) and 12 months (SII: \$64/kg; SI: \$140/kg; SIG: \$113/kg).

**Conclusions**—Modest financial incentives enhance weight losses during a community campaign and both incentives and optional group meetings improved overall weight loss outcomes during the follow-up period. However, the use of the financial incentives is the most cost-effective approach.

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## Introduction

Community wellness campaigns (i.e. initiatives designed to improve health outcomes in a specific population) have wide reach and provide an excellent platform to help address the epidemic of obesity and prevent chronic diseases (e.g., diabetes); however, weight losses produced in these initiatives are modest and of insufficient magnitude to affect health outcomes. For example, Web-based community campaigns commonly produce weight losses of only 1.2-1.8kg.(1-3) We previously reported that adding an evidence-based Internet behavioral weight loss program to a community initiative significantly enhanced weight loss outcomes.(1,3) Given the public health impact of wide-reaching community campaigns, it is important to identify additional novel strategies to further enhance weight loss without substantially increasing costs.

Financial incentives are being used by over 67% of large employers to motivate health behavior change and reduce healthcare costs.(10) While incentives have been shown to improve initial weight losses in previous trials, (6-8) these trials typically involve large amounts of money (\$150-\$400/person).(6-8) Moreover, once the incentive period is over, weight regain has been shown to be greater in programs with financial rewards. For example, two randomized trials comparing weight loss prescriptions with vs. without incentives showed that participants randomized to the incentive interventions experienced significantly greater weight regain during the no incentive follow-up period compared to those not receiving incentives.(6,7) Similarly, studies have shown that higher financial motivation for weight loss is associated with significantly greater weight regain.(11) Moreover, in contrast to traditional programs where weight loss is maintained for 6 months following the intensive treatment phase,(12) weight regain in incentive interventions occurs immediately upon incentive removal.(6,7) Thus, a review of the financial incentive weight loss literature concluded that longer-term study of the effectiveness of such interventions is needed.(5) Using behavioral economic principles, which suggest that better results might be obtained by providing *frequent small* incentives, *varying* the size of the incentive, and rewarding *behavior* change in addition to weight loss, we developed a novel incentive approach that might maintain the beneficial effects of incentives while minimizing the disadvantages of both cost and magnitude of weight regain.

Another strategy to increase weight losses in a community Internet program may be to add optional group sessions. Group sessions have been shown to improve weight losses, likely due to the support provided by intervention staff.(9) However, such programs are costly.(13) Thus, it is important to examine not only the efficacy of such an approach, but also the cost.

The primary aim of this study was to examine whether weight losses produced during a 12 week Internet behavioral program delivered in a community wellness initiative could be improved by adding either small financial incentives or optional group sessions. Secondary aims were to examine weight changes after the cessation of the intervention and cost-effectiveness.

## Methods

### Participants

Advertisements through employers and media outlets were used to recruit for the Shape Up Rhode Island 2012 campaign (SURI). The standard SURI program is team-based; 3 participants enroll with 5-11 team members and compete against other teams on weight loss and activity. Those who enrolled in SURI and were interested in weight loss were invited to participate in the research study. The first 676 who expressed interest were screened for the study. Exclusion criteria included age <18 or >70; BMI  $\geq 35$  kg/m<sup>2</sup>; current or planned pregnancy; uncontrolled medical condition (e.g., heart problem); previous study participation; unreliable Internet access; planned relocation; and non-English speaking. Those who reported a medical condition affected by weight loss obtained physician's consent to participate. A total of 268 participants were eligible, signed consent, and randomized (Figure 1).

### Design

Participants were randomly assigned to one of three arms: SURI+Internet Behavioral Weight Loss (SI; N=91); SURI+Internet Behavioral Weight Loss+Financial Incentives (SII; N=89); or SURI+Internet Behavioral Weight Loss + Optional Group Sessions (SIG; N=88). Approximately 50% of participants were the only participant within their team, but to avoid contamination, when multiple individuals were recruited from the same SURI team they were assigned as a single unit within the simple randomization procedure to ensure that all team members were randomized to the same study arm. The study statistician completed all randomization procedures. Participants were assessed at the end of the 3 month intervention and after an additional 9 months with no further intervention (i.e. 12 month follow-up). Procedures were approved by a local Institutional Review Board.

### Interventions

**SURI+Internet Behavioral Weight Loss (SI)**—Participants in SI received the standard 3 month team-based SURI program plus an Internet behavioral weight loss program. As part of the SURI program, participants received access to a website where they submitted weekly weight and activity data, a pedometer, a paper log for recording weight and activity, newsletters and community resources on healthy eating and exercise, and recognition for meeting weight and exercise goals.

Given our prior findings that adding an Internet behavioral intervention improved weight losses in SURI,(1,3) all participants in SI also received an Internet behavioral intervention. Before SURI began, participants attended a one time, in-person group session where they received a weight loss goal (lose 1-2lbs/week), calorie and fat gram goals (<250lbs: 1200-1500kcal/day, 30-40g fat/day; 250lbs:1500-1800kcal/day, 40-50g fat/day), and physical activity goals (gradually increase to 250mins/week) and were taught how to self-monitor and how to use the behavioral weight loss website. The Internet behavioral program included weekly multimedia videos based on the Diabetes Prevention Program.(14) It also had a self-monitoring platform where participants submitted their daily weight, calorie, and activity information and received weekly, automated feedback on their progress. Participants

received automated weekly reminders to report their self-monitoring information into the platform. Supplemental information on meal plans, prepackaged meals, and meal replacements was also on the website.

**SURI+Internet Behavioral Weight Loss+Incentives (SII)**—SII participants received all components described above. In addition, they received incentives for adherence and weight loss. Given that website engagement is associated with greater weight loss,(15) small financial rewards were provided for website use. Consistent with principles from behavioral economics, we rewarded/incentivized participants *frequently*, varied the *size* of the incentive, and did *not* inform participants of the reinforcement schedule.(16-19) Specifically, participants were told that each week they submit at least 5 days of weight, calorie, and activity information into the study website, they would earn anywhere from \$1 to \$10. To reinforce and engage participants at intervention outset, larger incentives were delivered at the beginning of the program (Week 1: \$8, Week 2: \$10) and incentive size varied thereafter (\$1, \$2, \$7, etc.). If participants completed all reporting, they earned a maximum of \$45 during the entire program. The SII website included a “bank” which displayed the participant’s previous week’s earnings and total earnings. Weekly reminders to submit information into the study website were framed using regret aversion language (“Don’t miss out on your money, be sure to submit your information by Sunday at midnight”).(20) In addition to incentivizing self-monitoring, we incentivized achieving a clinically significant weight loss. Those who lost 5-10% of initial body weight were entered into a \$50 raffle. Those who lost 10% were entered into a \$100 raffle. Ten winners were chosen from each raffle. Participants received all payouts after their 3 month assessment.

**SURI+Internet Behavioral Weight Loss+Group Option (SIG)**—SIG participants received everything described in SI plus the option to attend weekly group sessions at the research center. Given that SURI is an Internet-based low intensity campaign, we wanted SIG to appeal to the SURI audience and, therefore, made group attendance optional. The 12 weekly sessions were led by dietitians or exercise physiologists, included a private weigh-in, and covered topics that supplemented the Internet program (e.g., recipe modification, exercise motivation).

## Assessments

Unless noted otherwise, participants completed the following measures at baseline and month 3 (post-treatment) and at the 12 month follow-up. All participants received \$25 for completing the 3 month assessment and \$50 for completing the 12 month assessment. Assessments were conducted by blinded staff.

**Demographics**—Gender, age, race, and education were collected at baseline.

**Anthropometrics**—Weight was measured to the 0.1kg using a digital scale and height was measured at baseline using a wall-mounted stadiometer.

**Adherence**—The Internet behavioral weight loss website encoded logins, lessons viewed, and submission of self-monitoring data. SIG group leaders recorded attendance at group sessions.

**Costs**—Costs were assessed from the payer, participant, and societal perspective (sum of payer and participant costs). Payer costs were calculated by summing labor, rent, incentives, intervention materials, and the SURI registration fee. Staff labor costs were estimated using market values.(21) Cost of rent and intervention materials were based on local rates. Incentive cost was the mean cost per participant in the SII group. Participant costs included both direct and indirect costs. Direct costs involved the \$20 SURI registration fee and transportation costs associated with attendance at intervention sessions. Indirect costs included participant time spent using the websites and traveling to and attending group sessions; indirect costs were estimated using age and gender specific wage rates.(22) Detailed information on the cost-effectiveness analysis is presented in the eAppendix.

### Statistical Analyses

Statistical analyses were performed using SAS v.9.3 for Windows. An a priori power analysis was conducted on the primary outcome and showed that N=86 per group would be needed to achieve 90% power for a two-sided test at P=.05 to detect a 2% difference in percent weight loss (Cohen's  $d=.53$ ) between SI and SII and SIG and assuming 10% attrition at month 3 (primary endpoint). All planned secondary analyses were conducted at the P=.05 level. Baseline group differences were examined using analyses of variance (ANOVA) or chi-square tests. ANOVAs were used to examine adherence to the intervention, while post-hoc pairwise multiple group contrasts were conducted with a stepdown bootstrap procedure that controlled the overall Type I error rate for multiple group contrasts within each analysis at the P=.05 level of significance.(23) A longitudinal linear mixed model analysis(24) examined whether intervention groups differed on weight loss at post-treatment (month 3) and at the 12 month no treatment follow-up assessment. Data were fit with an autoregressive covariance structure. Missing data were handled under the assumption of missing at random. (25) Group differences in weight regain from month 3 (post-treatment) to the 12 month follow-up were examined using an ANCOVA, with month 3 weight loss as a covariate and the stepdown bootstrap procedure for group contrasts of the adjusted means. Group differences in 5% weight loss were examined using logistic regression; participants with missing values were assumed to have not achieved a 5% weight loss. Consistent with recent work in the field,(13) cost-effectiveness analyses were done as a within-trial analysis from the payer, participant, and societal perspectives and included participants with both cost and weight data. Group staff and rent costs were allocated to participants who attended sessions; other costs were allocated evenly to all participants in the group. Per capita costs from the payer, participant, and societal perspectives were determined. Using these estimates, 10,000 bootstrap samples were drawn to construct 95% bias corrected confidence intervals (CI) and P-values.

## Results

### Participants

Participants (N=268) were predominantly female (82.5%) and non-Hispanic White (88.7%), with a mean age of  $46.3 \pm 10.6$  years and BMI of  $33.6 \pm 6.3$  kg/m<sup>2</sup>. There were no significant differences between groups on baseline characteristics (Table 1). Retention at the final assessment was 91.4%.

### Adherence

Adherence to the 3 month weight loss program differed significantly among groups (Table 2). SII had significantly better adherence on all six website parameters compared to SI (i.e. logins, lessons viewed, and weight, calorie, fat and physical activity reporting; P's .037). SII also has better adherence than SIG on five out of the six website adherence metrics (P's .018). More logins, lessons viewed, and self-monitoring reporting days were all associated with greater percent weight loss across the three conditions ( $r$ 's=.54-.64, P's<.001). SIG participants attended 4.9 (95% CI, 3.9-5.8) out of 12 group sessions; better attendance was associated with greater weight loss ( $r$ =.44; P<.001).

### Weight loss

There was a significant overall group by time effect for percent weight loss across the 3 time periods (baseline, 3 month intervention, 12 month follow-up (P=.04). Examining for the source of the significant interaction, as shown in Figure 2, we found at post-treatment (month 3), weight losses were significantly greater in SII than SI (6.4%, 95% CI 5.1, 7.7 vs. 4.3%, 95% CI 3.0, 5.6, P=.03), while weight losses in SIG (5.8%, 95% CI 4.5, 7.1) were not significantly different from SI (P=.10) or SII (P=.57). At 12 months, both SIG (4.5%, 95% CI 3.2, 5.8, P<.001) and SII (3.1%, 95% CI 1.8, 4.4, P=.05) had significantly greater overall weight losses than SI (1.2%, 95% CI -0.1, 2.6), while SIG and SII did not significantly differ (P=.12).

Figure 2 also shows the magnitude of regain over the no-intervention follow-up period. Although all 3 groups regained weight, the magnitude of regain, adjusted for initial 3 month weight loss, differed across groups (P=.03). Post hoc group contrasts indicated SIG (+1.2%, 95% CI, 0.1-2.3) regained significantly less (P=.04) weight than SII (+3.1%, 95% CI, 2.0-4.2) and significantly less (P=.04) than SI (+3.0%, 95% CI, 1.9-4.1; P's .04). Regain did not differ (P=.86) between SII and SI.

A similar pattern of results is seen in 5% weight loss at 3 months and at 12 month follow-up (Figure 3). At the end of the program (3 months) more participants in SII achieved a 5% weight loss compared to SI (57.3% vs. 39.6%, P=.018, OR=2.1, 95% CI: 1.1-3.7), whereas SIG was in the middle (47.7%) and not significantly different from either SI (P=.27, OR=1.4, 95% CI: 0.8-2.5) or SII (P=.20, OR=0.7, 95% CI: 0.4-1.2). At month 12, more participants in SIG had a 5% weight loss compared to SI (40.9% vs. 24.2%, P=.018, OR=2.17, 95% CI: 1.14-4.12) and SII (29.2%) who met this criterion was not significantly different from SIG (P=.10, OR=1.7, 95% CI: 0.9-3.1) or SI (P=.45, OR=1.3, 95% CI: 0.7-2.5).

### Cost-effectiveness

Groups differed in payer, participant, and societal costs. On all three domains, SI was the least expensive, SIG was the most expensive, and SII was in the middle ( $P$ 's $<.05$ ; Table 3). Even though SII was somewhat more expensive than SI, given that it achieved significantly greater weight loss than SI at month 3, overall cost per kilogram of weight lost was similar in SI and SII (\$34/kg; \$34/kg), and both were more cost-effective than SIG (\$87/kg). Sensitivity analysis reducing transportation costs and participant time to travel to and attend group meetings did not change this effect (eAppendix). Despite the smaller magnitude of weight regain in SIG, SII remained the most cost-effective approach at month 12 (SII: \$64/kg SI: \$140/kg; SIG: \$113/kg).

### Discussion

The primary aim of this trial was to determine whether adding modest financial incentives (average payout of only \$2.66/week plus a raffle) or optional group sessions to an Internet behavioral program delivered in a community campaign improves 3 month weight loss outcomes. We found that only small financial incentives significantly improved initial weight losses and increased the proportion of participants achieving a 5% weight loss during the treatment period relative to SI. Although the primary aim focused on initial (3 month) outcomes, we were also interested in the longer-term effects in the absence of any further intervention. We found that participants in SIG had significantly less weight regain than the other two groups during the no treatment follow-up period and consequently, overall weight losses in SII and SIG were significantly greater than SI at month 12. Moreover, the proportion who maintained a 5% weight loss was greater in SIG compared to SI at 12 months.

The effective incentive program tested herein differed in several ways from those used in prior studies: the amount of money was smaller and varied week to week, the incentives were added to an Internet intervention as opposed to an in-person intervention, and adherence to self-monitoring behaviors was reinforced in addition to weight loss. Our results suggest that there are benefits to our approach. For example, an earlier trial added financial rewards of \$100/person/month to a 6-month Web program and yielded a 1.8% weight loss; (26) in contrast, we used substantially smaller incentives and a shorter program and were able to achieve superior weight losses (6.4%). Moreover, our approach of providing small incentives for adherence to self-monitoring increased this behavior which, as shown in prior studies,(27) promoted better weight loss outcomes. Thus, using small, variable rewards to incentivize core intervention behaviors may have a downstream effect on overall treatment outcomes. Finally, even though we only incentivized submission of self-monitoring data, participants in the incentive arm also viewed more intervention videos, suggesting a spillover effect. Given that Internet programs commonly suffer from suboptimal engagement,(28,29) these data suggest that small incentives, delivered in accordance with principles from behavioral economics, are an effective method to improve engagement and therefore treatment outcomes in Internet delivered interventions for obesity, or other health conditions.

A major concern often raised about the use of financial incentives is that when they are removed, participants regain weight at a greater rate than programs without financial rewards.(6,7) However, in our study, weight regain in the incentive condition did not differ from the Internet alone condition, which did not involve financial rewards. Our use of small incentives may have reduced the magnitude of weight regain relative to earlier studies by facilitating participants' attribution of weight loss to personal efforts rather than large extrinsic rewards. Also, given that self-monitoring is a behavior strongly associated with weight loss maintenance,(30) by incentivizing reporting and, therefore, self-monitoring, we may have facilitated habit development for monitoring, which contributed to better longer-term weight control in this incentive trial relative to other incentive trials for weight loss.

Contrary to our hypothesis, adding optional group sessions to the Internet initiative did not significantly improve initial (3 month) weight loss outcomes relative to the control condition. In order to appeal to the SURI audience (i.e. individuals enrolling in a low-intensity community campaign) group sessions were optional. Consequently, participants attended less than half of the available meetings. Thus, even though group attendance was associated with greater initial weight loss, given low attendance, the impact of group meetings on weight outcomes was likely attenuated.

While only SII was superior to SI at the end of the 3 month treatment phase, at month 12, *both* SII and SIG had greater overall weight losses compared to SI. The difference between the 3 and 12 month results was related to greater weight regain in the incentive and control conditions, relative to the optional group condition. We considered the possibility that topics covered in optional groups promoted additional skill development that facilitated weight maintenance. However, there was no evidence that attendance at group sessions had an effect on weight regain or 5% weight loss ( $P$ 's  $.36$ ). Thus, it is unclear why participants in this arm experienced less regain following treatment relative to the other arms. It is also important to note that group sessions significantly increased the costs of the program. Even with sensitivity analyses that reduced the transportation costs and participant time associated with attending groups, the group approach was less cost-effective than incentives at both 3 and 12 months.

Given the large number of individuals who enroll in community programs such as Shape Up RI, using small financial incentives within a community campaign may represent a way to successfully produce clinically significant weight losses in large numbers of individuals at very modest costs and, therefore, help to prevent the development of obesity related diseases. Our findings may also be relevant for popular corporate wellness programs. Many companies are using *large* rewards (over \$300/employee) to promote weight loss.(31) Our results suggest that coupling *small* incentives with an *evidence-based incentive structure* may yield excellent outcomes and decrease program costs. If implemented within this context, additional cost analyses would be necessary to more accurately determine the cost-effectiveness of this approach from the perspective of the corporation (e.g., productivity, presenteeism, etc.).(8)

Limitations of this study include a predominantly female and White sample. In addition, treatment stopped at the end of the 12 week community program. As seen in almost all prior



weight loss trials, the weight losses were greatest at the end of the 12 week intervention, with gradual weight regain over the no treatment follow-up period. Ongoing intervention has been shown to be critical for preventing weight regain and optimizing long-term outcomes. (8) Therefore future studies should consider the impact of lengthening the intervention beyond three months.(8) Specifically, it would be important to determine whether extending the use of small incentives throughout the 12 month follow-up would reduce the magnitude of weight regain and improve overall weight loss outcomes.

Strengths of the study include its randomized design, use of novel approaches to enhance weight losses within an Internet community initiative, objective assessments of primary outcomes and adherence metrics, and large sample size relative to other financial incentive weight loss trials.(6,7) This trial also included an examination of the cost-effectiveness of different approaches to enhance weight losses within a community campaign; such data are crucial to key stakeholders when deciding whether to implement a large-scale intervention. Moreover, this trial involved a follow-up, which allowed for the examination of the effects of each intervention on weight regain.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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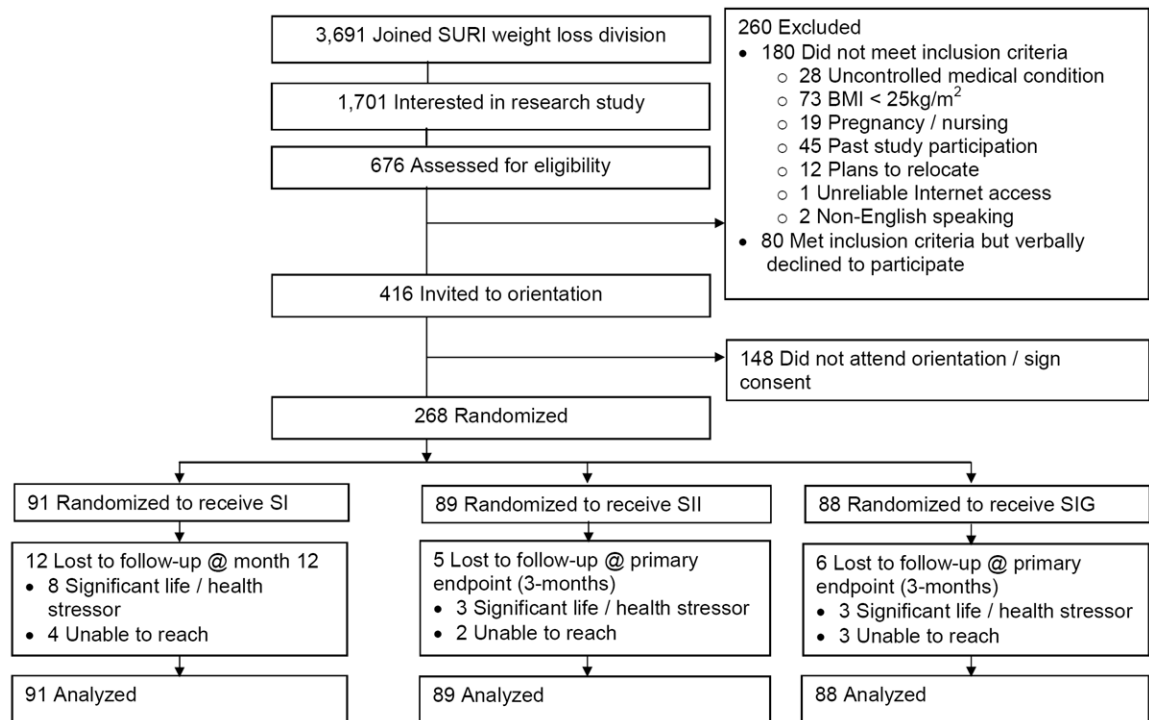
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**What is already known**

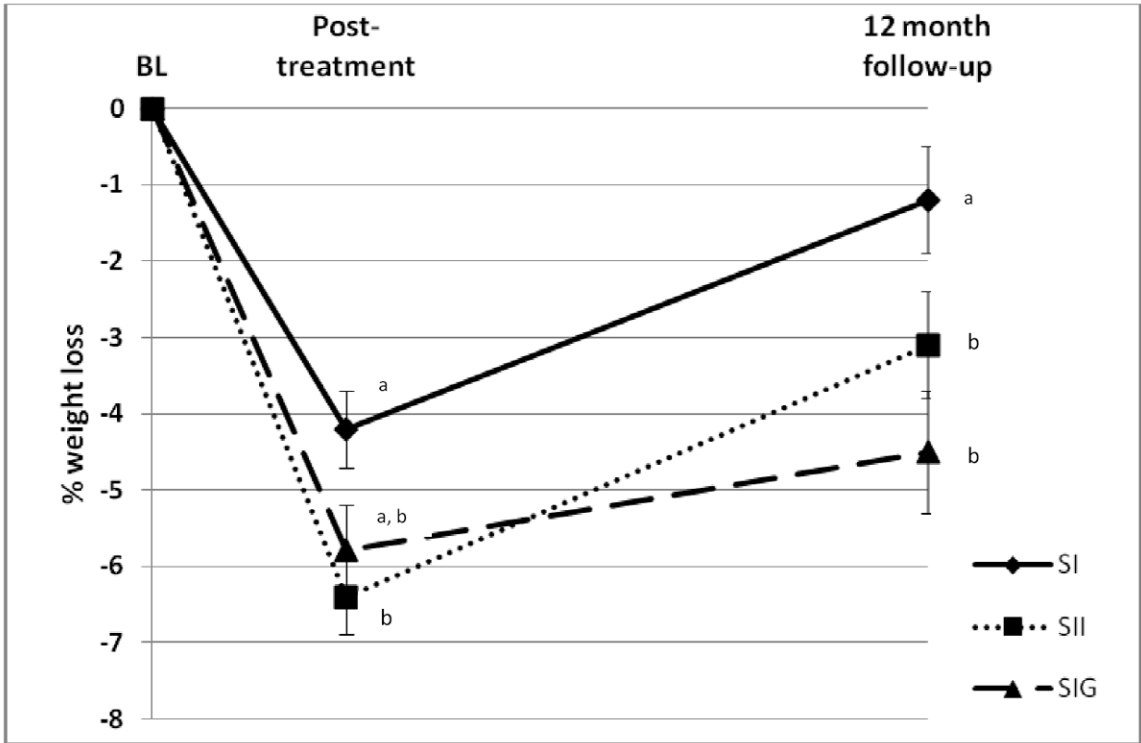
- Web-based community weight loss initiatives yield modest weight losses of 1- to 2-kg. (1-3)
- Adding evidence-based Internet behavioral weight loss programs improves outcomes in these initiatives. (2,3)
- While findings are somewhat mixed,(4,5) large financial incentives and frequent group sessions have generally been shown to improve weight loss outcomes in face-to-face programs.(6-9) However, the addition of *small, variable* incentives and optional group sessions to a Web-based dissemination initiative have not been examined.

**What this study adds**

- This study shows that adding small financial incentives improves both obesity treatment outcomes and engagement (log-ins, lessons viewed, and reporting of weight, diet, and activity data into the self-monitoring platform) relative to the Web-only condition during a 3-month Web-based behavioral weight loss dissemination initiative. Participants offered optional group sessions did not differ in weight loss at 3 months from the Web-only or Web plus incentive condition.
- The optional group meeting condition yielded smaller magnitudes of weight regain compared to the Web-only and Web plus incentive programs and at 12 months was associated greater overall weight loss than Web-only. Overall weight loss for optional group meetings and incentives did not differ.
- From the societal perspective, given the magnitude of weight loss relative to the low cost, adding small incentives to a Web-based weight loss program may be more cost-effective than a Web alone approach or Web plus optional group meetings (post-treatment cost-effectiveness ratios: \$34/kg, \$34/kg, \$87/kg, respectively; 12 month follow-up cost-effectiveness ratios: \$64/kg, \$140/kg, \$113/kg, respectively).

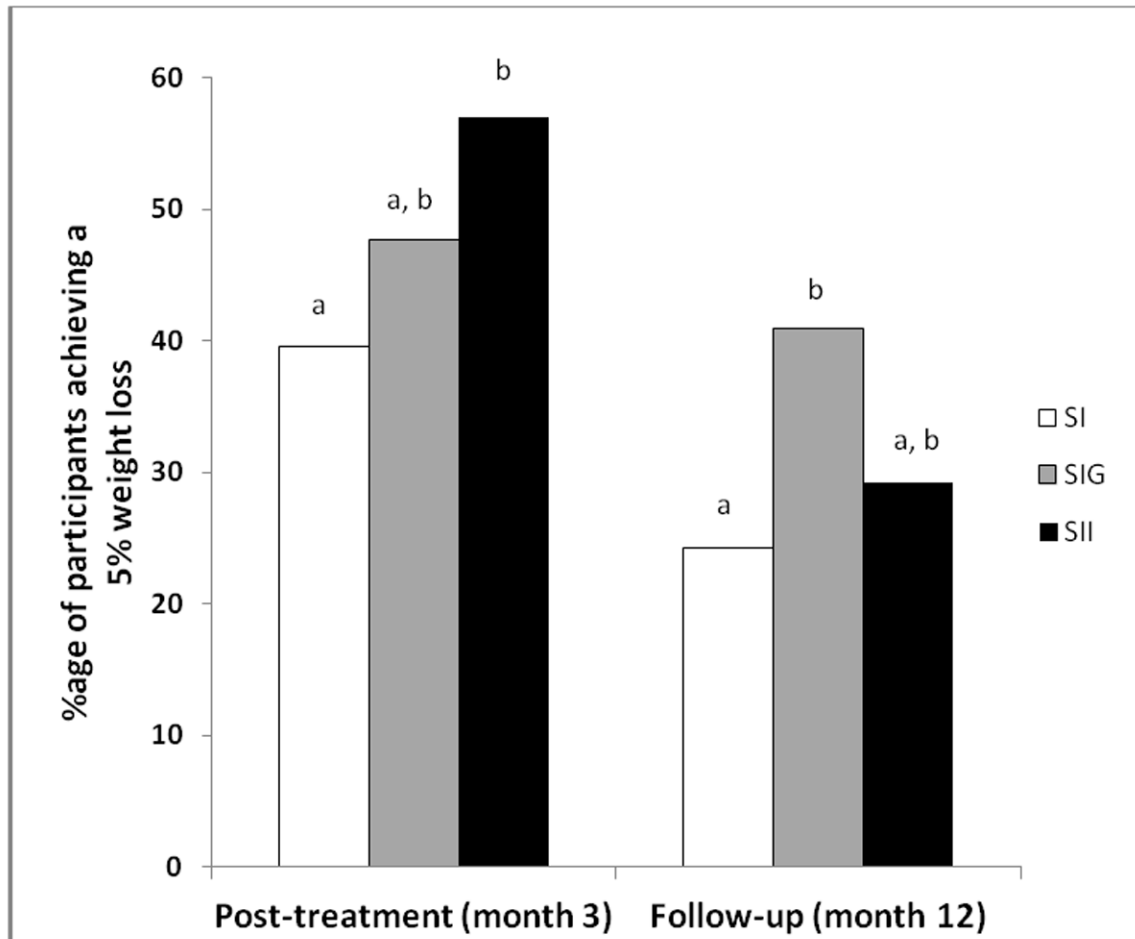


**Figure 1. Flow of participants through the Shape Up Rhode Island 2012 Research Study**



**Figure 2. Percent weight loss at post-treatment (month 3) and weight regain from post-treatment to 12 month follow-up**

Note: Different letters indicate that weight losses differ significantly from one another at that time point. Error bars represent standard error of the mean.



**Figure 3.** Percentage of participants in SI, SIG, and SII achieving a 5% weight loss at post-treatment (month 3) and 12 month follow-up.<sup>1</sup>

<sup>1</sup> Different letters indicate that percentage of participants achieving a 5% weight loss differ significantly from one another at that time point.

**Table 1**

Participant characteristics.

	<b>Total (N=268)</b>	<b>SI (N=91)</b>	<b>SII (N=89)</b>	<b>SIG (N=88)</b>
Female, n (%)	221 (82.5)	76 (83.5)	71 (79.8)	74 (84.1)
Age, mean (SD)	46.3 (10.5)	45.1 (11.0)	46.3 (9.4)	47.4 (11.4)
Race/Ethnicity, n (%)				
Non-Hispanic White	236 (88.7)	81 (90.0)	77 (86.5)	78 (89.7)
Non-White	30 (11.3)	9 (10.0)	12 (13.5)	9 (10.3)
Education				
Vocational/High School	21 (7.9)	9 (10.0)	2 (2.2)	10 (11.4)
Some College	51 (19.1)	17 (18.9)	18 (20.2)	16 (18.2)
College Graduate	114 (42.7)	38 (42.2)	42 (47.2)	34 (38.6)
Post-graduate	81 (30.3)	26 (28.9)	27 (30.3)	28 (31.8)
Weight, kg, mean (SD)	91.8 (19.7)	90.1 (17.1)	92.8 (21.8)	92.7 (20.0)
BMI, kg/m <sup>2</sup> , mean (SD)	33.6 (6.3)	32.9 (5.5)	33.5 (6.5)	34.3 (6.8)

Note: Two participants did not respond to Race/Ethnicity, and one participant did not respond to Education; analyses on those variables used N=266 and N=267, respectively.

**Table 2**

Treatment adherence by intervention arm (M, 95% CI).\*

	SI	SII	SIG
Log-in weeks (out of 12)	9.0 <sup>a</sup> (8.3 to 9.7)	10.6 <sup>b</sup> (10.0 to 11.2)	9.1 <sup>a</sup> (8.3 to 10.0)
Lessons viewed (out of 12)	5.7 <sup>a</sup> (5.0 to 6.4)	7.1 <sup>b</sup> (6.3 to 8.0)	6.3 <sup>a,b</sup> (5.4 to 7.1)
# weight days submitted (out of 84)	58.2 <sup>a</sup> (52.7 to 63.8)	71.7 <sup>b</sup> (67.2 to 76.2)	60.6 <sup>a</sup> (54.4 to 66.7)
# calorie days submitted (out of 84)	56.9 <sup>a</sup> (51.3 to 62.6)	70.0 <sup>b</sup> (65.4 to 74.7)	58.8 <sup>a</sup> (52.5 to 65.0)
# fat gram days submitted (out of 84)	56.6 <sup>a</sup> (51.0 to 62.2)	69.9 <sup>b</sup> (65.2 to 74.5)	58.5 <sup>a</sup> (52.2 to 64.8)
# physical activity days submitted (out of 70) <sup>†</sup>	39.7 <sup>a</sup> (34.4 to 44.9)	52.7 <sup>b</sup> (47.9 to 57.5)	42.9 <sup>a</sup> (37.2 to 48.6)
Optional group sessions attended (out of 12)	-	-	4.9 (3.9 to 5.8)

\* Within each variable, values with different superscripts differ significantly from one another at P<.05.

<sup>†</sup> Consistent with traditional behavioral weight loss treatment and the goal of not overwhelming participants with too many behavior change prescriptions at once, physical activity was not introduced and therefore not monitored until week 3 of the internet behavioral weight loss program. As such, there are only 70 possible self-monitoring days for this variable.



**Table 3**

Mean (95% confidence interval) per capita costs and cost-effectiveness (cost per kg weight loss).<sup>1, 2</sup>

	SI	SII	SIG
Payer costs	\$ 22 (22,22) <sup>a</sup>	\$72 (65,81) <sup>b</sup>	\$88 (79,97) <sup>c</sup>
Participant costs	\$125 (119,131) <sup>a</sup>	\$141 (135,146) <sup>b</sup>	\$418 (366,475) <sup>c</sup>
Societal costs	\$147 (141,154) <sup>a</sup>	\$213 (202,224) <sup>b</sup>	\$506 (445,570) <sup>c</sup>
Cost / kg at month 3	\$34/kg	\$34/kg	\$87/kg

<sup>1</sup> Payer costs include staff, rent, incentives, and materials. Participant costs include program fees, transportation, and time. Societal costs are the sum of payer and participant costs. Additional cost details are provided in eTables 1 and 2.

<sup>2</sup> Within variable values with different superscripts (a v. b) differ significantly from one another at P<.05.