

# What Do Physicians Recommend To Their Overweight and Obese Patients?

Suzanne Phelan, PhD, California Polytechnic State University

Mithun Nallari, MD, Montefiore Hospital, Bronx, NY

Francine E. Darroch, MA, Brown Medical School and The Miriam Hospital, Providence, RI

Rena R. Wing, PhD, Brown Medical School and The Miriam Hospital, Providence, RI

## Abstract

**Background:** It is recognized that physicians play an important role in responding to the nation's obesity epidemic. Little is known, however, about what physicians say to their obese patients to help them lose weight.

**Objective:** This cross-sectional survey examined weight loss recommendations of family physicians and internists. Surveys were mailed to 188 physicians and 54% (n = 101) responded. The survey assessed physicians' weight loss recommendations, the basis for recommendations, and their expected weight loss outcomes for a hypothetical patient. Physicians rated the extent to which they recommended various weight control strategies to their obese patients. They also rated the extent to which clinical experience, personal experience, and the medical literature were important in formulating their recommendations.

**Results:** The most common strategies recommended were increasing physical activity, reducing consumption of fast foods, reducing portion sizes, and reducing soda consumption. Physicians were less likely to recommend regular self-weighing, recording food intake, and decreasing television viewing. Meal replacements and weight loss medications were rarely advised. Physicians reported that they based their weight loss recommendations more on clinical experience than on the medical literature or personal experience; these latter 2 were rated as equally important. Physicians reported that, from their perspective, the equivalent of a 21.5% weight loss would be an "acceptable" outcome for a hypothetical obese patient; a 10.6% weight loss "disappointing."

**Conclusions:** Physicians, like patients, need to be educated about the benefits of modest weight loss and the weight loss strategies empirically proven to be most effective, including self-monitoring. Further research is needed to understand the barriers to recommending and implementing these effective strategies.

Approximately 65% of Americans are either overweight or obese. Strong evidence links obesity to increased morbidity and mortality.<sup>1,2</sup> Fortunately, modest weight loss has been shown to improve many risk factors for cardiovascular, pulmonary, and cancer conditions.<sup>1-4</sup>

Physicians see an estimated 25% of the US population every month,<sup>5</sup> and overweight patients represent approximately 60% of this patient population.<sup>6</sup> Patients who report receiving physician counseling about weight loss are up to 2 times more likely to report that they are currently trying to lose weight.<sup>7,8</sup> However, only 29% to 42% of overweight and obese patients report that they had been counseled by their physicians to lose weight.<sup>7,9</sup> Similarly, obesity-related counseling is included in approximately 20% to 36% of visits with primary care physicians.<sup>10,11</sup> Limited weight loss counseling may reflect the many barriers physicians face, including limited time, lack of reimbursement, limited training, and perceived lack of interest on the part of their patients.<sup>12</sup> Nonetheless, many overweight and obese patients report that they want more intensive weight loss treatment than what their physicians provide.<sup>13</sup>

A number of scientific bodies have published treatment recommendations based on systematic reviews of the literature that could be used by physicians.<sup>2,4,14</sup> However, little is known about what physicians currently say to their obese patients to help them lose weight. Wadden and colleagues<sup>15</sup> surveyed 259 treatment-seeking obese patients about their physicians' recommendations; almost half (44.8%) indicated that their physician had not prescribed any of 10 common weight control methods. Nearly one fourth (23.2%) of the physicians were reported (by respondents) to have prescribed a diet plan, with a commercial weight loss program, medication, readings, and exercise being the 4 next most commonly prescribed interventions. Price et al<sup>16</sup> surveyed 318 family physicians and reported that the most commonly recommended weight loss techniques were decreasing caloric consumption (92%), participating in Weight Watchers (84%), consulting a dietitian/nutritionist (76%), and aerobic exercise (75%). These reports, however, did not provide a full picture of physicians' recommendations or the basis on which their recommendations rested.

The purpose of this study was to comprehensively assess lifestyle recommendations for weight control in a group of family physicians and internal medicine physicians. We wanted to better understand the behavioral strategies the physicians recommended to their patients and the extent to which they based their recommendations on clinical experience, personal experience, or the medical literature. We also collected data about physicians' expectations about obesity treatment outcomes.

## **Participants and Methods**

### **Participant Characteristics**

Surveys were sent to 188 physicians from a mailing list of physicians practicing in the New England area and assembled by Rhode Island Hospital. Surveys that were not returned within 1 month of the initial mailing were re-sent 2 additional times over a subsequent 2-month period. Of the 188 surveys sent out, 101 were returned, resulting in a 54% response rate. Characteristics of the physicians are displayed in Table 1. Overall, most (64.3%) of physicians were 41 to 60 years and 69.4% were male; 81.4% were normal weight and 67.3% reported engaging in >150 minutes of physical activity per week. Most (47.4%) were family physicians (Table 1). Payment for participation was not provided, and this study was approved the Miriam Hospital's Institutional Review Board (Providence, RI).

### **Survey**

Basic demographic information about the physicians was collected. Physicians were also asked to indicate how many patients in their practice (as a percentage of all their patients) were overweight or obese. They also indicated the frequency with which they addressed weight control issues with these patients using a Likert scale (where 1 = never, 4 = sometimes, and 7 = always). We assessed use of lifestyle recommendations by asking physicians to rate, on a Likert scale (where 1 = never and 7 = always), the

frequency with which they instructed their overweight/obese patients to follow each of 25 different weight loss strategies commonly used in obesity treatment studies. (The specific strategies are listed in Results, Table 2.)

Physicians were also asked on what basis they selected the strategies they recommended to their patients, including (1) clinical experience; (2) personal experience; and (3) the medical literature. Examples were provided to define the 3 domains. For clinical experience the example was, "You have seen other patients successful with particular methods, and therefore advise other patients to try similar techniques." For personal experience the example was, "You have personally had success with specific diet and exercise strategies and so recommend similar strategies to your patients." For medical literature the example was, "You have read about successful dietary changes in the medical literature and tailor your recommendations accordingly." Physicians were asked to rate each category using a Likert scale, where 1 = of minimal importance, 4 = of moderate importance, and 7 = of great importance, in the selection of recommendations for weight control.

To determine attitudes regarding various weight loss outcomes, 4 questions were presented based on a hypothetical obese patient. Specifically, physicians were asked to "consider the following case: You have a patient who you've been seeing for more than 2 years. She is 5'6", has always weighed around 220 pounds, and has no medical complications." Physicians were then asked to provide a weight (in pounds) that, after treatment, would represent a dream weight, a happy weight, an acceptable weight, and a disappointed weight.<sup>17,18</sup> From these weights, we computed weight loss and percentage of weight loss from initial weight (220 pounds).

### **Statistical Analysis**

All statistical analyses were done using SPSS software, version 13.0 (SPSS Inc., Chicago, IL). Each item of the survey was analyzed using descriptive statistics including the mean, standard deviation, and frequency distributions. Independent t tests and analysis of variance were used to examine differences in weight loss outcomes and strategies based on physicians' age, gender, body weight, or field (ie, family vs internal medicine). Paired t tests were used to examine differences in ratings of strategies.

## **Results**

### **Lifestyle Recommendations**

Physicians reported that approximately  $52.3\% \pm 17.9\%$  of their patients were overweight or obese. The majority of physicians (75.5%) reported "always" or "nearly always" addressing weight control issues with their overweight and obese patients. Physicians who reported engaging in  $\geq 150$  minutes of physical activity per week were more likely to report addressing weight control issues with their overweight or obese patients than those who reported less physical activity ( $P = .001$ ; Table 2). Physicians who were  $>60$  years old were also more likely to address weight control issues than physicians who were 60 or younger ( $P = .03$ ). There were no differences in reports of addressing weight control issues based on gender or the physicians' history of diabetes or heart disease (Table 2).

The weight loss strategies that physicians reported are listed in Table 2 from the highest to lowest in frequency. The most common strategies recommended were increasing physical activity, reducing consumption of fast foods, reducing portion sizes, and reducing soda consumption. Physicians only "sometimes" recommended regular self-weighing, recording food intake, and decreasing television viewing, or referral to a nutritionist or commercial weight loss program. Meal replacements, Internet resources, and weight loss medications were rarely advised.

We also examined whether recommendations differed depending on physician characteristics (data not shown). Using the univariate  $P < .05$  criterion, female physicians were more likely than male physicians

to recommend decreasing television viewing, specific locations for engaging in physical activity, referral to a dietitian for individual counseling, and recording food intake in a diary; men were more likely to recommend eating a low carbohydrate diet. Physicians older than 60 were more likely than younger physicians to recommend use of a low carbohydrate diet and regular self-weighing; no other significant age differences were observed. Normal-weight physicians were more likely to advise a specific calorie goal than overweight physicians but did not significantly differ in any of the other recommendations. High exercisers ( $\geq 150$  minutes/week) were more likely than low exercisers ( $< 150$  minutes/week) to recommend following a specific diet (ie, low carbohydrate diet, a Mediterranean diet); regular self-weighing; increasing physical activity and specific locations for physical activity; and breakfast consumption.

Physicians were also asked on what basis they selected the weight loss strategies that they recommended to their patients. Clinical experience was given significantly more weight than personal experience ( $5.3 \pm 1.3$  vs  $4.5 \pm 1.4$ ;  $P = .001$ ) or the medical literature ( $5.3 \pm 1.3$  vs  $4.7 \pm 1.4$ ;  $P = .0001$ ) on a scale where 1 = minimal importance and 7 = great importance. No statistically significant differences were found between basing recommendations on personal experience versus the medical literature ( $P = .39$ ).

### **Weight Loss Outcomes**

When asked about weight loss outcomes for a hypothetical overweight patient, physicians reported that, from their perspective, the equivalent of a 37.5% weight loss would be a "dream" outcome for the patient, a 27.0% weight loss a "happy" outcome, a 21.5% weight loss an "acceptable" outcome, and a 10.6% weight loss a "disappointing" outcome. These weight losses represented body mass indices of 22.5, 25.9, 27.9, and 31.8 kg/m<sup>2</sup> for a "dream," "happy," "acceptable," and "disappointing" outcomes, respectively. Thirty percent ( $n = 29$ ) of physicians reported that a weight loss between 5% and 10% would be a "disappointing" outcome and 10.3% ( $n = 10$ ) reported that a 5% to 10% weight loss would be an "acceptable" outcome. We also examined whether outcomes differed as a function of field of medicine (ie, family vs internal medicine). Compared with family physicians internists reported higher "acceptable" percent weight losses ( $24.1\% \pm 7.3\%$  vs  $19.6\% \pm 9.1\%$ ;  $P = .01$ ) and "disappointing" weight losses ( $13.4\% \pm 9.4\%$  vs  $8.2\% \pm 7.2\%$ ;  $P = .007$ ) but no differences in dream or happy outcomes. There were also no significant differences in weight loss outcomes based on physicians' gender or body weight.

### **Discussion**

This study was one of the first to comprehensively evaluate the specific behavioral strategies that physicians recommend to their overweight patients to lose weight. Physicians' recommendations included important physical activity and dietary strategies and targeted 3 major culprits in the obesity epidemic (ie, fast food, soft drinks, and portion sizes)<sup>19</sup> but neglected some other strategies shown empirically to be effective for weight control (eg, self-monitoring and meal replacements). The most common recommendation physicians reported was to increase physical activity. Physical activity is critical for promoting weight loss maintenance<sup>20,21</sup> and may be an appealing strategy for physicians to prescribe because it has important cardiovascular and metabolic benefits. However, exercise alone is not the most effective approach of promoting weight loss.<sup>22</sup> Self-weighing and self-monitoring were only "sometimes" recommended, yet these are among the few known predictors of weight loss success.<sup>23,24</sup> Similarly, meal replacements were rarely recommended but have been shown to produce long-term successful weight control in both research<sup>25</sup> and primary care<sup>26</sup> settings.

Interestingly, referrals to commercial weight loss programs were only "sometimes" recommended in the current study, which was in contrast with an earlier study.<sup>16</sup> Given the importance of maintaining ongoing contact with patients to promote both weight loss and maintenance,<sup>27</sup> referral to other physicians such as registered dietitians, nurses, and behavior therapists with expertise in obesity treatment may be an important tool at the disposal of physicians who themselves may be unable to provide frequent contact, but more research is needed.<sup>12</sup> Although commercial weight loss programs are generally understudied, some long-term data suggest that modest weight loss (4 kg) can be achieved and maintained over 2

years.<sup>28</sup> Physicians reported almost never recommending weight loss medications or Internet sources for weight loss. The effects of community-based Internet programs are modest at best,<sup>29</sup> but medications approved for obesity treatment (sibutramine and orlistat) can help promote long-term weight control.<sup>30</sup>

It is important to note, however, that the patients who volunteer to participate in weight control research studies may be different from those seen in physicians practices. Translating research findings into practice remains a challenge.<sup>31-33</sup> In practice, financial barriers may prohibit patients from being able to afford, for example, the cost of a scale, meal replacements, Internet access, or extra copayments for visits that are not covered by insurance. Although commercial programs have scholarships available to assist low-income patients, follow-up rates for physician referrals to these programs are unknown. Moreover, adherence to recommended strategies among diverse patient populations remains understudied. Future research should focus on identifying the reasons why some effective weight control strategies are not more typically recommended to overweight/obese patients, including the role of patient adherence, financial barriers, limited physician time, and lack of payment by most health-insurance and managed care plans.<sup>12, 34</sup>

We found that a high percentage (75.5%) of physicians reported addressing weight control issues with their overweight and obese patients—a finding in contrast with some patient-based<sup>15, 35, 36</sup> and national surveys.<sup>37, 38</sup> Differences between physician reports in our study and other research may reflect positive changes in physician practices over time or, alternatively, differences in the populations studied, reporting biases, poor recall, communication gaps in patient-physician interactions, or how "addressing" weight control issues was defined.

In selecting strategies to recommend to patients, physicians reported that their clinical experience was more important than the medical literature, which was rated as important as personal experience. Using successful experiences from patients to advise other patients may help to identify the most effective strategies for a physician's specific patient population. Moreover, lack of knowledge about weight control counseling and dietary issues has been cited by physicians as a barrier to addressing dietary issues with obese patients<sup>35, 39</sup> and may lead physicians to rely more on clinical and personal experiences to help inform their weight loss recommendations. Greater training in obesity treatment strategies during medical school and residency has been related to higher rates of discussing diet and exercise with obese patients.<sup>40</sup> Future research should investigate ways to keep physicians informed of the latest weight control research findings and identify barriers that keep physicians from incorporating research findings into their practice.

In this study, physicians who exercised were more likely to address weight control issues and advise physical activity and other strategies. Other reports have similarly found that physicians who exercised more<sup>34</sup> or who watched their own diets<sup>40</sup> were more likely to calculate body mass index and/or counsel their patients to exercise. These findings may reflect some of the ways in which a physician's personal experiences may influence his or her weight control recommendations.

Similar to other studies,<sup>41</sup> physicians in this study reported high expectations for weight loss, with the equivalent of a 21% weight loss being "acceptable" and a 10% weight loss "disappointing" for an obese patient. These high expectations are consistent with and may, in part, reflect patients' notoriously high weight loss expectations.<sup>42, 43</sup> Nonetheless, these findings are surprising in light of consensus that a 5% to 10% weight loss is associated with significant health benefits and is equivalent or more than the typical outcomes of lifestyle programs.<sup>2</sup> Moreover, results of the Diabetes Prevention Program<sup>44</sup> and the Finnish Diabetes Prevention Study<sup>45</sup> suggest that modest 5% to 10% weight losses can reduce the risk of developing type 2 diabetes.

Findings from this cross-sectional study are limited by generalizability. Frequency of "addressing" weight loss was assessed by only 1 question and was not further quantified. Moreover, we had a 54% response rate, which is the same or better than other studies of physicians' attitudes<sup>39, 41</sup> but, nonetheless, limits the implications made from these findings.

## Conclusion

The good news is that physicians are recommending important weight loss strategies to their obese patients, including reducing portion sizes and exercising. However, several specific strategies that have been recommended in a variety of treatment guidelines for obesity<sup>1, 2, 46-49</sup> should be advised more frequently. In particular, physicians should encourage patients to record all the foods and beverages they consume and, ideally, to indicate portion sizes and calories in those foods. Self-monitoring has been shown to be critical for both weight loss and maintenance.<sup>23, 50-52</sup> Weighing frequently, ideally daily, has also been shown in numerous studies to be helpful in improving weight losses and preventing weight regain.<sup>23, 53</sup> Participants who are instructed to consume meal replacement products, typically for 2 meals a day initially, and then 1 meal a day long-term, have been shown to have better weight losses and maintenance than patients prescribed the same number of calories without meal replacements.<sup>25, 54</sup> Using meal replacement products simplifies the diet for patients and consequently improves adherence. Finally, because physicians often cannot devote the time needed to help a patient with their weight loss efforts, it may be useful to refer patients to other programs that can provide more intensive assistance with weight loss.<sup>4</sup>

**Table 1: Physician Characteristics (n = 101)**

<b>Characteristics</b>	<b>%</b>
Age (years)	
31–40	23.5
41–50	38.8
51–60	25.5
>60	12.2
Gender	
Male	69.4
Female	30.6
Weight	
Normal weight	81.4
Overweight	18.6
Field	
Internal medicine	37.1
Family practice	47.4
Other	15.5
Physical activity level/week (minutes)	
>150	67.3
<150	32.7
Diabetes	
Yes	7.1
No	92.9
History of heart disease	
Yes	4.1
No	95.9

**Table 2: Physicians' Self-Reported Frequency of Recommending Various Weight Loss Strategies**

<b>Weight Loss Strategy</b>	<b>Frequency (mean ± SD)</b>
Increase physical activity	6.7 ± 0.5 <sup>a</sup>
Reduce consumption of fast food	6.5 ± 1.0 <sup>b</sup>
Reduce portion sizes	6.1 ± 1.1 <sup>c</sup>
Reduce soda consumption	6.0 ± 1.4 <sup>d</sup>
Eat a low-calorie diet	5.6 ± 1.3 <sup>e</sup>
Suggest a specific type of physical activity	5.6 ± 1.3 <sup>e</sup>
Decrease the fat content of the diet	5.4 ± 1.5 <sup>e,f</sup>
Consume breakfast	5.4 ± 1.9 <sup>e,f</sup>
Recommend a specific intensity of physical activity	5.1 ± 1.5 <sup>f</sup>
Recommend locations to which individuals can go to engage in physical activity	5.1 ± 1.5 <sup>f</sup>
Refer to a dietitian for individual counseling	4.7 ± 1.4 <sup>g</sup>
Weigh themselves regularly	4.5 ± 1.9 <sup>g,h</sup>
Use fat and/or calorie modified foods	4.3 ± 1.7 <sup>h,i</sup>
Provide in-office educational materials	4.3 ± 1.7 <sup>h,i</sup>
Refer to a commercial program	4.1 ± 1.6 <sup>h,i</sup>
Follow a specific calorie goal	4.1 ± 1.7 <sup>i,j</sup>
Eat a modified low-carbohydrate diet (ie, <40 g carbohydrate)	3.9 ± 1.7 <sup>i,j</sup>
Record food intake in a diary	3.8 ± 1.9 <sup>i,j</sup>
Decrease television viewing	3.6 ± 1.9 <sup>j</sup>
Eat a Mediterranean diet	3.2 ± 1.9 <sup>k</sup>
Eat a low-carbohydrate diet	3.0 ± 1.7 <sup>k</sup>
Use meal replacements	2.6 ± 1.6 <sup>l,k</sup>
Refer to an exercise specialist	2.4 ± 1.4 <sup>l</sup>
Recommend Internet sources for weight loss	2.4 ± 1.6 <sup>l</sup>
Use weight loss medication	2.0 ± 1.1 <sup>m</sup>

Values with different subscripts differ at  $P < .05$  level.



**Table 3: Physician Characteristics and Frequency of Addressing Weight Control Issues with Obese Patients\***

Characteristic	Frequency (mean $\pm$ SD)	<i>P</i>
Age (years)		
31–40	5.9 $\pm$ 0.8	
41–50	6.1 $\pm$ 0.9	0.03
51–60	5.6 $\pm$ 1.4	
>60	6.7 $\pm$ 0.5	
Gender		0.06
Male	5.9 $\pm$ 1.1	
Female	6.3 $\pm$ 0.8	
Weight		0.15
Normal weight	6.1 $\pm$ 1.0	
Overweight	5.7 $\pm$ 1.0	
Field		0.89
Internal medicine	5.9 $\pm$ 1.2	
Family practice	6.0 $\pm$ 0.8	
Other	5.9 $\pm$ 1.2	
Physical activity level (minutes per week)		0.001
>150	6.2 $\pm$ 0.9	
<150	5.5 $\pm$ 1.1	
Diabetes		0.71
Yes	6.1 $\pm$ 0.9	
No	6.0 $\pm$ 1.0	
History of heart disease		0.33
Yes	6.5 $\pm$ 0.6	
No	6.0 $\pm$ 1.0	

\* 1 = never, 4 = sometimes, 7 = always.

## References

1. World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: World Health Organization; 1998.
2. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report. National Institutes of Health. *Obes Res* 1998; 6(suppl 2): 51S–210S.
3. Blackburn GL. Effects of weight loss on weight-related risk factors. In: Brownell KD, Fairburn CG, eds. *Eating disorders and obesity: a comprehensive handbook*. New York: The Guilford Press; 1995: 406–10.
4. McTigue KM, Harris R, Hemphill B, et al. Screening and interventions for obesity in adults: summary of the evidence for the US Preventive Services Task Force. *Ann Intern Med* 2003; 139: 933–49.
5. Green LA, Fryer GEJ, Yawn BP, Lanier D, Dovey SM. The ecology of medical care revisited. *N Engl J Med* 2001; 344: 2021–5.
6. Bowerman S, Bellman M, Saltsman P, et al. Implementation of a primary care physician network obesity management program. *Obes Res* 2001; 9(suppl 4): 321S–5S.
7. Galuska DA, Will JC, Serdula MK. Are health care professionals advising obese patients to lose weight? *JAMA* 1999; 282: 1576–8.
8. Sciamanna CN, Tate DF, Lang W, Wing RR. Who reports receiving advice to lose weight? Results from a multi-state survey. *Arch Int Med* 2000; 160: 2334–9.
9. Nawaz H, Adams ML, Katz DL. Weight loss counseling by health care providers. *Am J Pub Health* 1999; 89: 764–7.
10. McAlpine DD, Wilson AR. Trends in obesity-related counseling in primary care: 1995–2004. *Med Care* 2007; 45: 322–9.
11. Stafford RS, Rarhat JH, Misra B. National patterns of physician activities related to obesity management. *Arch Fam Med* 2000; 9: 631–8.
12. Lyznicki JM, Young DC, Riggs JA, Davis RM. Obesity: assessment and management in primary care. *Am Fam Physician* 2001; 63: 2185–96.
13. Potter MB, Vu JD, Croughan-Minihane M. Weight management: what patients want from their primary care physicians. *J Fam Pract* 2001; 50: 513–8.
14. Harvey EL, Glenny AM, Kirk SF, Summerbell CD. An updated systematic review of interventions to improve health professionals' management of obesity. *Obes Rev* 2002; 3: 35–55.
15. Wadden TA, Andersen DA, Foster GD, Bennett A, Steinberg C, Sarwer DB. Obese women's perceptions of their physician's weight management attitudes and practices. *Arch Fam Med* 2000; 9: 854–60.
16. Price JH, Desmond SM, Krol RA, Snyder FF, O'Connell JK. Family practice physicians' beliefs, attitudes and practices regarding obesity. *Am J Prev Med* 1987; 3: 215–20.
17. Foster GD, Wadden TA, Phelan S, Sarwer DB, Sanderson RS. Obese patients' perceptions of treatment outcomes and the factors that influence them. *Arch Int Med* 2001; 161: 2133–9.
18. Foster GD, Wadden TA, Vogt RA, Brewer G. What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *J Consult Clin Psychol* 1997; 65: 79–85.
19. Hill JO, Wyatt HR, Melanson EL. Genetic and environmental contributions to obesity. *Med Clin N Amer*. 2000; 84: 333–46.
20. Klem ML, Wing RR, McGuire MT, Seagle HM, Hill JO. A descriptive study of individuals successful at long-term maintenance of substantial weight loss. *Am J Clin Nutr* 1997; 66: 239–46.

21. Wing RR. Physical activity in the treatment of the adulthood overweight and obesity: current evidence and research issues. *Med Science Sports Exerc* 1999; 31(11 Suppl): S547–52.
22. Wadden TA, Vogt RA, Foster GD, Anderson DA. Exercise and the maintenance of weight loss: 1-year follow-up of a controlled clinical trial. *J Consult Clin Psychol* 1998; 66: 429–33.
23. Wing RR, Tate DF, Gorin A, Raynor HA, Fava JL. A self-regulation program for maintenance of weight loss. *N Engl J Med* 2006; 346: 393–403.
24. Wadden TA, Letizia KA. Predictors of attrition and weight loss in persons treated by moderate and severe caloric restriction. In: Wadden TA, VanItallie TB, eds. *Treatment of the seriously obese patient*. New York: Guilford Press; 1992.
25. Ditschuneit HH, Flechtner-Mors M, Johnson TD, Adler G. Metabolic and weight-loss effects of a long-term dietary intervention in obese patients. *Am J Clin Nutr* 1999; 69: 198–204.
26. Ashley JM, St Jeor ST, Schrage JP, et al. Weight control in the physician's office. *Arch Intern Med* 2001; 161: 1599–604.
27. Perri MG, McAllister DA, Gange JJ, Jordan RC, McAdoo WG, Nezu AM. Effects of four maintenance programs on the long-term management of obesity. *J Consult Clin Psychol* 1988; 56: 529–34.
28. Heshka S, Anderson JW, Atkinson RL, et al. Weight loss with self-help compared with a structured commercial program: a randomized trial. *JAMA* 2003; 289: 1792–8.
29. Womble LG, Wadden TA, McGuckin BG, Sargent SL, Rothman RA, Krauthamer-Ewing ES. A randomized controlled trial of a commercial internet weight loss program. *Obes Res* 2004; 12: 1011–8.
30. Rucker D, Padwal R, Li SK, Curioni C, Lau DC. Long-term pharmacotherapy for obesity and overweight: updated meta-analysis. *BMJ* 2007; 335: 1194–9.
31. Ornstein S, Nietert PJ, Jenkins RG, Wessell AM, Nemeth LS, Rose HL. Improving the translation of research into primary care practice: results of a national quality improvement demonstration project. *Jt Comm J Qual Patient Saf* 2008; 34: 379–90.
32. Baumbusch JL, Kirkham SR, Khan KB, et al. Pursuing common agendas: a collaborative model for knowledge translation between research and practice in clinical settings. *Res Nurs Health* 2008; 31: 130–40.
33. Glasgow RE, Emmons KM. How can we increase translation of research into practice? Types of evidence needed. *Annu Rev Public Health* 2007; 28: 413–33.
34. Abramson S, Stein J, Schaufele M, Frates E, Rogan S. Personal exercise habits and counseling practices of primary care physicians: a national survey. *Clin J Sport Med* 2000; 10: 40–8.
35. Huang J, Yu H, Marin E, Brock S, Carden D, Davis T. Physicians' weight loss counseling in two public hospital primary care clinics. *Acad Med* 2004; 79: 156–61.
36. Simkin-Silverman LR, Gleason KA, King WC, et al. Predictors of weight control advice in primary care practices: patient health and psychosocial characteristics. *Prev Med* 2005; 40: 71–82.
37. Stafford RS, Farhat JH, Misra B, Schoenfeld DA. National patterns of physician activities related to obesity management. *Arch Fam Med* 2000; 9: 631–8.
38. McAlpine DD, Wilson AR. Trends in obesity-related counseling in primary care: 1995–2004. *Med Care* 2007; 45: 322–9.
39. Kushner RF. Barriers to providing nutrition counseling by physicians: a survey of primary care practitioners. *Prev Med* 1995; 24: 546–52.
40. Forman-Hoffman V, Little A, Wahls T. Barriers to obesity management: a pilot study of primary care clinicians. *BMC Fam Pract* 2006; 7: 35.
41. Foster GD, Wadden TA, Makris AP, et al. Primary care physicians' attitudes about obesity and its treatment. *Obes Res* 2003; 11: 1168–77.

42. Foster GD, Wadden TA, Vogt RA, Brewer G. What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *J Consult Clin Psychol* 1997; 65: 79–85.
43. Foster GD, Wadden TA, Phelan S, Sarwer DB, Sanderson RS. Obese patients' perceptions of treatment outcomes and the factors that influence them. *Arch Intern Med* 2001; 161: 2133–9.
44. Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002; 346: 393–403.
45. Lindstrom J, Louheranta A, Mannelin M, et al. The Finnish Diabetes Prevention Study (DPS): lifestyle intervention and 3-year results on diet and physical activity. *Diab Care* 2003; 26: 3230–6.
46. Anderson DA, Wadden TA. Treating the obese patient: suggestions for primary care practice. *Arch Fam Med* 1999; 8: 159–67.
47. GA. B. Contemporary diagnosis and management of obesity. Newtown (PA): Handbooks in Health Care Co.; 1998.
48. Lyznicki JM, Young DC, Riggs JA, Davis RM, Council on Scientific Affairs, American Medical Association. Obesity: assessment and management in primary care. *Am Fam Physician* 2001; 63: 2185–96.
49. McTigue KM, Harris R, Hemphill B, et al. Screening and interventions for obesity in adults: summary of the evidence for the US Preventive Services Task Force. *Ann Intern Med* 2003; 139: 933–49.
50. Boutelle KN, Kirschenbaum DS. Further support for consistent self-monitoring as a vital component of successful weight control. *Obes Res* 1998; 6: 219–24.
51. Baker RC, Kirschenbaum DS. Self-monitoring may be necessary for successful weight control. *Behav Ther* 1993; 24: 377–94.
52. Wadden TA, Foster GD. Behavioral treatment of obesity. *Med Clin N Amer* 2000; 84: 441–62.
53. Butryn ML, Phelan S, Hill JO, Wing RR. Consistent self-monitoring of weight: a key component of successful weight loss maintenance. *Obesity (Silver Spring)* 2007; 15: 3091–6.
54. Heymsfield SB, van Mierlo CA, van der Knaap HC, Heo M, Frier HI. Weight management using a meal replacement strategy: meta and pooling analysis from six studies. *Int J Obes Relat Metab Disord* 2003; 27: 537–49.
55. Svendsen OL, Toubro S, Bruun JM, Linnert JP, Kroustrup JP. [Guidelines for treatment of overweight/obesity, 2006.] *Ugeskr Laeger* 2006; 168: 180–2.
56. Tsigos C, Hainer V, Basdevant A, et al. Management of obesity in adults: European clinical practice guidelines. *Obesity Facts: Eur J Obes* 2008; 1: 1–11.