

# Medical triggers are associated with better short- and long-term weight loss outcomes

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## Abstract

**Background.** Medical events are often reported as triggers for weight loss, but it is unknown whether medical triggers result in better short- and long-term weight control.

**Methods.** The relationship between medical triggers and weight loss was examined in the National Weight Control Registry (NWCR), a database of individuals who have lost  $\geq 30$  lbs and kept it off for  $\geq 1$  year. Recall of weight loss triggers may become difficult over time, thus participants were limited to those reporting weight loss  $< 5$  years ago. Three groups were examined: (1) participants with medical triggers ( $N = 207$ ), (2) participants with nonmedical triggers ( $N = 539$ ), and (3) participants with no trigger ( $N = 171$ ).

**Results.** Participants with medical triggers were older than those with nonmedical triggers or no trigger ( $50.5 \pm 11.7$ ,  $44.9 \pm 11.8$ ,  $46.7 \pm 13.3$  years;  $P = 0.0001$ ), had a higher initial BMI at entry into the NWCR ( $26.1 \pm 5.0$ ,  $25.0 \pm 4.3$ ,  $24.8 \pm 4.4$  kg/m<sup>2</sup>;  $P = 0.004$ ), and were more likely to be male (37.1%, 18%, 17.2%;  $P = 0.0001$ ). Participants with medical triggers reported greater initial weight loss than those with nonmedical triggers or no trigger ( $36.5 \pm 25.0$ ,  $31.8 \pm 16.6$ ,  $31.8 \pm 17.1$  kg;  $P = 0.01$ ). Participants with medical triggers also gained less weight over 2 years of follow-up than those with nonmedical triggers or no trigger ( $P = 0.003$ ).

**Conclusions.** Medical triggers may produce a teachable moment for weight control, resulting in better initial weight loss and long-term maintenance.

**Keywords:** Teachable moment; Weight maintenance; NWCR

## Introduction

Medical events are commonly reported as triggers for weight loss initiation [1], but it is unknown whether experiencing a medical trigger is associated with better initial weight loss and sustained weight loss over time. In other areas of behavioral medicine, medical events have been shown to prompt long-term behavior change [2–6]. Most notably, in the smoking cessation literature, it has been reported that experiencing a myocardial infarction (MI) quadruples an individual's odds of quitting [7], with impressive cessation rates (30–78%) up to 1 year after the MI

[8–10]. Based on these promising data, effective smoking cessation programs have been developed for use during hospitalization for cardiac events [8,11–13]. These programs have been compared to standard care and produce much higher abstinence rates [13,14], possibly because they capitalize on the heightened motivation created by the cardiac event. It is unknown whether medical triggers create a similar teachable moment for weight loss and the adoption of long-standing eating and exercise behavior changes.

The present study examined the relationship between medical triggers and weight loss and subsequent maintenance among participants in the National Weight Control Registry (NWCR). The NWCR is a database of over 3000 individuals who have lost at least 30 lbs and have maintained their weight loss for at least 1 year (on average, NWCR participants have lost 66 lbs and maintained the loss for over 6 years) [15]. We hypothesized that NWCR participants who, at entry into the Registry, reported that

their weight loss was initiated after a medical trigger would maintain their weight loss better over the subsequent 2-year period than individuals reporting nonmedical triggers or no trigger at all. This is the first study to examine the relationship between medical triggers and prospective weight change. Understanding this relationship may help inform future treatment of obesity in medical settings.

## Method

### *Participants*

Participants in the NWCR must be at least 18 years old, have lost a minimum of 30 lbs, and have maintained their weight loss for at least 1 year. Volunteers are recruited through advertisements in national and local newspapers, television, and radio and are not compensated for their participation. For this study, we limited our sample to participants who completed the two categorical questions about weight loss triggers at entry into the Registry (see below for details), had reached the Year 2 assessment, and denied pregnancy from baseline to the Year 2 follow-up. Given that retrospective reporting of triggers for weight loss may become increasingly difficult over time [16], we further limited the sample to NWCR participants who, at entry into the Registry, reported that their successful weight loss occurred within the past 5 years. A total of 1357 NWCR participants meet these criteria, of whom 917 had completed both the Years 1 and 2 assessments. The average age of the participants was  $46.6 \pm 12.2$  years; they were predominately women (78%), Caucasian (94%), and college-educated (55%). On average, these participants had a BMI of  $25.2 \pm 4.5$  kg/m<sup>2</sup>, lost  $32.9 \pm 18.9$  kg, and maintained at least a 30-lb weight loss for  $29.0 \pm 13.3$  months before enrolling in the Registry. Overall, these participants were significantly older ( $46.6 \pm 12.2$  vs.  $43.0 \pm 11.8$  years;  $P = 0.000$ ) and had a lower BMI at entry into the NWCR ( $25.2 \pm 4.5$  vs.  $26.1 \pm 5.8$  kg/m<sup>2</sup>;  $P = 0.003$ ) than participants ( $N=440$ ) who did not complete both assessments.

### *Assessments*

#### *Demographic and weight history*

Demographic information and medical histories were obtained from all participants at entry into the Registry. To assess medical history, participants indicated on a yes or no checklist if a physician told them before their weight loss whether they had each of the following conditions: heart attack, heart failure, stroke, angina, arthritis, high cholesterol, high blood pressure, and sleep apnea. Self-reported weight in pounds was also collected at entry into the Registry and at Years 1 and 2. The self-reported weights of Registry participants have previously been shown to be reliable and valid [17].

### *Triggers for weight loss*

At entry into the Registry, participants were asked to report (1) if there was a specific incident or “triggering event” that prompted them to begin their successful weight loss (yes or no) and (2) if yes, to check the type of event that triggered their weight loss (allowed to check only one). The response options were medical (“doctor told me to lose weight,” “family member had a heart attack—scared I was next”), emotional (“coworker teased me about my weight”), lifestyle (“began new job,” “was approaching 40th birthday”), inspiration or impetus from another person (“saw Oprah fit into small-size jeans,” “spouse promised to take me on a cruise if I lost 30 lbs”), weight loss program became available (“found out about a new diet clinic”), saw picture or image of self (“saw how fat I was in pictures from son’s wedding”), and reached lifetime high weight or size (“stepped on scale and realized I had hit 200 lbs for the first time in my life”). Because of our interest in examining the impact of medical triggers on weight loss and maintenance, three groups were created based on the trigger status reported at entry into the study: (1) participants endorsing medical triggers ( $N = 207$ ), (2) participants endorsing nonmedical triggers ( $N = 539$ ), and (3) participants endorsing no trigger for their weight loss ( $N = 171$ ).

### *Diet and physical activity*

The Block Food Frequency Questionnaire [18], a measure known to correlate with 4-day food records, was used to assess self-reported dietary intake at baseline and 1 year. We examined estimates of current total daily energy intake and percentage of daily energy obtained from fat. The Paffenbarger Activity Questionnaire (PAQ) [19] was used to provide an estimate of calories expended per week in overall leisure time activity at baseline and 1 year. Previous studies have shown that reported changes in exercise on the PAQ are predictive of weight change in obese individuals [20].

### *Statistics*

All analyses were performed using the Statistical Package for the Social Sciences (SPSS for Windows, Version 11.0, SPSS Inc., Chicago, IL, USA). Descriptive statistics are presented as either means  $\pm$  SDs (unadjusted) for continuous measures or percentages for categorical responses. Independent  $t$  tests were used to compare differences in demographic variables between individuals who did not complete the 1- and 2-year assessments. Univariate ANOVAs (for continuous variables), and chi-squared analyses (for categorical variables) were used to examine differences in trigger status (i.e., medical trigger, other trigger, no trigger) as a function of demographic factors. Time-related changes in weight among the trigger groups were analyzed using multivariate analysis of variance for repeated measures. Significant demographic covariates were also entered

Table 1  
 BMI, initial weight loss, and weight regain from baseline to Year 2 (Mean  $\pm$  SD) in NWCR participants who report different triggers for their weight loss ( $N = 917$ )

Type of trigger	%	Initial BMI	Initial weight loss	Weight change (kg) from baseline to Year 2
Medical trigger	22.9	26.1 $\pm$ 5.0	36.5 $\pm$ 25.0	3.8 $\pm$ 8.4
Nonmedical trigger	59.9	25.0 $\pm$ 4.3	31.8 $\pm$ 16.6	5.2 $\pm$ 10.8
Reached lifetime high	21.3	25.3 $\pm$ 4.5	29.7 $\pm$ 14.9	4.4 $\pm$ 6.5
Saw picture/mirror of self	12.7	24.4 $\pm$ 3.9	31.2 $\pm$ 17.8	4.7 $\pm$ 6.7
Lifestyle	8.7	24.9 $\pm$ 4.4	30.6 $\pm$ 12.1	4.3 $\pm$ 5.8
Emotional	6.9	25.0 $\pm$ 4.4	34.4 $\pm$ 19.5	6.2 $\pm$ 9.0
Program became available	5.3	25.9 $\pm$ 3.7	32.3 $\pm$ 16.1	7.4 $\pm$ 9.4
Inspiration	5.0	24.9 $\pm$ 4.7	40.8 $\pm$ 20.6	6.1 $\pm$ 6.5
No trigger	17.1	24.8 $\pm$ 4.4	31.8 $\pm$ 17.1	6.2 $\pm$ 8.6

into the repeated-measures model. LSD post hoc tests were performed when appropriate.

## Results

The majority of NWCR participants reported a trigger for their weight loss (83%), with medical triggers being the most common (23%); see Table 1. Participants who reported a medical trigger were significantly older than those with other triggers or no trigger (50.5  $\pm$  11.7, 44.9  $\pm$  11.8, 46.7  $\pm$  13.3 years;  $P = 0.0001$ ), were more likely to be male (37.1%, 18%, 17.2%;  $P = 0.0001$ ), and had a higher BMI at entry into the NWCR (26.1  $\pm$  5.0, 25.0  $\pm$  4.3, 24.8  $\pm$  4.4 kg/m<sup>2</sup>;  $P = 0.004$ ). Significant differences in duration of weight maintenance, ethnicity, and education were not observed.

Participants with a medical trigger were more likely to report having one or more medical conditions associated with obesity compared to those with nonmedical triggers or

no triggers (86%, 57.7%, 60.3%;  $P = 0.0001$ ). Conversely, among participants reporting obesity-related medical comorbidities, 30% said their successful weight loss had been triggered by a medical event compared to only 9% of participants denying such conditions.

### Initial weight loss

Overall, participants reported an average weight loss of 32.8  $\pm$  19.0 kg at entry into the Registry. Participants with a medical trigger reported greater initial weight loss (36.5  $\pm$  25.0, 31.8  $\pm$  16.6, 31.8  $\pm$  17.1 kg;  $P = 0.01$ ) compared to those with nonmedical triggers or no triggers, respectively. The effect remained significant ( $P = 0.04$ ) after controlling for demographic covariates including age, BMI, gender, and history of obesity-related medical comorbidity.

### Weight maintenance

Over the 2-year period, average weight regain was 5.0  $\pm$  7.7 kg [note: this regain is higher than in previous NWCR reports because the sample was limited to participants with shorter durations (5 years or less) who are more likely to regain] [17,21]. A significant trigger group  $\times$  time interaction was observed ( $P = 0.003$ ), even after controlling for age, BMI, gender, initial weight loss, and history of obesity-related medical comorbidity ( $P = 0.001$ ). LSD post hoc contrasts indicated that participants with a medical trigger gained significantly less at 1 ( $P = 0.02$ ) and 2 ( $P = 0.001$ ) years compared to those reporting no initial trigger. Having a medical trigger was also associated with less 2-year weight regain compared to having non-medical triggers ( $P = 0.04$ ). Despite gaining more weight than those with medical triggers, participants with non-medical triggers gained less at 2 years than those who had no initial weight loss trigger ( $P = 0.05$ ) (Fig. 1). There were no differences between any of the groups on calorie and fat intake or physical activity at baseline or in change from baseline to 1 year.

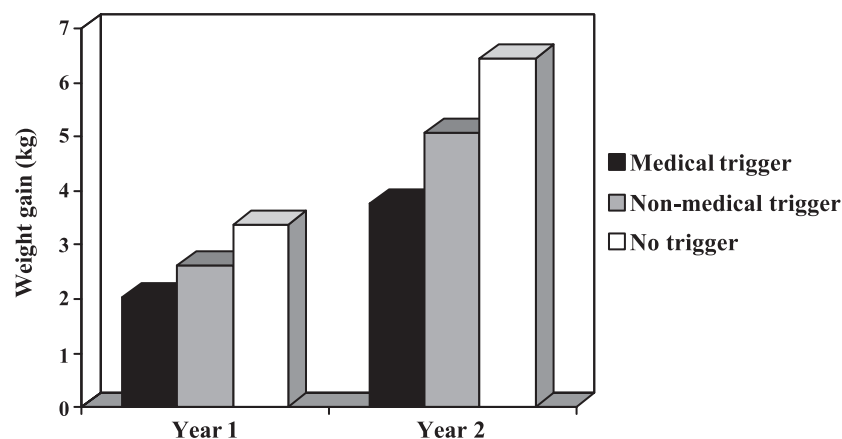


Fig. 1. Weight gain among successful weight maintainers who had a medical weight loss trigger, a nonmedical weight loss trigger, or no weight loss trigger.

## Discussion

Medical events are known to produce a teachable moment for behavior change across several health behaviors (e.g., smoking, alcohol use) [2–14]. The present study adds to this literature by demonstrating that medical triggers for weight loss are associated with greater initial weight losses and better maintenance of weight loss over time than nonmedical triggers for weight loss or no trigger at all. Medical triggers may increase the saliency of the health threats imposed by obesity and thereby enhance motivation to succeed. Thus, the period following a medical trigger may be an opportune time to intervene with overweight individuals and may optimize both initial and long-term treatment outcome. These hypotheses, however, await further investigation.

Medical triggers in the present study were broadly defined and included being told by a physician to lose weight, as well as medical events experienced by the participants themselves or others. Future studies may wish to distinguish between these categories to gain a better understanding of the impact of medical events on weight loss. Moreover, since we did not assess whether weight loss following a medical trigger was intentional or unintentional, an alternative interpretation of our results is that the better weight control observed in the medical trigger group was the result of disease pathology rather than motivation or improved eating and exercise habits. However, the relationship between medical triggers and initial weight loss and weight regain remained significant after controlling for obesity-related medical comorbidities, suggesting that disease status alone does not account for these findings. Differences in dietary and exercise habits were not observed among the trigger groups, perhaps because the differences in weight regain between the groups were small (ranging from 1.4 to 2.67 kg), and measures of eating and exercise are likely not sensitive enough to detect such small differences [22]. Despite these limitations, this study has several strengths, including the large sample size and the long-term weight loss success of the NWCR and the fact that this sample was followed prospectively for several years.

These results may be particularly useful to primary care physicians, who are dealing with increased numbers of overweight and obese patients at risk for serious medical conditions. Identification of an obesity-associated medical condition may create a good opportunity to offer patients help with weight management. Given that the majority of participants with obesity-related medical comorbidities did not report having a medical trigger for weight loss, it appears that simply experiencing a medical condition alone is not enough to promote better long-term weight control. Rather, additional prompting or encouragement from physicians during this time may be necessary to capitalize on the teachable moment created by a health threat.

In sum, our findings suggest that experiencing a medical trigger produces a teachable moment for behavior change in overweight individuals and results in better weight loss and maintenance for up to 2 years. Currently, treatment programs

do not specifically target individuals who have experienced a medical event and physicians often do not counsel overweight patients presenting with medical comorbidities to lose weight [23]. As a result, health care practitioners may be missing out on periods of naturally heightened motivation for behavior change. In the treatment of other health-risk behaviors, intervening immediately following a medical event has enhanced treatment response rates. Similar intervention models should be developed for weight control to optimize long-term weight loss as observed in National Weight Control Registry participants.

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