

# Dialing In: Effect of Telephonic Wellness Coaching on Weight Loss

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**O**besity poses a substantial threat to the US health and healthcare system.<sup>1</sup> Among adults, higher morbidity in association with being overweight or obese has been observed for hypertension,<sup>2-4</sup> type 2 diabetes,<sup>5-8</sup> coronary heart disease, stroke, respiratory problems, and some types of cancers.<sup>9-16</sup> Epidemiologic studies have shown that mortality increases with body mass index (BMI) values above 30.<sup>17-19</sup> Consequently, obesity has conferred a significant economic burden for the nation.<sup>20</sup> A wide variety of programs have been developed to address the obesity issue in the United States, including wellness coaching programs.

In wellness coaching programs, wellness coaches assist individuals to establish and work toward health-promoting goals using techniques such as motivational interviewing.<sup>21</sup> Telephonic wellness coaching offers the personalized focus and discussion, while avoiding common barriers for on-site consultations such as inadequate transportation or lack of childcare. Telephonic coaching programs have been used to address a variety of health behaviors including smoking, nutrition, and weight.<sup>22-25</sup>

Evidence for the effectiveness of telephonic coaching on weight loss is limited, with only a few studies having demonstrated a small but positive effect.<sup>24,26,27</sup> Previous published studies have largely not provided details on participant or intervention factors that may mediate the outcomes of such coaching programs. The goals of this study are to estimate the effect of telephonic coaching on weight loss in a large, commercially insured population and to evaluate how a participant's initial stage of change, motivation level, and intensity of coaching program received impact weight loss among wellness coaching participants.

## METHODS

### Telephonic Wellness Coaching Program

This study assesses a health plan-administered telephonic wellness coaching program that consists of 4 telephone calls designed to help participants reduce risk factors through health education and behavior-change counseling. During the initial telephone contact, health coaches

review the top 3 risk factors identified on each participant's health assessment questionnaire. Health coaches also assess each participant's readiness to change, level of

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**Objective:** To estimate the effect of telephonic wellness coaching on weight loss in a commercially insured population.

**Study Design:** Pre-post evaluation design.

**Methods:** Self-reported weight was obtained from 2 annual health assessment questionnaires administered during 2008 and 2010. Baseline (T1) information from these questionnaires was used to identify overweight/obese individuals and to determine targets for a 4-call wellness coaching program. Overweight/obese individuals identified at T1 were classified into following groups: (1) targeted for wellness coaching (N = 1448, including 1050 participants and 398 nonparticipants); (2) not targeted for wellness coaching, but targeted for other telephonic wellness care management (WCM) programs (N = 1270); (3) not targeted for any WCM programs (N = 7586). Weight reported on questionnaires a year later (T2) was used to calculate weight change between T1 and T2. Paired t-tests were used to detect significant weight changes over time. Multivariable linear regressions were used to compare weight changes between the groups. Stratified analysis was conducted to determine the effectiveness of telephonic wellness coaching for subgroups based on participants' selected health goals, intensity of the intervention received and initial stage of change.

**Results:** The group targeted for wellness coaching reported an average weight change of -0.44 kg (95% confidence interval [CI], -0.76 to -0.16) at T2, significantly more weight loss than reported by the group not targeted for any WCM programs. Participants who started in preparation stage and completed the program reported weight change of -1.43 kg (95% CI, -2.17 to -0.68), highest among program participants.

**Conclusions:** Small weight loss was observed for obese/individuals targeted for telephonic wellness coaching.

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For author information and disclosures, see end of text.

### Take-Away Points

Telephonic wellness coaching programs are popular interventions for a large population because of their versatility and convenience.

- This large retrospective study observed small weight loss among telephonic wellness coaching participants more than 6 months after they finished the program.

- It evaluated factors that impact weight loss among wellness coaching participants, including participants' initial stage of change, motivation level, and intensity of coaching received.

This information can assist decision making of whether to offer telephonic wellness coaching programs to a population. The analysis on successful elements of wellness coaching programs can help compare telephonic wellness coaching programs or improve program design.

1-on-1 instruction, and mentoring by an established coach. Third, fidelity to the program is assessed through randomly recorded phone conversations between health coaches and participants to ensure that the delivery of the program is consistent across health coaches and follows established policies and procedures.

### Program Participants

Employers purchase the wellness coaching program benefit for their employees from the health plan. The eligible employees are required to complete an annual health assessment questionnaire at the beginning of each benefit year in order to receive program-related incentives provided by employer groups. The incentives vary across employers from lower office visit and prescription co-pays to gift cards. Health assessment questionnaire respondents are first prioritized for case management or disease management. Disease management is a nurse-administered, telephonic program that targets patients with 1 of 5 chronic diseases: asthma, ischemic heart disease, chronic obstructive pulmonary disease, diabetes, or chronic heart failure, and focuses on chronic disease self-management. Case management is a nurse-administered, telephonic program that targets patients with complex medical needs and focuses on coordination of care. The prioritizing processes for disease management and case management are separate from the health assessment. For respondents who neither need disease management nor case management but have 3 or more risk factors identified via questionnaire, these respondents will receive outbound calls from an engagement specialist to enroll them in the wellness coaching intervention. Individuals who have few risk factors identified via questionnaire do not receive outreach to participate in the wellness coaching program, but are encouraged to use the health plan's online health tools to maintain good health.

motivation to change, and perceived barriers to adopt healthy lifestyle behaviors.

Initial stage of change is determined by asking participants how ready they are to make changes to improve their health on a scale of 1 to 10. If participants respond with a score between 1 and 4 and show characteristics of not considering change, feeling no control, or believing consequences not to be serious, the health coach will classify them as pre-contemplation. If participants respond with a score between 5 and 7 and have considered the benefits and costs of their health behaviors as well as proposed changes in behaviors, the health coach will classify them as contemplation. For participants who respond with a score between 8 and 10, having experimented with small changes will lead to classification as being in the preparation stage; having demonstrated definitive actions to change will lead to classification as being in the action stage; and having definitive actions over an extended time period will lead to classification as being in the maintenance stage.

After the assessment, health coaches work with each participant to create an action plan that includes personalized health-related goals, actions the person will take, strategies for coping with perceived barriers, and identification of who might support them with their efforts. The action plan is mailed to the program participants. During subsequent calls, the health coach discusses progress, barriers and action items with the participant. The length of each phone call ranges between 10 and 20 minutes.

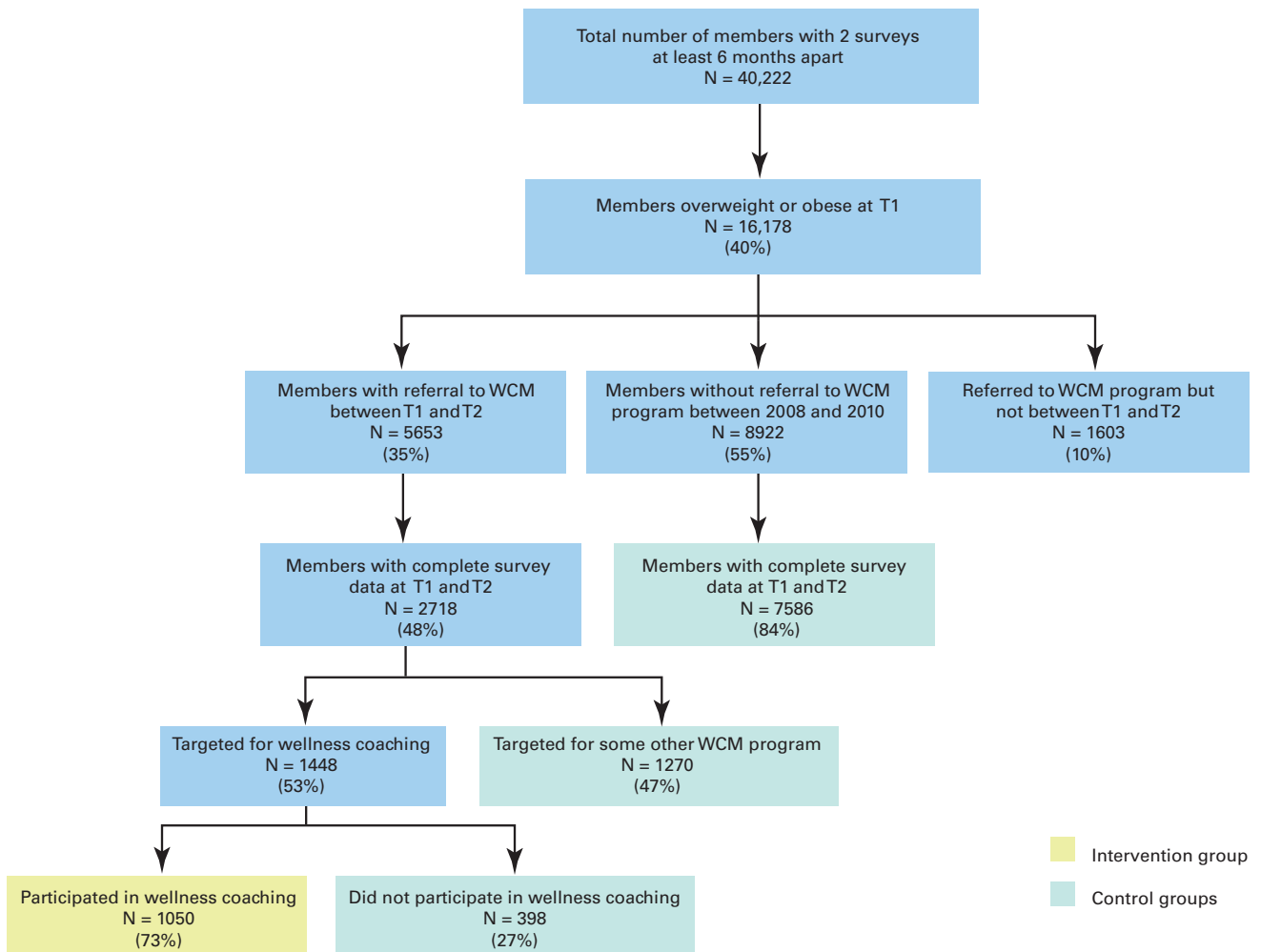
The health coaches that deliver the intervention can be registered nurses, registered dietitians, exercise physiologists or health educators. Several approaches are taken to ensure quality and consistency of interventions being delivered. First, health coaches are required to have a bachelor's or master's degree with additional training in motivational interviewing and certification such as Chronic Condition Professionals from the Health Sciences Institute. Second, health coaches receive ongoing trainings which utilize cognitive behavioral therapy modules. The trainings include classroom training,

motivation to change, and perceived barriers to adopt healthy lifestyle behaviors. Initial stage of change is determined by asking participants how ready they are to make changes to improve their health on a scale of 1 to 10. If participants respond with a score between 1 and 4 and show characteristics of not considering change, feeling no control, or believing consequences not to be serious, the health coach will classify them as pre-contemplation. If participants respond with a score between 5 and 7 and have considered the benefits and costs of their health behaviors as well as proposed changes in behaviors, the health coach will classify them as contemplation. For participants who respond with a score between 8 and 10, having experimented with small changes will lead to classification as being in the preparation stage; having demonstrated definitive actions to change will lead to classification as being in the action stage; and having definitive actions over an extended time period will lead to classification as being in the maintenance stage. After the assessment, health coaches work with each participant to create an action plan that includes personalized health-related goals, actions the person will take, strategies for coping with perceived barriers, and identification of who might support them with their efforts. The action plan is mailed to the program participants. During subsequent calls, the health coach discusses progress, barriers and action items with the participant. The length of each phone call ranges between 10 and 20 minutes. The health coaches that deliver the intervention can be registered nurses, registered dietitians, exercise physiologists or health educators. Several approaches are taken to ensure quality and consistency of interventions being delivered. First, health coaches are required to have a bachelor's or master's degree with additional training in motivational interviewing and certification such as Chronic Condition Professionals from the Health Sciences Institute. Second, health coaches receive ongoing trainings which utilize cognitive behavioral therapy modules. The trainings include classroom training,

### Health Assessment Questionnaires

During the course of the study period, there was a change in the health risk assessment questionnaire administered by the health plan. The University of Michigan Health Risk Appraisal (HRA) was used through May 2009<sup>28</sup>; afterward the StayWell Health Media Health Assessment (HA) was used.<sup>29</sup> This change in health assessment questionnaires reflects a business decision of the health plan and not of the authors, who conducted the evaluation retrospectively. The HRA consists of 47 questions while the HA consists of 150 questions. Common health risks assessed by the 2 questionnaires include body weight, existing medical conditions, physical

■ **Figure.** Flow of Study Population for Individuals Who Completed 2 Health Assessment Questionnaires (T1 and T2) at Least 6 Months Apart Between 2008 and 2010



T1 indicates baseline; T2, follow-up; WCM, wellness care management.

activity, nutrition, alcohol, smoking, stress, safety belt use, skin protection, absenteeism at work, perceived health, and overall life satisfaction. On each instrument, respondents also report their race/ethnicity, gender, level of education, and motivation to lose weight. Although both questionnaires assess similar health risks, the wording of the questions and answers differ markedly. For example, the HRA asks “Do you have heart problems? (Never/Have Currently/In the Past)” while the corresponding HA question is worded as “Have you been diagnosed with coronary heart disease? (Yes/No).” For this evaluation, we only used questions from the 2 questionnaires that could be reconciled to allow consistent measurement over time.

## STUDY DESIGN

As shown in the **Figure**, 40,222 individuals responded to 2 questionnaires at least 6 months apart from 2008 to 2010 for our pre-post evaluation. The average time between baseline (T1) and follow-up (T2) questionnaires was 385 days (approximately 1.05 years) with a standard deviation of 70 days. BMI was calculated from responses to height and weight questions on these surveys. Overweight was defined as a BMI between 25 kg/m<sup>2</sup> and 29.9 kg/m<sup>2</sup> and obesity was defined as a BMI of 30 kg/m<sup>2</sup> or greater. Among respondents, 16,178 (40%) were considered overweight or obese at baseline. Of the overweight and obese respondents, 5653 (35%) were referred for a

wellness care management (WCM) program during the study period between baseline and follow-up; 8922 (55%) did not receive any referral during the study period, and 1603 (10%) received a referral, but outside of the period, and thus were excluded from the analysis. Two percent (2%) of the adults who reported a more than 2-inch difference in their height across the 2 time periods were excluded from study population due to potential data quality concern. Respondents with complete data on weight, height, age, gender, race/ethnicity, level of education, motivation to lose weight, smoking status, and comorbidities were used for the analysis. The final study population was divided into 3 groups. The intervention group consisted of obese or overweight respondents targeted for the telephonic wellness coaching program (N = 1448, including 1050 participants and 398 nonparticipants). The 2 comparison groups were overweight or obese respondents: (1) not targeted for any telephonic WCM program (N = 7586) and (2) not targeted for telephonic wellness coaching, but targeted for other WCM programs, primarily disease management (N = 1270).

### Statistical Analysis

Differences in the distribution of demographic characteristics, self-reported chronic disease status, smoking status, and motivation to lose weight at baseline among the study groups were tested using  $\chi^2$  test, while differences in baseline BMI among the groups were tested using ANOVA. Paired *t*-tests were used to detect whether significant weight changes were reported for each group between baseline and follow-up.

To illustrate the impact of outliers, we reported the 1-year weight change for each group after removing outliers in 2 ways: a) statistically, by calculating upper and lower fences based on mean and standard deviation of the weight changes between T1 and T2 using “outer fence” formula (mean  $\pm$  4.72\* standard deviation),<sup>30</sup> and b) by removing 4% of the study population that had more than an 18-kg (40-lb) difference (increase or decrease) in self-reported weight based on health coach suggestions of what constituted a substantial weight change.

The association between self-reported weight change and the wellness coaching program was determined using multi-variable linear regression, adjusted for sex, race, education, motivation to lose weight, and comorbidities. *P* values less than .05 were considered statistically significant. Analyses were performed in SAS 9.2.<sup>31</sup>

In addition to our primary analyses among targeted members, we also conducted stratified analysis among wellness coaching program participants. We examined the average weight change stratified by: a) wellness coaching objective; b) the number of phone calls with the wellness coach; and c)

the initial stage of change. Since wellness coaching participants could establish multiple goals upon program initiation, we applied a hierarchy to make these categories mutually exclusive. The hierarchy was: weight loss > physical activity > nutrition > smoking > others. Due to sample size concerns, the intensity of intervention (ie, number of phone calls the participant received) was dichotomized into 1 to 3 calls and 4 or more calls. Although the program is designed to consist of 4 calls, on rare occasions participants (<1%) may have had more than 4 calls with a health coach if additional coaching was requested by the participant. Participants who received 4 or more phone calls with health coaches were considered program completers. We used a paired *t*-test to determine whether weight changes were significant for each group between baseline and follow-up, with 95% confidence intervals (CIs) for weight changes were reported.

## RESULTS

### Demographic Characteristics for Study Population

**Table 1** shows the characteristics of the study population. This population was well educated, with 70% of them having had at least some college education. The majority of the population was Caucasian; 55% of the population was male. The distributions of gender, race/ethnicity, and education were not different among the groups. More than 70% of respondents reported having motivation to lose weight in all study groups.

The average age was 45 years or above for all 3 groups, with the group targeted for other WCM programs having the highest average age (50 years). The groups were significantly different in their smoking and chronic disease status. Respondents targeted for other WCM programs had consistently higher rates of diabetes (40%) and asthma (27%) compared with respondents targeted for wellness coaching (12% and 9%, respectively). The group targeted for wellness coaching program had the highest prevalence of ever smoking (smoking sometime during their lifetime, may or may not smoke currently). As expected, the group not targeted for any programs had the fewest risk factors. Overall, the group targeted for wellness coaching was more similar to the group not targeted for any program than to the group targeted for other WCM programs.

### Average Weight Change for Intervention and Control Groups

**Table 2** provides the changes in self-reported weight between baseline and follow-up at 1 year by group, removing outliers using the 2 methodologies. After excluding 4% of individuals who reported a more than 18-kg (40-lb) weight change between baseline and follow-up, the average weight change was -0.44 kg (95% CI, -0.76 to -0.16) among respon-

**Table 1.** Baseline Characteristics by Group

Variables	Overweight or Obese Individuals Targeted for Wellness Coaching (N = 1448)			Overweight/Obese Individuals Targeted for Other WCM Programs (N = 1270)	Overweight/Obese Individuals Not Targeted for Any WCM Programs (N = 7586)	P
	Total Targeted (N = 1448)	Participants (N = 1050)	Non-participants (N = 398)			
Age in years (mean, SD)	47 (10)	47 (10)	46 (11)	50 (10)	45 (10)	<0.01
Gender—male (%)	54	52	59	53	55	0.74
Race/ethnicity—white (%)	89	91	85	84	87	0.63
<b>Education (%)</b>						
Some high school/high school graduate	29	26	35	30	29	0.37
Some college	34	36	31	33	30	0.87
College/post graduate	37	38	34	37	41	0.52
<b>Self-reported chronic disease<sup>a</sup></b>						
Asthma	9	10	6	27	9	<.01
Diabetes	12	12	10	40	5	<.01
High blood pressure	38	38	38	48	26	<.01
High cholesterol	33	35	29	46	28	<.01
<b>Self-reported being ever-smoker (%)</b>	55	55	54	47	38	<.01
<b>BMI at baseline (mean, SD)</b>	33(6)	33 (6)	32 (6)	34 (5)	32 (5)	0.07
<b>Motivated to lose weight—yes (%)</b>						
Yes	91	91	91	70	84	0.31

BMI indicates body mass index; SD, standard deviation; WCM, wellness care management.  
<sup>a</sup>The percentages do not sum to 100 because a person can report multiple diseases.

dents targeted for wellness coaching and  $-0.74$  kg (95% CI,  $-1.06$  to  $-0.15$ ) specifically among wellness coaching participants. There was no statistically significant weight loss reported by either comparison group.

**Table 3** shows the comparison of weight changes among the groups from the multivariable model. After excluding 4% of respondents who reported more than 18 kg (40 lb) weight changes, respondents targeted for wellness coaching reported  $-0.59$  kg (95% CI,  $-0.88$  to  $-0.30$ ) more weight loss than respondents not targeted for any program. The unadjusted model and the full model adjusting for age, gender, education, and self-reported comorbidities yielded similar coefficient estimates for being targeted for wellness coaching. The respondents targeted for wellness coaching reported a 0.28-kg greater weight loss than the respondents targeted for other wellness programs, but the difference was not statistically significant.

### Stratified Analysis Among Wellness Coaching Program Participants

**Table 4** shows the results of average weight change stratified by participants' goals, number of phone calls between the

health coach and the participants, and the participants' initial stage of changes. Based on the results of the paired *t*-test, individuals who set goals of weight loss and physical activity benefited most by losing 1.51 kg ( $P = .001$ ) and 0.99 kg ( $P = .01$ ), respectively with no significant weight change reported for participants that set other goals. Participants who started in the preparation stage report an average weight change of  $-1.43$  kg (95% CI,  $-2.17$  to  $-0.68$ ) if they completed the 4 phone calls.

## DISCUSSION

Overweight or obese health assessment respondents targeted for wellness coaching reported an average of .44 kg weight loss, .59 kg more weight loss than health assessment respondents not targeted for any wellness care management programs. Among wellness coaching participants, we observed that individuals who set goals of weight loss and physical activity reported significant weight loss while individuals who chose other health goals did not. Participants who started wellness coaching in the preparation stage and completed the 4-call program reported the most weight loss ( $-1.43$  kg).

■ **Table 2.** Changes in Self-Reported Weight (kg) by Group

	Overweight or Obese Individuals Targeted for Wellness Coaching (N = 1448)			Overweight/Obese Individuals Not Targeted for Any WCM Programs (N = 7586)	Overweight/Obese Individuals Targeted for Other WCM Programs (N = 1270)
	Total Targeted (N = 1448)	Program Participants (N = 1050)	Nonparticipants (N = 398)		
<b>Average weight change, No exclusion (kg, 95% CI)</b>	-1.54 (-2.00 to -1.11)	-1.85 (-2.37 to -1.33)	-0.77 (-1.63 to 0.12)	-0.19 (-0.36 to -0.04)	-0.87 (-1.35 to -0.45)
<b>Average weight change, outlier exclusion method 1<sup>a</sup> (kg, 95% CI)</b>	-1.08 (-1.45 to -0.71)	-1.37 (-1.81 to -0.91)	0.30 (-0.97 to 0.36)	0.06 (-0.07 to 0.19)	-1.15 (-0.52 to -0.16)
<b>Average weight change, Outlier exclusion method 2<sup>b</sup> (kg, 95% CI)</b>	-0.44 (-0.76 to -0.16)	-.74 (-1.06 to -0.15)	0.29 (-0.24 to 0.81)	0.16 (-0.04 to 0.27)	-.27 (-0.56 to 0.02)

CI indicates confidence interval; WCM, wellness care management.

<sup>a</sup>Removed statistically by calculating upper and lower fences based on mean weight change and standard deviation. Numbers of exclusions for each group were: wellness coaching participants n = 12; targeted for wellness coaching but did not participant n = 7; not targeted for any WCM programs n = 56; targeted for other WCM programs n = 12.

<sup>b</sup>Weight decrease/increase more than 40 lb (18 kg) are excluded as outliers. Numbers of exclusions for each group were: wellness coaching participants n = 47; targeted for wellness coaching but did not participant n = 18; not targeted for any WCM programs n = 208; targeted for other WCM programs n = 36.

■ **Table 3.** Compare Weight Changes Between the Groups Using Multivariable Linear Regressions

Coefficients (CIs)	Overweight/Obese Individuals Targeted for Wellness Coaching vs Not Targeted for Any WCM Programs <sup>a</sup>		Overweight/Obese Individuals Targeted for Wellness Coaching vs Targeted for Other WCM Programs <sup>b</sup>	
	Model 1 (raw model)	Model 2 (adjust for covariates)	Model 1 (raw model)	Model 2 (adjust for covariates)
<b>Intercept</b>	0.33 (-0.15 to 0.81)	0.29 (-0.27 to 0.86)	-0.16 (-0.58 to 0.25)	0.86 (-0.45 to 2.18)
<b>Targeted for wellness coaching</b>	-0.59 (-0.88 to -0.30)	-0.59 (-0.88 to -0.30)	-0.28 (-0.59 to 0.02)	-0.30 (-0.73 to 0.14)
<b>Age</b>		-0.01 (-0.02 to 0.00)		-0.01 (-0.03 to 0.01)
<b>Gender</b>		0.26 (0.04-0.48)		0.41 (-0.01 to 0.83)
<b>Education (reference = some High school/high school grad)</b>				
Some College		-0.02 (-0.29 to 0.25)		0.28 (-0.24 to 0.80)
College grad or higher		0.08 (-0.18 to 0.33)		0.65 (0.14-1.16)
<b>Diabetes</b>		-1.04 (-1.51 to -0.56)		-0.53 (-1.09 to 0.02)
<b>Hypertension</b>		0.57 (0.31 to 0.83)		0.53 (-0.06 to 0.95)
<b>Motivated to lose weight (reference = no)</b>		0.07 (-0.24 to 0.38)		-1.15 (-1.90 to -0.40)

CI indicates confidence interval; WCM, wellness care management.

<sup>a</sup>Weight decrease/increase more than 40 lbs (18 kg) are excluded as outliers. Numbers of exclusions for individuals targeted for wellness coaching participants n = 55; exclusions for individuals not targeted for any WCM programs n = 208. For model 2, other variables tested but not significant, thus not included in the final, were self-reported high cholesterol, self-reported being ever-smoker, and interaction between comorbidities and whether being targeted for wellness coaching.

<sup>b</sup>Weight decrease/increase more than 40 lb (18 kg) are excluded as outliers. Numbers of exclusions for individuals targeted for other WCM programs n = 36. For model 2, other variables tested but not significant, thus not included in the final were self-reported high cholesterol, self-reported being ever-smoker, and interaction between comorbidities and whether being targeted for wellness coaching.

The strengths of this study are the large sample size and collection of program participation information among program participants that allowed stratified analysis using factors such as initial stage of change, wellness goals set, and program completion. It is interesting that among participants who began the program in the preparation stage, those who

completed all 4 calls reported the most weight loss while those who did not complete the 4 calls reported no significant weight loss. Meanwhile, the weight loss reported by participants who started in the action stage did not differ by whether they completed the 4-call intervention or not. This suggests that if health coaches are able to increase the motivation



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and confidence for participants in the preparation stage, and provide them necessary tools to act on, these individuals may benefit from the program while participants in other stages may realize little benefit from the program as it is currently designed. Interventions may need greater customization according to the participants' initial stage of change to maximize program benefits for all participants.

These results should be interpreted conservatively, since this is a retrospective study with limited information collected for the study population. There are many additional unobserved factors could have had an impact on weight loss among program participants. For example, motivated participants might enroll in wellness or weight loss programs in addition to the employer-sponsored and health plan-administered wellness coaching and health plan-administered wellness coaching programs. It is unclear whether these unobserved factors were distributed differentially among the groups and whether this impacts the comparison among the 3 groups. Despite the large sample size, another limitation of this study is the generalizability of the findings. Our study population includes commercially insured individuals with education levels higher than those of the general population. The findings may not be generalizable to minority, younger, or less educated populations. Using self-reported weight is another limitation of this study.

The respondents targeted for telephonic wellness coaching reported a small but significant weight loss. It is unclear whether weight loss can be sustained beyond 1 year and whether the small weight loss observed has meaningful long-term health benefits. Sustaining weight loss is a persistent issue in weight loss programs.<sup>32</sup> We only identified 1 published study that followed telephonic weight loss program participants for up to 2 years, and that study reported no significant weight loss among telephonic coaching participants at 2 years compared with participants who received a mail intervention or usual care.<sup>33,34</sup> It is worth noting that in this HealthPartners clinical trial, participants who received either phone, mail, or usual care were all highly motivated volunteers who responded to mail or a clinic poster about the trial. Because a major technique in telephonic wellness coaching is motivational interviewing, the benefit of intervention may be limited to participants who are already highly motivated. As shown in this study, wellness coaching participants who started in the preparation stage benefited significantly from the program. Participants who were already in the action stage reported weight loss, but showed no additional benefit from complet-

**Table 4. Average Weight Change Stratified by Goals Set by Participants, by Number of Phone Calls Completed, and by Number of Calls and Initial Stage of Change**

		N <sup>a</sup>	Average weight change (kg, 95% CI)
<b>Goals</b>			
	Weight loss	135	-1.51 (-2.42 to -0.60)
	Physical activity	451	-0.99 (-1.78 to -0.15)
	Smoking	150	-0.95 (-1.74 to -0.60)
	Nutrition	126	-0.06 (-0.81 to 0.91)
	Others	141	-0.13 (-1.00 to 0.73)
<b>Number of Phone Calls</b>			
	1 to 3 calls	470	-0.16 (-0.64 to 0.32)
	4 or more	533	-1.13 (-1.56 to -0.67)
<b>Initial Stage of Change and Number of Phone Calls</b>			
Pre-contemplation	1-3 calls	29	1.53 (-0.17 to 3.33)
	4+ calls	23	-2.01 (-4.43 to 0.40)
Contemplation	1-3 calls	101	-0.22 (-1.18 to 0.75)
	4+ calls	122	-0.38 (-1.30 to 0.54)
Preparation	1-3 calls	161	0.11 (-0.67 to 0.91)
	4+ calls	214	-1.43 (-2.17 to -0.68)
Action	1-3 calls	145	-1.17 (-2.15 to -0.27)
	4+ calls	158	-1.21 (-2.01 to -0.46)
Maintenance	1-3 calls	34	1.86 (-0.10 to 3.69)
	4+ calls	16	-0.64 (-3.96 to 2.65)
CI indicates confidence interval.			
<sup>a</sup> Weight decrease/increase more than 40 lb (18 kg) are excluded as outliers. Total number of participants excluded was 55.			

ing the program. Additional studies with different populations and additional settings are needed to fully address the impacts of telephonic wellness coaching on both short-term and long-term weight loss.

Research suggests that a moderate amount of weight loss has potential benefits for obese patients.<sup>35,36</sup> But the amount of weight loss observed in this telephonic wellness coaching program is less than 1% of total body weight and among a healthier population. Future studies on telephonic wellness coaching and weight loss may need to also report details on nutritional and physical activity components of the programs that could be associated with weight loss and the sustainability of these behaviors. If the lifestyle changes adopted through wellness coaching result in a sustainable, small amount of weight loss, this may improve health outcomes in the long term.

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## REFERENCES

- Centers for Disease Control and Prevention. Chronic disease prevention and health promotion: obesity. <http://www.cdc.gov/chronicdisease/resources/publications/aag/obesity.htm>. Accessed January 2013.
- Criqui MH, Mebane I, Wallace RB, Heiss G, Holdbrook MJ. Multivariate correlates of adult blood pressures in nine North American populations: the Lipid Research Clinics Prevalence Study. *Prev Med*. 1982;11(4):391-402.
- Dyer AR, Elliott P. The INTERSALT study: relations of body mass index to blood pressure. INTERSALT Co-operative Research Group. *J Hum Hypertens*. 1989;3(5):299-308.
- Stamler R, Stamler J, Riedinger WF, Algera G, Roberts RH. Weight and blood pressure. Findings in hypertension screening of 1 million Americans. *JAMA*. 1978;240(15):1607-1610.
- Haffner SM, Mitchell BD, Hazuda HP, Stern MP. Greater influence of central distribution of adipose tissue on incidence of non-insulin-dependent diabetes in women than men. *Am J Clin Nutr*. 1991;53(5):1312-1317.
- Hu FB, Manson JE, Stampfer MJ, et al. Diet, lifestyle, and the risk of type 2 diabetes mellitus in women. *N Engl J Med*. 2001;345(11):790-797.
- Goran MI, Ball GD, Cruz ML. Obesity and risk of type 2 diabetes and cardiovascular disease in children and adolescents. *J Clin Endocrinol Metab*. 2003;88(4):1417-1427.
- Kahn SE, Hull RL, Utzschneider KM. Mechanisms linking obesity to insulin resistance and type 2 diabetes. *Nature*. 2006;444(7121):840-846.
- Health implications of obesity. National Institutes of Health Consensus Development Conference Statement. *Ann Intern Med*. 1985;103(6 pt 2):1073-1077.
- Kurth T, Gaziano JM, Berger K, et al. Body mass index and the risk of stroke in men. *Arch Intern Med*. 2002;162(22):2557-2562.
- Strazzullo P, D'Elia L, Cairella G, et al. Excess body weight and incidence of stroke: meta-analysis of prospective studies with 2 million participants. *Stroke*. 2010;41(5):e418-e426.
- Rönmark E, Andersson C, Nystrom L, et al. Obesity increases the risk of incident asthma among adults. *Eur Respir J*. 2005;25(2):282-288.
- Mandal S, Hart N. Respiratory complications of obesity. *Clin Med*. 2012;12(1):75-78.
- Giovannucci E. Insulin and colon cancer. *Cancer Causes Control*. 1995;6(2):164-179.
- Giovannucci E, Colditz GA, Stampfer MJ, Willett WC. Physical activity, obesity, and risk of colorectal adenoma in women (United States). *Cancer Causes Control*. 1996;7(2):253-263.
- Must A, Jacques PF, Dallal GE, Bajema CJ, Dietz WH. Long-term morbidity and mortality of overweight adolescents. A follow-up of the Harvard Growth Study of 1922 to 1935. *N Engl J Med*. 1992;327(19):1350-1355.
- Flegal KM, Graubard BI, Williamson DF, Gail MH. Excess deaths associated with underweight, overweight, and obesity. *JAMA*. 2005;293(15):1861-1867.
- Flegal KM, Graubard BI, Williamson DF, Gail MH. Cause-specific excess deaths associated with underweight, overweight, and obesity. *JAMA*. 2007;298(17):2028-2037.
- Manson JE, Stampfer MJ, Hennekens CH, Willett WC. Body weight and longevity. A reassessment. *JAMA*. 1987;257(3):353-358.
- Finkelstein EA, Trogon JG, Cohen JW, Dietz W. Annual medical spending attributable to obesity: payer- and service-specific estimates. *Health Aff (Millwood)*. 2009;28(5):w822-w831.
- Institute HS. Moving to an Evidence-Based Health Coaching Practice. [http://infocus.healthsciences.org/Infocus\\_Moving\\_to\\_an\\_Evidence-Based\\_Health\\_Coaching\\_Practice.html](http://infocus.healthsciences.org/Infocus_Moving_to_an_Evidence-Based_Health_Coaching_Practice.html). Accessed January 2013.
- Lichtenstein E, Glasgow RE, Lando HA, Ossip-Klein DJ, Boles SM. Telephone counseling for smoking cessation: rationales and meta-analytic review of evidence. *Health Educ Res*. 1996;11(2):243-257.
- Stead LF, Perera R, Lancaster T. Telephone counselling for smoking cessation. *Cochrane Database Syst Rev*. 2006;19(3):CD002850.
- Terry PE, Seaverson EL, Grossmeier J, Anderson DR. Effectiveness of a worksite telephone-based weight management program. *Am J Health Promot*. 2011;25(3):186-189.
- Vanwormer JJ, Boucher JL, Pronk NP. Telephone-based counseling improves dietary fat, fruit, and vegetable consumption: a best-evidence synthesis. *J Am Diet Assoc*. 2006;106(9):1434-1444.
- Hellerstedt WL, Jeffery RW. The effects of a telephone-based intervention on weight loss. *Am J Health Promot*. 1997;11(3):177-182.
- van Wier MF, Ariens GA, Dekkers JC, et al. Phone and e-mail counselling are effective for weight management in an overweight working population: a randomized controlled trial. *BMC Public Health*. 2009;9:6.
- University of Michigan Health Resource Center. Health Risk Appraisal (HRA). <http://www.hmrc.umich.edu/content.aspx?pageid=19&fname=hra.txt>. Accessed January 2013.
- Johnson and Johnson Company, Wellness + Prevention Inc. Health Risk Assessment. <http://www.healthmedia.com/products/digitalcoachingprograms/succeed.htm>. Accessed January 2013.
- Tukey J. Exploratory data analysis Addison-Wesely; 1977.
- SAS. SAS 9.2 Product Documentation. <http://support.sas.com/documentation/92/index.html>. Accessed January 2013.
- Svetkey LP, Stevens VJ, Brantley PJ, et al. Comparison of strategies for sustaining weight loss: the weight loss maintenance randomized controlled trial. *JAMA*. 2008;299(10):1139-1148.
- Jeffery RW, Sherwood NE, Brelje K, et al. Mail and phone interventions for weight loss in a managed-care setting: weigh-to-be one-year outcomes. *Int J Obes Relat Metab Disord*. 2003;27(12):1584-1592.
- Sherwood NE, Jeffery RW, Pronk NP, et al. Mail and phone interventions for weight loss in a managed-care setting: weigh-to-be 2-year outcomes. *Int J Obes (Lond)*. 2006;30(10):1565-1573.
- Goldstein DJ. Beneficial health effects of modest weight loss. *Int J Obes Relat Metab Disord*. 1992;16(6):397-415.
- Wing RR, Lang W, Wadden TA, et al. Benefits of modest weight loss in improving cardiovascular risk factors in overweight and obese individuals with type 2 diabetes. *Diabetes Care*. 2011;34(7):1481-1486. ■