

Literature Review: Weight Control

# Promising Practices for the Prevention and Control of Obesity in the Worksite

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## Abstract

**Purpose.** To identify worksite practices that show promise for promoting employee weight loss.

**Data Source.** The following electronic databases were searched from January 1, 1966, through December 31, 2005: CARL Uncover (via Ingenta), CDP, CINAHL, Cochrane Central Register of Controlled Trials, Cochrane Library, CRISP, Dissertation Abstracts, EMBASE, ERIC, Health Canada, INFORM (part of ABI/INFORM Proquest), LocatorPlus, New York Academy of Medicine, Ovid MEDLINE, SPORTDiscus, PapersFirst, PsycINFO, PubMed, and TRIP.

**Study Inclusion and Exclusion Criteria.** Included studies were published in English, conducted at a worksite, designed for adults (aged  $\geq 18$  years), and reported weight-related outcomes.

**Data Extraction.** Data were extracted using an online abstraction form.

**Data Synthesis.** Studies were evaluated on the basis of study design suitability, quality of execution, sample size, and effect size. Changes in weight-related outcomes were used to assess effectiveness.

**Results.** The following six promising practices were identified: enhanced access to opportunities for physical activity combined with health education, exercise prescriptions alone, multicomponent educational practices, weight loss competitions and incentives, behavioral practices with incentives, and behavioral practices without incentives.

**Conclusions.** These practices will help employers and employees select programs that show promise for controlling and preventing obesity. (*Am J Health Promot* 2011;25[3]:e12–e26.)

**Key Words:** Obesity, Worksite, Environmental, Policy, Educational, Behavioral Practices. Manuscript format: literature review; Research purpose: intervention testing/program evaluation; Study design: content analysis; Outcome measure: biometric; Setting: workplace; Health focus: weight control; Strategy: education, skill building/behavioral change, incentives, policy, culture change, built environment; Target population age: adults; Target population circumstances: education/income level, geographic location, and race/ethnicity

## PURPOSE

Obesity and its related comorbidities have reached epidemic proportions in the United States.<sup>1</sup> Compared with employees who maintain a healthy weight, obese adults have higher medical care costs, rates of absenteeism, and rates of disability, and their overall productivity is lower.<sup>2–5</sup> One study<sup>6</sup> that examined the relationship between body mass index (BMI) and medical costs found that each additional unit of BMI increased medical charges by 1.9%. Another study<sup>2</sup> compared medical expenses for normal weight and obese persons and estimated that persons who are obese spent \$1429 (42%) more for medical care in 2006 than did persons of normal weight. These findings suggest that reducing the prevalence of overweight and obesity can improve employee health and may lead to health care cost savings for employers.

In response to the obesity epidemic and the need to identify effective worksite strategies for obesity prevention and control, the Division of Nutrition, Physical Activity and Obesity (DNPAO) at the Centers for Disease Control and Prevention (CDC) developed strategies and promising practices that contribute to weight loss. To complement the *Guide to Community Preventive Services* (hereafter *Community Guide*) worksite obesity review recommendation,<sup>7</sup> these promising practices were created through a systematic review of the literature and were evaluated on evidence of effectiveness, design suitability, quality of execution, sample size, and effect size. The *Community Guide* recommends worksite programs intended to improve diet or

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**Table 1**  
**Process for Determining Promising Worksite Practices to Prevent and Control Obesity, Literature Review, January 1, 1966, Through December 31, 2005**

Evidence of Effectiveness*	Quality of Execution†	Study Design Suitability‡	No. of Studies	Consistent Result§	Effect Size
Promising practice	A 0–1 Limitation	Greatest	1	Yes	Sufficient
	A 0–1 Limitation	Greatest or moderate	≥2	Yes	Sufficient
	A 0–1 Limitation	Greatest, moderate, or least	≥3	Yes	Sufficient
	B 2–3 Limitations	Greatest	≥2	Yes	Sufficient
	B 2–3 Limitations	Greatest or moderate	≥3	Yes	Sufficient
	B 2–3 Limitations	Greatest, moderate, or least	≥4	Yes	Sufficient
	C 4–5 Limitations	Greatest	≥3	Yes	Sufficient
	C 4–5 Limitations	Greatest or moderate	≥4	Yes	Sufficient
	C 4–5 Limitations	Greatest, moderate, or least	≥5	Yes	Sufficient
	D 6–7 Limitations	Greatest	≥4	Yes	Sufficient
	D 6–7 Limitations	Greatest or moderate	≥5	Yes	Sufficient
	D 6–7 Limitations	Greatest, moderate, or least	≥6	Yes	Sufficient
Unable to address if promising practice	Insufficient quality of execution and/or study design suitability		Too few studies	No	Small

\* Reasons why a strategy cannot be a promising practice: (1) studies are of insufficient design and/or execution, (2) too few studies were found, (3) results are inconsistent, and/or (4) effect size is too small.

† The quality of execution of each study was assessed by looking at the study population and intervention description, sampling, exposure and outcome measurement, data analysis, interpretation of results, and other factors. A total of nine limitations was possible. Based on the number of limitations, each study is categorized as A (zero to one limitation), B (two to three limitations), C (four to five limitations), D (six to seven limitations), or F (eight to nine limitations). Studies with F were excluded from this review.

‡ Study design suitability (i.e., is the study design used appropriate for measuring the effectiveness of the strategy?). The studies with greatest suitability limit biases and generally result in greater confidence in the findings: for example, greatest (randomized controlled trials, prospective cohort studies, and other designs with concurrent comparison groups such as time series with comparison group), moderate (all retrospective designs, case-control, and time series), and least (before-and-after studies and no comparison group and cross-sectional studies).

§ Weight-related outcome results are consistent in direction and size.

|| Effect size is the magnitude of the change in a weight-related outcome. Sufficient effect size is defined on a case-by-case basis by experts' opinion.

physical activity behaviors based on strong evidence of their effectiveness for reducing weight among employees.<sup>7</sup> Benedict and Arterburn<sup>8</sup> examined worksite-based weight loss programs and found modest improvements in body weight. Previous workplace reviews<sup>9–11</sup> looked at study effects, mostly from randomized controlled trials (RCTs), which often represent too few studies to provide specific information to implement a *Community Guide* recommendation. Moreover, the majority of these reviews<sup>9–11</sup> centered only around physical activity interventions. Our review extends the current literature by looking at before-and-after studies, which may have less suitable designs or lower quality of execution but will allow us to explore a wider range of novel approaches that worksites can potentially implement given their various demographics. Additionally, we add a level of specificity by examining promising practices that worksites can consider around both nutrition and physical activity in the following categories: (1)

environmental and policy strategies, (2) informational and educational strategies, and (3) behavioral strategies. Promising practices developed by the DNPAO highlight emerging interventions that have preliminary evidence of effectiveness and warrant further adoption and evaluation by the research community.

## METHODS

We conducted a systematic review that complements earlier reviews<sup>7–11</sup> to identify promising weight loss practices of worksites using the *Community Guide* method.<sup>12,13</sup> A multidisciplinary team with expertise in worksite health promotion, nutrition, physical activity, and obesity conducted this systematic review and identified promising practices.

### Scope of the Review

**Promising Practices.** We defined worksite promising practices as those delivered to employees by employers that demonstrate a reduction in a weight-

related outcome (i.e., weight, percentage of body fat, waist circumference, ratio of waist to hip, and BMI [calculated as weight in kilograms divided by height in meters squared]) or the prevalence of individuals who are overweight (BMI ≥25.0) or obese (BMI ≥30.0). A promising practice was determined on the basis of the number of available studies and the strength of their design and execution, as well as the size and consistency of reported effects for weight-related outcomes.

For example, a promising practice can be determined on the basis of one or two well-designed and executed studies with few limitations. Alternatively and more commonly, a promising practice was determined on the basis of a group of less suitable studies such as before-and-after studies taken together, especially if the reported effects for weight-related outcomes were consistent (Table 1).

**Worksite.** We defined worksite as any place where people are employed and

received a wage or salary for their labor. Worksites could differ in size (i.e., very small, small, medium, or large), type (i.e., for profit or non-profit), work schedule (i.e., rotating shift work or night and day schedules), and location (i.e., United States or international).

### Conceptual Model

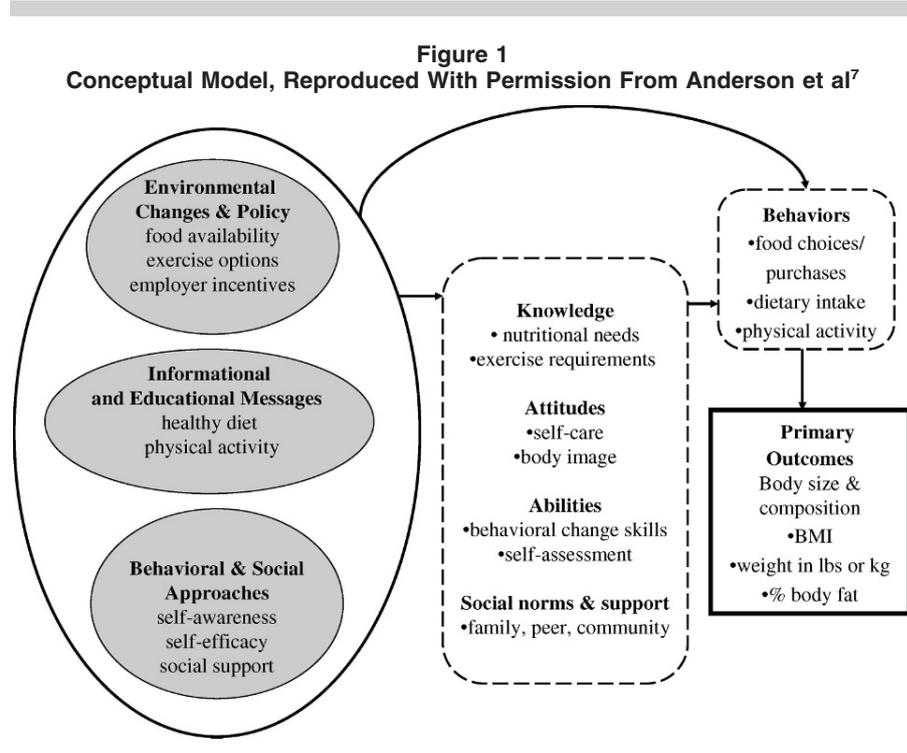
Figure 1 shows the conceptual model used for this review. The review team focused on the following 3 strategies: (1) environmental and policy strategies to change the structure of physical and organizational environments to provide healthy food, convenient opportunities for physical activity, and incentives; (2) informational and educational strategies to change employees' knowledge and attitudes about the benefits of healthy nutritional habits and opportunities for physical activity; and (3) behavioral strategies to teach employees skills to successfully adopt and maintain behavioral changes and to create social environments that facilitate and enhance behavioral change. Detailed characteristics of these three strategies are provided in the "Results" section.

### Data Sources

We searched English-language articles published from January 1, 1966, through December 31, 2005, from peer-reviewed and grey literature<sup>14</sup> using the following computerized databases: CARL Uncover (via Ingenta), CDP, CINAHL, Cochrane Central Register of Controlled Trials, Cochrane Library, CRISP, Dissertation Abstracts, EM-BASE, ERIC, Health Canada, INFORM (part of ABI/INFORM Proquest), LocatorPlus, New York Academy of Medicine, Ovid MEDLINE, SPORTDiscus, PapersFirst, PsycINFO, PubMed, and TRIP. We reviewed reference lists of included publications to find related studies. Search terms are provided in the Appendix.

### Inclusion and Exclusion Criteria

We selected studies if they were conducted in a worksite and reported a weight-related outcome for adult employees aged at least 18 years (including retirees, spouses or partners, and dependents). In order to explore a wider range of worksite approaches, no limitation was set on duration of the



study or worksite characteristics, including size, type, type of work schedule, and location. We excluded practices that involved surgery, used only pharmacotherapy, used diets that provided fewer than 1000 kcal/d, or intervened with inpatients only. We excluded practices that promote the use of commercial weight loss diets (e.g., Slim Fast [Slim Fast Foods Co, West Palm Beach, Florida]). We included the Weight Watchers program (<http://www.weightwatchers.com/>) because it has a component specifically designed for worksites.<sup>15,16</sup>

We placed included studies into the three strategy groups of the conceptual model on the basis of the description provided in the articles retrieved. This is summarized in Figure 1.

### Data Extraction

Two independent abstractors assessed the selected studies using an online version of the *Community Guide* abstraction form.<sup>17</sup> At least two members of the review team reconciled discrepancies between abstractors. We evaluated studies for study design suitability and quality of execution. We classified suitability of study design

according to the *Community Guide* process. The following three possible categories describe the study design: greatest, moderate, or least suitability.<sup>12,13</sup> Unlike the *Community Guide* obesity review,<sup>7</sup> we included studies with less suitable designs such as before-and-after studies. The quality of execution of each study was assessed by looking at the following: (1) study population and intervention description, (2) sampling, (3) exposure and outcome measurement, (4) data analysis, (5) interpretation of results, (6) and other possible biases and confounders. A total of nine limitations was possible. We classified studies on the basis of the quality of execution as A (zero to one limitation), B (two to three limitations), C (four to five limitations), D (six to seven limitations), or F (eight to nine limitations); the *Community Guide* classified studies as good (zero to one limitation), fair (two to four limitations), or limited (five or more limitations).<sup>12,13</sup> We did not include studies with more than eight limitations in this review (Table 1); the *Community Guide* excluded studies with more than five limitations.<sup>7</sup>

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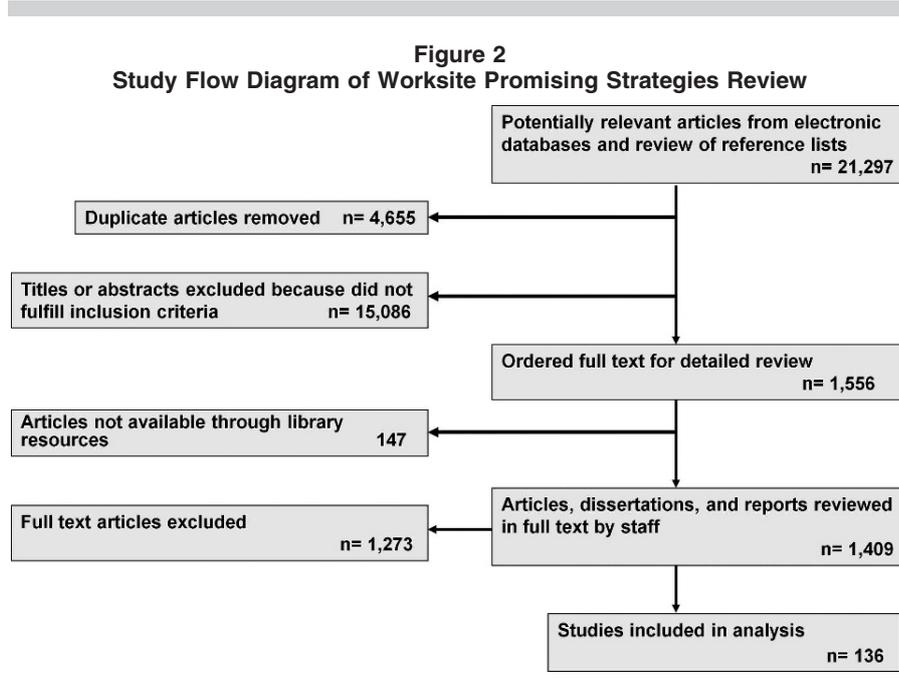
### Data Synthesis

We calculated a median effect size for each weight-related outcome.<sup>7</sup> We calculated individual effect sizes using the following method. For studies with before-and-after measurements of weight-related outcome in intervention (I) and concurrent comparison (C) groups, effect size =  $\Delta I - \Delta C$ . For studies with postintervention measurements of weight-related outcome only in intervention and comparison groups, effect size =  $I_{\text{post}} - C_{\text{post}}$ , where  $I_{\text{post}}$  indicates the intervention group postmeasurement and  $C_{\text{post}}$  indicates the control group postmeasurement. For studies with before-and-after measurements of weight-related outcome with no comparison group, effect size =  $I_{\text{post}} - I_{\text{pre}}$ , where  $I_{\text{post}}$  indicates the intervention group postmeasurement and  $I_{\text{pre}}$  indicates the intervention group baseline measurement.<sup>18</sup> We determined an absolute effect size ( $\Delta I - \Delta C$ ) when reported outcomes used the same measurements and units; otherwise, we calculated percentage relative effect size ( $[\Delta I - \Delta C] / I_{\text{baseline}}$ ).

### RESULTS

We found 21,297 titles and abstracts (Figure 2). After reviewing all titles and abstracts, we retrieved 1556 studies and included 136 studies with 142 arms in the review. Table 2 summarizes study designs, threats to validity, and effect sizes for all the included studies divided among the following three strategies: (1) environmental and policy, (2) informational and educational, and (3) behavioral.

Environmental and policy strategies included the following practices: (1) enhanced access to opportunities for physical activity only; (2) enhanced access to opportunities for physical activity combined with health education; (3) enhanced access to healthy food combined with health education; (4) enhanced access to healthy food combined with other nonenvironmental and policy strategies; (5) enhanced access to opportunities for physical activity combined with enhanced access to healthy food; (6) enhanced access to opportunities for physical activity and access to healthy food



combined with health education; (7) specific policies on time structure of breaks, mealtime, physical activity time, or worker release time; and (8) specific policies on food availability in cafeterias, vending machines, or meetings. No studies were found for practices 4, 5, 7 and 8.

Informational and educational strategies included the following practices: (1) small media (i.e., pamphlets or newsletters that convey health education information), (2) exercise prescriptions alone, (3) nutrition prescription, and (4) multicomponent educational practices.

Behavioral strategies included the following practices: (1) weight loss competitions and incentives, (2) behavioral practices with incentives, and (3) behavioral practices without incentives.

Table 3 summarizes the applicability for each included study and provides information on industry setting, location, sex, duration, and retention rate. The following sections present strategy and promising practice definitions and a representative example for each promising practice. The majority of studies provided weight loss measures, which are included in median effect size calculations when available.

### Environmental and Policy Strategies

**Summary.** Environmental and policy strategies address the entire workforce or populations (not individuals) and targeted physical and organizational structures through the development of worksite and public policies that support healthy behaviors. They are likely to be sustained for a longer period than individually oriented strategies.<sup>19</sup>

**Promising Practice 1: Enhanced Access to Opportunities for Physical Activity Combined With Health Education.** Enhanced access to opportunities for physical activity combined with health education enables or facilitates access to physical activity programs, workshops, classes, and other resources in a worksite setting. Such practices can include developing walking trails, building a fitness center at the worksite, or creating a par course (fitness trail).

A representative example<sup>20</sup> of this promising practice was done with employees in the skilled-trades divisions at a university, where they participated in a 16-week exercise intervention centered on the use of a nearby 1½-mile par course that included 19 strength-training and aerobic activities. Results indicated a mean change of -6.80 lb for those participating in the intervention vs. nonparticipants.

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Based on our criteria in determining a promising practice (Table 1), we identified five studies<sup>20-24</sup> that evaluated the effectiveness of this practice (Table 2). All five studies measured a percentage relative change in a weight-related outcome, with a median effect size of -3.24% (interquartile range [IQR], -7.24% to -3.09%) (Table 2). With at least one study in the greatest study design suitability and one limitation<sup>20</sup> (Table 4), these studies<sup>20-24</sup> provide sufficient evidence that enhanced access to physical activity combined with health education is promising in the worksite setting for the prevention and control of obesity as measured by change in weight.

**Informational and Educational Strategies**

**Summary.** Informational and educational strategies focus on the provision of information designed to increase awareness or knowledge as a requisite to motivate behavioral change. These strategies present both general health information, including information about weight loss or maintenance, chronic disease prevention, and risk reduction, and specific information about physical activity and nutrition. These strategies do not include any environmental and policy strategies.

**Promising Practice 2: Exercise Prescriptions Alone.** Exercise prescription involves a planned or structured physical activity regimen given to an individual or group that includes specific recommendations for the frequency, intensity, and type of exercise. The practices reviewed involved recruiting participants into voluntary groups at the worksite. After completing physical fitness evaluations, participants are placed in exercise training programs of mild, moderate, or vigorous intensity.

A representative example of this promising practice was done with male employees from a national corporation who participated in a yearlong worksite weight loss program. They selected their own exercise regimen of 30 minutes at least three times a week to achieve 65% to 75% maximum heart rate. Results indicated a mean change of -6.38 lb for those in the exercise group vs. control group.<sup>25</sup>

Based on our criteria in determining a promising practice (Table 1), we identified 14 studies<sup>25-38</sup> that evaluated the effectiveness of exercise prescriptions alone (Table 2). Thirteen studies<sup>25-27,29-38</sup> measured weight, with a resulting median effect size of -4.84 lb (IQR, -6.49 to -2.70 lb) (Table 2). With five studies<sup>25,26,28,29,35</sup> in the greatest study design suitability and one limitation (Table 5), these studies<sup>25-38</sup> provide sufficient evidence that exercise prescriptions when used alone in the worksite setting are promising in the prevention and control of obesity as measured by change in weight.

**Promising Practice 3: Multicomponent Educational Practices.** Multicomponent educational practices are aimed at providing information, with the curriculum or modules addressing health promotion programs (e.g., healthy lifestyles, physical activity, and nutrition) and risk reduction programs (e.g., weight management, cardiovascular risks, and diabetes risks). In addition to health education sessions, these studies incorporated components such as (1) exercise prescription, (2) nutrition prescription, and (3) small media (i.e., pamphlets or newsletters that convey health education information).

Based on the program description and what was reported by the author, these multicomponent practices all offered a health education session combined with exercise prescription, nutrition prescription, or small media. Because of the variety of studies and their differences, we came up with the best common theme represented by these studies.

A representative example of this promising practice was done with female home health aides who participated in a 9-month worksite program. The study involved supervised exercise twice a week complemented with lectures on motivation, leisure-time physical activity, and nutrition. Results indicated a mean change of -7.04 lb for those in the program vs. nonparticipants.<sup>39</sup>

Based on our criteria in determining a promising practice (Table 1), we identified 25 studies<sup>33,39-62</sup> that evaluated the effectiveness of multicomponent educational practices (Table 2). Seventeen stud-

ies<sup>33,39-43,48,49,51,53-57,59,61,62</sup> measured weight, with a resulting median effect size of -5.20 lb [IQR, -7.61 to -1.44 lb] (Table 2). Five studies<sup>44,46,52,58,60</sup> measured BMI and reported a median decrease of -0.46 kg/m<sup>2</sup> [IQR, -0.52 to -0.27 kg/m<sup>2</sup>]. With one<sup>39</sup> study in the greatest study design suitability and one limitation (Table 6), these studies<sup>33,39-62</sup> provide efficient evidence that multicomponent educational practices are promising in the worksite setting for the prevention and control of obesity as measured by change in weight.

**Behavioral Strategies**

**Summary.** Behavioral strategies to prevent and control obesity focus on teaching behavioral management skills or structuring the social environment to provide support for persons trying to initiate or maintain weight change. Strategies often include individual or group behavioral counseling and will often involve coworkers, family members, and other intermediaries who are part of an individual's social environment.

Behavioral methods may involve modeling or demonstration, participatory skill development, individual benchmarking (i.e., goal setting and achievement), providing feedback, providing incentives or disincentives, or providing materials necessary to enhance the desired behavior (e.g., pedometer and food journals).

**Promising Practice 4: Weight Loss Competitions and Incentives.** Competitions and incentives consist of rewards for weight loss or behavioral change to increase physical activity or improve nutrition. The rewards can be in kind, financial, or the honor or pride of winning. The incentives can vary in size and by type and can be used for screening, enrollment, compliance (i.e., staying in the program), completion of the program, or maintenance of the changes after completion of the program. These practices do not include teaching behavioral management skills, modeling or demonstration, or participatory skill development.

A representative example of this promising practice was done with employees who participated in three 12- to 15-week weight loss competitions

**Table 2**  
**Effectiveness of Strategies to Prevent and Control Obesity in the Worksite, Literature Review, January 1, 1966, Through December 31, 2005**

Practice	No. of Studies	Evidence		Effect Size, median (interquartile range)	Sufficiency of Evidence
		Study Design Suitability*	Quality of Execution†		
<b>Environmental and Policy Strategies</b>					
Enhanced access to opportunities for physical activity only	2	Least suitability: 2 studies <sup>48,149</sup>	Category B: 2 studies <sup>48,149</sup>	...	No
Enhanced access to opportunities for physical activity combined with health education	5	Greatest suitability: 1 study <sup>20</sup> Moderate suitability: 1 study <sup>23</sup> Least suitability: 3 studies <sup>21,22,24</sup>	Category A: 1 study <sup>20</sup> Category B: 0 study Category C: 4 studies <sup>21-24</sup> Category D: 0 study	-3.24% (-7.24% to -3.09%)	Yes
Enhanced access to healthy food combined with health education	4	Greatest suitability: 2 studies <sup>150,151</sup> Moderate suitability: 0 study Least suitability: 2 studies <sup>152,153</sup>	Category A: 1 study <sup>151</sup> Category B: 1 study <sup>150</sup> Category C: 0 study Category D: 2 studies <sup>152,153</sup>	...	No
Enhanced access to opportunities for physical activity and access to healthy food combined with health education	5	Greatest suitability: 3 studies <sup>154-156</sup> Moderate suitability: 1 study <sup>157</sup> Least suitability: 1 study <sup>156,158</sup>	Category A: 0 study Category B: 1 study <sup>156</sup> Category C: 3 studies <sup>154,155,158</sup> Category D: 1 study <sup>157</sup>	...	No
<b>Informational and Educational Strategies</b>					
Small media	6	Greatest suitability: 4 studies <sup>104,131,159,160</sup> Moderate suitability: 1 study <sup>160,161</sup> Least suitability: 1 study <sup>162</sup>	Category A: 1 study <sup>162</sup> Category B: 2 studies <sup>104,161</sup> Category C: 2 studies <sup>131,159</sup> Category D: 1 study <sup>160</sup>	...	No
Exercise prescriptions alone	14	Greatest suitability: 10 studies <sup>25,26,28-32,35,37,38</sup> Moderate suitability: 2 studies <sup>27,36</sup> Least suitability: 2 studies <sup>33,34</sup>	Category A: 5 studies <sup>25,26,28,29,35</sup> Category B: 4 studies <sup>30-33</sup> Category C: 4 studies <sup>27,34,36,38</sup> Category D: 1 study <sup>37</sup>	-2.45% (-3.56% to -1.69%) -4.84 lb (-6.49 to -2.70 lb)	Yes
Nutrition prescription	1	Greatest suitability: 1 study <sup>25</sup>	Category B: 1 study <sup>25</sup>	...	No
Multicomponent educational practices	25	Greatest suitability: 13 studies <sup>39,40,42,44,46-48,50,54,55,59,60,62</sup> Moderate suitability: 4 studies <sup>43,45,52,61</sup> Least suitability: 8 studies <sup>33,41,49,51,53,56,57,59</sup>	Category A: 1 study <sup>39</sup> Category B: 13 studies <sup>33,41,44,46-48,51,53,54,58-60,62</sup> Category C: 10 studies <sup>40,42,43,45,50,52,55-57,61</sup> Category D: 1 study <sup>49</sup>	-2.24% (-3.57% to -0.99%) -5.20 lb (-7.61 to -1.44 lb)	Yes
<b>Behavioral Strategies</b>					
Weight loss competitions and incentives	16	Greatest suitability: 6 studies <sup>63,64,67,68,71,73</sup> Moderate suitability: 2 studies <sup>72,77</sup> Least suitability: 8 studies <sup>65,66,69,70,74-76,78</sup>	Category A: 2 studies <sup>67,71</sup> Category B: 7 studies <sup>54,65,68,69,73,75,78</sup> Category C: 6 studies <sup>63,66,70,72,74,76</sup> Category D: 1 study <sup>77</sup>	-2.66% (-5.34% to -1.22%) -6.51 lb (-10.35 to -3.69 lb)	Yes
Behavioral practices with incentives	17	Greatest suitability: 8 studies <sup>79,80,82,84,85,92,94,95</sup> Moderate suitability: 4 studies <sup>81,83,90,93</sup> Least suitability: 5 studies <sup>86-89,91</sup>	Category A: 1 study <sup>82</sup> Category B: 10 studies <sup>79-81,83,84,87-89,92,95</sup> Category C: 4 studies <sup>85,86,91,94</sup> Category D: 2 studies <sup>90,93</sup>	-3.72% (-4.69% to -1.67%) -6.24 lb (-8.33 to -2.92 lb)	Yes
Behavioral practices without incentives	47	Greatest suitability: 26 studies <sup>48,97,98,101,102,104,106-109,115,117,119,121-123,125-129,131,132,135,137,140</sup> Moderate suitability: 7 studies <sup>100,111,112,114,116,124,138</sup>	Category A: 4 studies <sup>97,108,115,119</sup> Category B: 22 studies <sup>48,98,101,103,104,106,107,109,114,121-128,132-134,137,139</sup>	-2.33% (-6.69% to -0.55%) -5.81 lb (-8.62 to -1.21 lb)	Yes

Table 2, Continued

Practice	No. of Studies	Evidence		Effect Size, median (interquartile range)	Sufficiency of Evidence
		Study Design Suitability*	Quality of Execution†		
		Least suitability: 14 studies <sup>96,99,103,105,110,113,118,120,130,133,134,136,139,141</sup>	Category C: 17 studies <sup>96,99,100,102,105,112,113,116,118,120,129-131,135,138,140,141</sup> Category D: 4 studies <sup>110,111,117,136</sup>		

\* Study design suitability (i.e., is the study design used appropriate for measuring the effectiveness of the strategy?). The studies with greatest suitability limit biases and generally result in greater confidence in the findings: for example, greatest (randomized controlled trials, prospective cohort studies, and other designs with concurrent comparison groups such as time series with comparison group), moderate (all retrospective designs, case-control, and time series), and least (before-and-after studies and no comparison group and cross-sectional studies).

† Based on the quality of execution, studies were classified as A (zero to one limitation), B (two to three limitations), C (four to five limitations), D (six to seven limitations), or F (eight to nine limitations). Studies with F were excluded from this review.

with incentives. Employees created teams that competed to achieve the highest total weight loss. The team that achieved the greatest percentage of their goal received money that was contributed by each participant at the start of the program. Participants were given a weight loss goal (not to exceed 20 lb). Results indicated a mean change of -12.10 lb for participants after the competitions ended.<sup>63</sup>

Based on our criteria in determining a promising practice (Table 1), we identified 16 studies<sup>63-78</sup> that evaluated the effectiveness of competitions and incentives (Table 2). Twelve studies<sup>63-70,74-77</sup> measured weight, with a median effect size of -6.51 lb (IQR, -10.35 to -3.69 lb) (Table 2). Two studies<sup>71,78</sup> measured percentage of body fat with skinfold measurements and reported a median effect size of -1.58%. With two studies<sup>67,71</sup> in the greatest study design suitability and one limitation (Table 7), these studies<sup>63-78</sup> provide sufficient evidence that competitions and incentives in the worksite setting are promising in the prevention and control of obesity as measured by change in weight.

**Promising Practice 5: Behavioral Practices With Incentives.** Behavioral practices teach behavioral management skills, modeling or demonstration, participatory skill development, and individual benchmarking (i.e., goal setting and achievement) and provide feedback and social support for behavioral patterns. Such practices are complemented by in-kind or financial incentives, typically given for participation or completion of the program.

Based on the program description and what was reported by the author, these practices all offered a behavioral component within the intervention and included incentives. Because of the variety of studies and their differences, we came up with the best common theme represented by these studies.

A representative example of this promising practice was done with hospital employees who participated in 10 weekly 30-minute behavioral change sessions offered during the lunch hour. Groups sessions focused on initial weight loss, goal setting, and other topics. Monetary prizes were available at the completion of treatment. Results indicated a mean change of -8.10 lb for participants after the program ended.<sup>79</sup>

Based on our criteria in determining a promising practice (Table 1), we identified 17 studies<sup>79-95</sup> that evaluated the effectiveness of behavioral practices with incentives (Table 2). Fourteen studies<sup>79-82,84-86,88-92,94,95</sup> measured weight, with a median effect size of -6.24 lb (IQR, -8.33 to -2.92 lb) (Table 2). With at least one study<sup>82</sup> in the greatest study design suitability and one limitation (Table 8), these studies<sup>79-95</sup> provide sufficient evidence that behavioral practices with incentives are promising in the worksite setting for the prevention and control of obesity as measured by change in weight.

**Promising Practice 6: Behavioral Practices Without Incentives.** These programs teach participants specific behavioral skills that enable them to incorporate physical activity and improve their

nutrition through modeling or demonstration, participatory skill development, individual benchmarking (i.e., goal setting and achievement), feedback, and building social support for behavioral patterns. These programs did not offer incentives. The typical behavioral practice consisted of one-on-one or group consultations with personalized goals or plan of action to improve employees' nutrition, increase their physical activity, or help them lose weight.

Based on the program description and what was reported by the author, these practices all offered a behavioral component within the intervention and did not include incentives. Because of the variety of studies and their differences, we came up with the best common theme represented by these studies.

A representative example of this promising practice was done in a building maintenance company, where employees were offered lectures, practical training, individual counseling, group discussion, and self-education sessions on nutrition and physical activity. Individual goals were set, and follow-up self-evaluation with input by supervisor and spouse or family was offered. Results indicated a mean change of -3.30 lb for participants after the program ended.<sup>121</sup>

Based on our criteria in determining a promising practice (Table 1), we identified 47 studies<sup>48,96-141</sup> that evaluated the effectiveness of behavioral practices without incentives (Table 2). Thirty-four studies<sup>48,97-101,103,105-108,111,113,114,116,118,119-121,123-127,129,130,133-136,137,139-141</sup> measured weight, with a median effect size of -5.81 lb (IQR,

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**Table 3**  
**Applicability of Promising Practices to Prevent and Control Obesity in the Worksite, Literature Review, January 1, 1966, Through December 31, 2005\***

Promising Practice	Industry†	Country	Sex	Duration	Retention Rate
<b>Environmental and Policy Strategies</b>					
Enhanced access to opportunities for physical activity combined with health education	Companies <sup>21-23</sup>	United States <sup>20-24</sup>	Men <sup>20</sup>	<6 mo <sup>20</sup>	<50% <sup>24</sup>
	School <sup>20</sup> Health care <sup>24</sup>		Both <sup>21-24</sup>	6-12 mo <sup>21-24</sup>	>50% <sup>20,22</sup> Unknown <sup>21,23</sup>
<b>Informational and Educational Strategies</b>					
Exercise prescriptions alone	Companies <sup>27,32</sup>	United States <sup>26,27,32,33,35,36,37</sup>	Men <sup>25,26,28,29,31,34,36,37</sup>	<6 mo <sup>26,27,29,31,33,34,37</sup>	<50% <sup>33,36</sup>
	Health care <sup>29,30,33</sup> Government <sup>26,31,34,37</sup> Unknown <sup>25,28,35,36,38</sup>	Canada <sup>34,38</sup> Sweden <sup>30</sup> United Kingdom <sup>29</sup> Japan <sup>28</sup> Australia <sup>25</sup> Unknown <sup>31</sup>	Women <sup>27,30,33</sup> Both <sup>27,35</sup>	6-12 mo <sup>25,27,28,30,35,36</sup>	>50% <sup>25,26,28,29,30,31,34-37</sup> Unknown <sup>27</sup>
Multicomponent educational practices	Companies <sup>41,48,54,57,59</sup>	United States <sup>33,40,41,43,47,48,51-54,56,59,61,62</sup>	Men <sup>44</sup>	<6 mo <sup>33,41,44,45,47,51,54,55,57,59</sup>	<50% <sup>33,39,51,52,56,59,62</sup>
	Health care <sup>33,39,42,56</sup> Government <sup>43,45,47,53</sup> School <sup>55</sup> Unknown <sup>40,44,46,49-52,58,60-62</sup>	Finland <sup>39,60</sup> United Kingdom <sup>45</sup> Belgium <sup>44</sup> Denmark <sup>58</sup> Australia <sup>42,46</sup> India <sup>50</sup> Unknown <sup>49,55,57</sup>	Women <sup>33,39</sup> Both <sup>40-43,46-55,57-61</sup> Unknown <sup>45,56,62</sup>	6-12 mo <sup>40,42,43,46,50,52,53,58</sup> >12 mo <sup>39,48,49,56,60-62</sup>	>50% <sup>40-46,48-50,54,55,57,58,60</sup> Unknown <sup>47,53,61</sup>
<b>Behavioral Strategies</b>					
Weight loss competitions and incentives	Companies <sup>63,64,66,67,69,71,75</sup>	United States <sup>63,65-75,77,78</sup>	Women <sup>69</sup>	<6 mo <sup>63-65,67,69,70,74,75,77,78</sup>	<50% <sup>66,67,72</sup>
	Health care <sup>65,74,77</sup> Government <sup>72,76</sup> School <sup>68,70,78</sup> Unknown <sup>73</sup>	Canada <sup>76</sup> Unknown <sup>64</sup>	Both <sup>63,64,66-68,70-73,75,76,78</sup> Unknown <sup>65,74,77</sup>	6-12 mo <sup>66,68,71,73,76</sup> >12 <sup>72</sup>	>50% <sup>63-65,68-70,73-75,77,78</sup> Unknown <sup>71,76</sup>
Behavioral practices with incentives	Companies <sup>81,82,87-90,92</sup>	United States <sup>79-85,87-91,93-95</sup>	Women <sup>89</sup>	<6 mo <sup>79,80,86,88,91,95</sup>	<50% <sup>80,83,91,94</sup>
	Health care <sup>79,80,93,95</sup> Government <sup>91</sup> School <sup>84,85,94</sup> Unknown <sup>83,86</sup>		Finland <sup>92</sup> Unknown <sup>86</sup>	Both <sup>79-95</sup>	6-12 mo <sup>81,82,84,85,89,92,94</sup> >12 mo <sup>83,87,90,93</sup>
Behavioral practices without incentives	Companies <sup>48,96,102,111-113,115,116,121,123-125,127,131,132,134-137,140,141</sup>	United States <sup>48,96-102,105,106,109,113,114,116,118,120,126,127,129-131,133-141</sup>	Men <sup>97,107-109,115,118,121,123-125</sup>	<6 mo <sup>98,103,105,107,111,116,118-120,126,127,129,130,135-137,139-141</sup>	<50% <sup>96,101,104,113,114,118,120,127</sup>
	Health care <sup>104,120</sup> Government <sup>100,103,107-109,118,122,126,128,129,133,138</sup> School <sup>98,99,106,114,139</sup> Unknown <sup>97,101,105,117,119,130</sup>	Canada <sup>103</sup> England <sup>104</sup> Mediterranean Sea and Persian Gulf <sup>107</sup> Scotland <sup>108</sup> Japan <sup>112,121,124,125,132</sup> Sweden <sup>115,117,122</sup> Australia <sup>119</sup> Netherlands <sup>128</sup> Denmark <sup>123</sup> Unknown <sup>111</sup>	Women <sup>101,133,136,139</sup> Both <sup>48,96,98-100,102-106,111,112,114,116,117,119,120,122,126-128,130-132,134,135,137,138,140</sup> Unknown <sup>129,113,141</sup>	6-12 mo <sup>48,96,97,99-102,104,106,108,109,113,114,123,125,128,133,138</sup> >12 mo <sup>48,112,115,117,121,122,124,131,132,134</sup>	>50% <sup>48,97-100,102,103,105-109,115,116,119,121-126,128,131-134,137,138,140</sup> Unknown <sup>111,112,117,129,130,135,136,139,141</sup>

\* Employees were either white or blue collar and aged 18 to 65 years.

† Subcategories of industries were based on the U.S. Department of Labor industry sectors. Companies indicate a worksite at a company or corporation that was not affiliated with government or education or was unspecified (can include but is not limited to manufacturing, insurance, or transportation companies); School, worksite at an institution of education (i.e., public and private schools, colleges, or universities); Government, worksite affiliated with local, state, or federal government (can include but is not limited to public service agencies, police, firefighters, military, etc.); Health care, public or private hospitals, home care, medical services; and Unknown, information was not provided in the article reviewed.

**Table 4**  
**Promising Practice 1: Enhanced Access to Opportunities for Physical Activity Combined With Health Education (5 Studies)**

Quality of Execution	Study Design Suitability		
	Greatest	Moderate	Least
A 0–1 Limitation	King et al., <sup>20</sup> 1988	...	...
B 2–3 Limitations	...	...	...
C 4–5 Limitations	...	Elberson et al., <sup>23</sup> 2001	Bowne et al., <sup>21</sup> 1984; Corry, <sup>22</sup> 1990; Harvey, <sup>24</sup> 1998
D 6–7 Limitations	...	...	...
F 8–9 Limitations	...	...	...

**Table 5**  
**Promising Practice 2: Exercise Prescriptions Alone (14 Studies)**

Quality of Execution Limitation	Study Design Suitability		
	Greatest	Moderate	Least
A 0–1 Limitation	Fukahori et al., <sup>28</sup> 1999; Adams et al., <sup>26</sup> 1986; Gamble et al., <sup>29</sup> 1993; Juneau et al., <sup>35</sup> 1987; Pritchard et al., <sup>25</sup> 2002	...	...
B 2–3 Limitations	Gettman et al., <sup>31</sup> 1983; Gerdle et al., <sup>30</sup> 1995; Heath and Broadhurst, <sup>33</sup> 1984; Grandjean et al., <sup>32</sup> 1996	...	...
C 4–5 Limitations	Rhodes and Dunwoody, <sup>38</sup> 1980	Leaf et al., <sup>36</sup> 1997; Bobalik et al., <sup>27</sup> 1986	Jette and Sidney, <sup>34</sup> 1991
D 6–7 Limitations	Puterbaugh and Lawyer, <sup>37</sup> 1983	...	...
F 8–9 Limitations	...	...	...

–8.62 to –1.21 lb) (Table 2). Seven studies<sup>109,112,115,117,122,128,132</sup> reported a BMI change, with a median effect size of –0.24 kg/m<sup>2</sup> (IQR, –.52 to .05 kg/m<sup>2</sup>). With at least four studies<sup>97,108,115,119</sup> in the greatest study design suitability and one limitation (Table 9), these studies<sup>48,96–141</sup> provide sufficient evidence that behavioral

practices without incentives are promising in the worksite setting for the prevention and control of obesity as measured by change in weight.

We found that use of behavioral practices with or without incentives is promising, and employees may consider them when developing programs to encourage weight loss or to prevent

obesity among workers, retirees, and their dependents. Many structured formal weight loss programs<sup>142–144</sup> have reported that financial incentives can motivate people to adopt new behaviors. As reported by Kane et al.,<sup>145</sup> incentives seem to work in the short term for simple well-defined behavioral goals such as immunization. Less evi-

**Table 6**  
**Promising Practice 3: Multicomponent Educational Practices (25 Studies)**

Quality of Execution Limitation	Study Design Suitability		
	Greatest	Moderate	Least
A 0–1 Limitation	Pohjonen and Ranta, <sup>39</sup> 2001	...	...
B 2–3 Limitations	Harrell et al., <sup>47</sup> 1996; Heirich et al., <sup>48</sup> 1993; Siggaard et al., <sup>58</sup> 1996; Aldana et al., <sup>54</sup> 2002; Gomel et al., <sup>46</sup> 1993; Heath and Broadhurst, <sup>33</sup> 1984; Wier et al., <sup>62</sup> 1989; Braeckman et al., <sup>44</sup> 1999; Talvi et al., <sup>60</sup> 1999	...	Anderson and Anderson, <sup>41</sup> 1994; Masur-Levy et al., <sup>51</sup> 1990; Perovich and Sandoval, <sup>53</sup> 1995; Sumner et al. <sup>59</sup> 1986
C 4–5 Limitations	Anderson and Dusenbury, <sup>40</sup> 1999; Robbins et al., <sup>55</sup> 1987; Krishnan et al., <sup>50</sup> 2004; Barratt et al., <sup>42</sup> 1994	Brodie and Dugdill, <sup>45</sup> 1993; Bjurstrom and Alexiou, <sup>43</sup> 1978; Perkins et al., <sup>52</sup> 2004; Wier et al., <sup>61</sup> 2001	Shannon et al., <sup>57</sup> 1987; Sangor and Bichanich, <sup>56</sup> 1977
D 6–7 Limitations	...	...	Hoiberg et al., <sup>49</sup> 1984
F 8–9 Limitations	...	...	...

**Table 7**  
**Promising Practice 4: Weight Loss Competitions and Incentives (16 Studies)**

Quality of Execution Limitation	Study Design Suitability		
	Greatest	Moderate	Least
A 0–1 Limitation	Dennison et al., <sup>67</sup> 1996; Oden et al., <sup>71</sup> 1989	...	...
B 2–3 Limitations	Cohen et al., <sup>64</sup> 1987; Forster et al., <sup>68</sup> 1985; Schmitz et al., <sup>73</sup> 1997	...	Collins et al., <sup>65</sup> 1986; Yang et al., <sup>78</sup> 1988; Seidman et al., <sup>75</sup> 1984; Marks and Rippe, <sup>69</sup> 1997
C 4–5 Limitations	Brownell et al., <sup>63</sup> 1984	Poole et al., <sup>72</sup> 2001	Cox, <sup>66</sup> 1997; Shore et al., <sup>76</sup> 1989; Nelson et al., <sup>70</sup> 1987; Schumacher et al., <sup>74</sup> 1979
D 6–7 Limitations	...	Worick and Petersons, <sup>77</sup> 1993	...
F 8–9 Limitations	...	...	...

dence exists that incentives can sustain the long-term lifestyles changes (such as maintaining weight loss) required for health promotion.

## DISCUSSION

The purpose of this review was to systematically explore specific strategies and practices for promoting employee weight loss that show promise in the workplace. Previous reviews<sup>7–11</sup> examined worksite interventions that mostly represent RCTs assessing worksite nutrition or physical activity programs. Our review adds a level of specificity to the existing literature<sup>8–11</sup> and the *Community Guide* worksite recommendation<sup>7</sup> by examining interventions by environmental and policy, health education, and behavioral strategies. This resulted in six promising practices that organizations can consider implementing in their worksites. Our review included studies with weight out-

comes and a broadened method to include before-and-after studies. We recognize these as having less suitable study designs and lower quality of execution, but they may allow for future innovation and research to move the field of worksite obesity prevention forward.

Given our criteria (developed a priori) and the magnitude of change in weight-related outcomes, we concluded that these practices are promising in the worksite setting for the prevention and control of obesity. We are unable to identify the strength of evidence of effectiveness for one promising practice over another because of the heterogeneity between studies (weight outcome and design) and the number of studies available within each strategy. These practices should be tested by worksites and warrant further evaluation by the research community.

Our review has some inherent limitations, which include broadening the

method to include less suitable designs and lower quality of execution that may probe for further testing of worksite practices. Additionally, we are unable to determine if weight loss is sustained because of the inclusion of studies that have shorter durations. The level of evidence differs from that used for the *Community Guide*.<sup>7</sup> We included studies with more than five limitations (i.e., with lesser quality of execution). We identified few studies that evaluated environmental, policy, or media strategies. Such strategies often used a population-based approach that did not allow calculation of an average weight loss. Exclusion of such studies may have resulted in an underreporting bias. The reach of our included studies was difficult to evaluate because the intended audience and the participation and retention rates were not always reported. Furthermore, study population characteristics such as age, sex, race/ethnicity, socio-

**Table 8**  
**Promising Practice 5: Behavioral Practices With Incentives (17 Studies)**

Quality of Execution Limitation	Study Design Suitability		
	Greatest	Moderate	Least
A 0–1 Limitation	Aldana et al., <sup>82</sup> 2005	...	...
B 2–3 Limitations	Anderson et al., <sup>84</sup> 1993; Rozensky and Bellack, <sup>95</sup> 1976; Abrams and Follick, <sup>80</sup> 1983; Mattila et al., <sup>92</sup> 2004; Prochaska et al., <sup>79</sup> 1992	Aldana et al., <sup>83</sup> 1993; Aldana et al., <sup>81</sup> 2005	Goetzel et al., <sup>87</sup> 2002; Jeffery et al., <sup>89</sup> 1989; Henritze et al., <sup>88</sup> 1992
C 4–5 Limitations	Robison et al., <sup>94</sup> 1992; DeLucia et al., <sup>85</sup> 1989	...	Markenson and Schiff, <sup>91</sup> 1988; Dennison et al., <sup>86</sup> 1990
D 6–7 Limitations	...	Kneip et al., <sup>90</sup> 1985; Pescatello et al., <sup>93</sup> 2001	...
F 8–9 Limitations	...	...	...

**Table 9**  
**Promising Practice 6: Behavioral Practices Without Incentives (47 Studies)**

Quality of Execution Limitation	Study Design Suitability		
	Greatest	Moderate	Least
A 0–1 Limitation	Baer, <sup>97</sup> 1993; Hedberg et al., <sup>115</sup> 1998; Lovibond et al., <sup>119</sup> 1986; Drummond and Kirk, <sup>108</sup> 1998	...	...
B 2–3 Limitations	Brownell et al., <sup>101</sup> 1985; Cockcroft et al., <sup>104</sup> 1994; Crouch et al., <sup>106</sup> 1986; Elliot et al., <sup>109</sup> 2004; Nilsson et al., <sup>122</sup> 2001; Nisbeth et al., <sup>123</sup> 2000; Okayama et al., <sup>125</sup> 2004; Pavlou et al., <sup>126</sup> 1989; Proper et al., <sup>128</sup> 2003; Blair et al., <sup>98</sup> 1984; Dennis et al., <sup>107</sup> 1999; Muto and Yamauchi, <sup>121</sup> 2001; Peterson et al., <sup>127</sup> 1985; Heirich et al., <sup>48</sup> 1993; Shimizu et al., <sup>132</sup> 2004; Stunkard et al., <sup>137</sup> 1989	Okada, <sup>124</sup> 1991; Haus et al., <sup>114</sup> 1994	Stamler et al., <sup>134</sup> 1989; Chan et al., <sup>103</sup> 2004; Simpson et al., <sup>133</sup> 2004; White and Ransdell, <sup>139</sup> 2003
C 4–5 Limitations	Zandee and Oermann, <sup>140</sup> 1996; Bruno et al., <sup>102</sup> 1983; Reppart and Shaw, <sup>129</sup> 1978; Steinhardt et al., <sup>135</sup> 1999; Shi, <sup>131</sup> 1992	Briley et al., <sup>100</sup> 1992; Hermann-Nickell and Baker, <sup>116</sup> 1989; Furuki et al., <sup>112</sup> 1999; Trent and Stevens, <sup>138</sup> 1995	Aldana et al., <sup>96</sup> 1994; Blair et al., <sup>99</sup> 1986; Colvin, <sup>105</sup> 1979; Grove et al., <sup>113</sup> 1979; Kelly, <sup>118</sup> 1979; Loper, and Barrows, <sup>141</sup> 1985; Miller and Edelman, <sup>120</sup> 1990; Schaefer and Anderson, <sup>130</sup> 1998
D 6–7 Limitations	Karlehagen and Ohlson, <sup>117</sup> 2003	Frankle et al., <sup>111</sup> 1986	Stunkard and Brownell, <sup>136</sup> 1980; Erfurt and Holtyn, <sup>110</sup> 1991
F 8–9 Limitations	...	...	...

economic status, risk, and other health-status information were not always reported. Therefore, determining whether one approach was best suited for particular subgroups of employees was not possible.

Given the diversity of worksite types, workforce sizes, and employees included in this review, these promising practices are applicable to a variety of worksites and employees. Programs must be designed to meet employee needs and preferences.<sup>146</sup> Implementation of effective weight loss programs may also decrease health care costs associated with obesity and its comorbidities,<sup>147</sup> reduce absenteeism,<sup>5</sup> increase productivity,<sup>148</sup> and over time result in a positive return on investment.

On the basis of the promising practices and the *Community Guide* worksite obesity recommendation,<sup>7</sup> the CDC developed a free interactive Web site to help organizations design and implement effective obesity prevention and control programs. The Web site, branded “CDC’s LEAN Works! Leading Employees to Activity and Nutrition” ([www.cdc.gov/LEANWorks](http://www.cdc.gov/LEANWorks)), provides detailed information on how to plan, build, promote, and assess worksite obesity prevention and control programs.

### SO WHAT? Implications for Health Promotion Practitioners and Researchers

#### What is already known on this topic?

Numerous studies have shown that reducing the prevalence of overweight and obesity can improve employee health and lead to health savings for employers. Previous workplace reviews looked at study effects, mostly from randomized control trials, that are often too small a number of studies to provide specific information on implementing worksite interventions for the prevention and control of obesity.

#### What does this article add?

Our systematic review extends the current literature by looking at before and after studies that may have less suitable designs, but will allow us to explore a wider range of novel approaches worksites can potentially implement given their various demographics.

#### What are the implications for health promotion practice or research?

Combined with other research, this review highlights emerging interventions that have preliminary evidence of effectiveness that war-

rant further adoption and evaluation by the research community. This supports previous reviews that examine the effectiveness of nutrition and physical interventions to reduce weight among employees in the worksite setting.

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**Appendix  
English-Language Search Terms**

Absenteeism	Benefit	Body mass index
Access	Businesses	Cafeteria(s)
After work extension of food service	Cardiovascular diseases	Care
Behavior	Convenience	Corporate culture
Break room or breakroom	Cost reduction	Didactic instruction
Cardiovascular	Dietary behaviors	Dietary choice(s)
Cholesterol	Employee turnover and morale	Employee(s)
Cost	Environment intervention(s)	Exercise
Diet	Exercise facilities	Exercise facility or facilities
Effectiveness	Fitness center(s)	Food services
Employer(s)	Gym membership(s)	Health
Exercise break(s)	Health care	Health cost
Fitness	Health education	Health food
Fruit juice(s)	Health promotion	Health promotion
Health behavior	Health risk appraisal (assessment) (HRA)	Healthy choices
Health economics	Healthy snack(s)	Hyperlipidemia
Health planning	Incentive	Insurance
Health promotion and environment	Intervention studies	Lactation support or breastfeeding support
Healthy food	Management	Nutrition
Hypertension	Nutritional information	Obesity
Intervention or interventions	Occupational health service(s)/ or occupational health	Offsite/onsite facilities
Lifestyle	Parking	Percent body fat
Nutrition policy or policies	Physical activity or motor activity	Physical fitness
Obesity or obese	Presenteeism	Prevention
Overweight	Productivity	Program evaluation
Physical activity	Provision of information	Reimbursement
Physical fitness or exercise	Risk	Risk management
Primary prevention	Staircase(s)	Stairwell(s)
Promotion	Trial	Upper management
Return on investment (ROI)	Waist circumference	Waist-to-hip ratio
Risk reduction behavior	Walking path(s)	Weight
Telemedicine	Weight loss	Wellness program
Vending machine(s)	Workplace/ or worksite	Worksite
Walkability	Worksite health promotion	
Weight control		
Workforce		
Worksite compensation		

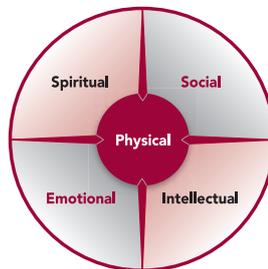
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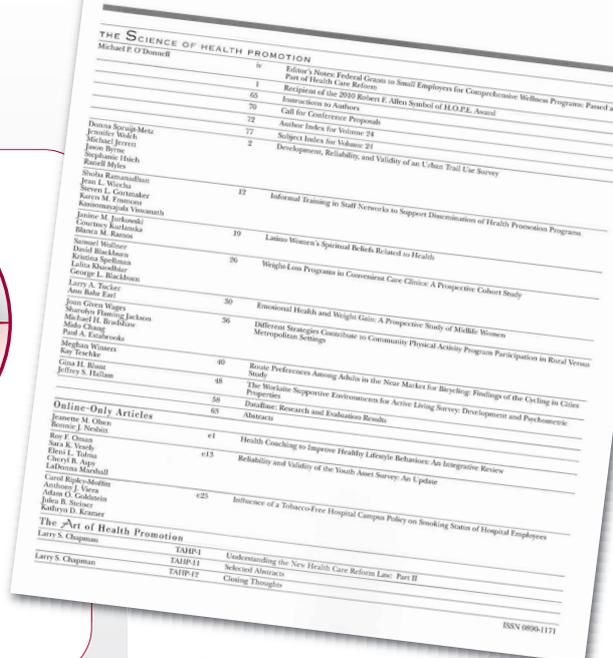
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“Health Promotion is the art and science of helping people discover the synergies between their core passions and optimal health, enhancing their motivation to strive for optimal health, and supporting them in changing their lifestyle to move toward a state of optimal health. Optimal health is a dynamic balance of physical, emotional, social, spiritual, and intellectual health. Lifestyle change can be facilitated through a combination of learning experiences that enhance awareness, increase motivation, and build skills and, most important, through the creation of opportunities that open access to environments that make positive health practices the easiest choice.”



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