

## Calorie Replacements: A Useful Tool to Support a Diabetes Weight Management Plan

### INTRODUCTION

The diabetes pandemic continues to grow in every country in the world. Although estimates vary slightly, full-blown diabetes is believed to afflict as many as 382 million adults worldwide. By 2035, that number is expected to rise to 592 million. Besides contributing to hundreds of thousands of deaths, poorly controlled diabetes can impair the function of heart, kidneys, eyes, and nerves and lead to cardiovascular disease, stroke, high blood pressure, nephropathy, blindness, neuropathy, and amputation. In addition to the heavy human burden, the increasing incidence of diabetes and the number of related co-morbidities, imposes measurable economic burdens. Currently, diabetes healthcare costs are estimated at 548 billion USD in 2013, a number which, of course, continues to rise with the incidence of diabetes<sup>1</sup>.

### SCIENTIST BIOGRAPHY



Rachel Johnson, R.D. worked as a hospital-based clinical dietitian for several years before joining Abbott Nutrition in 2000. In her clinical roles, she provided comprehensive nutrition support services to a variety of patients including inpatient and outpatient diabetes nutrition management and counseling. She also served as a consultant for an HIV clinic, counseling persons living with HIV/AIDS on a wide range of nutrition matters.

Since joining Abbott Nutrition's Scientific and Medical Affairs department, she has drawn on her extensive clinical background to provide expertise to drive Abbott's scientific programs and diabetes nutrition portfolio. She has spent most of her Abbott career working in Medical Affairs supporting international scientific programs and currently is responsible for Abbott Nutrition's global diabetes products and services as part of the Research and Development department.

Rachel Johnson is a Registered Dietitian who earned a Bachelor of Science in Dietetics, Nutrition, and Food Science from Northern Illinois University and completed her internship/registration at Ingalls Memorial Hospital – Internship/Registration

### LIFESTYLE INTERVENTION AND ADHERENCE

Fortunately, experts agree that lifestyle intervention including nutrition management is one of the best tools available to support comprehensive diabetes management and improve outcomes.<sup>2-5</sup> Clinical evidence shows that lifestyle intervention, including nutrition management, can help prevent or delay the onset of diabetes as well as manage glucose levels and cardiovascular risk factors in people with diabetes.<sup>3,6</sup> However, the ability to make lifestyle changes is often challenging for people with diabetes, who may have more difficulty losing weight than do their non-diabetic counterparts<sup>7</sup>. Nutrition management is particularly difficult, and adherence to the nutrition prescription is reported to be one of the most challenging aspects of diabetes care.<sup>8</sup> In one randomized survey of 832 primary care physicians, 85% of identified diet regimens as a problem for people with diabetes.<sup>9</sup>



The Registered Dietitian is a critical member of the healthcare team to facilitate diabetes nutrition education, however, helping patients adhere to lifestyle changes, including nutrition therapy, is an important activity for all members of the healthcare team.

Often, people with diabetes have trouble with food selection and portion control, and may skip meals, contributing to poor glucose control. People with diabetes who have not been successful with traditional diet approaches may seek alternative methods to help manage their diabetes. An individualized approach is important for successful diabetes weight management and health care professionals should consider various therapeutic options and practical tools to help their patients achieve weight loss goals.

### **CALORIE REPLACEMENTS: A TOOL FOR MEAL PLANNING**

No single nutrition prescription is appropriate for all people with diabetes. Experts emphasize an individualized approach to nutrition management which requires tailoring a program which takes into account the person's medical condition, treatment goals, desired outcomes, customary eating preferences and habits, and other lifestyle factors<sup>10</sup>. One tool that can be part of the health care professional's tool box to support nutrition management is the use of calorie replacements (also called meal replacements) as part of a calorie controlled meal plan. Studies have demonstrated factors associated with successful weight loss include physical activity, group and individual contact as well as the use of meal replacement.<sup>11,12</sup>

In general, a calorie replacement is defined as any single prepackaged food item (liquid shake, bar, portion-controlled entrée) that provides a set number of calories and nutrients, typically consumed up to three times a day as a substitute for conventional meals, partial meals or snacks. Consumed instead of, not along with regular meals and snacks, calorie replacements are formulated to replace potentially high-calorie, low-nutrient-value meals and snacks. Meal replacements can help support adherence to a diabetes meal plan because they provide:

- Portion control
- Fixed calorie amounts
- Reduced choices and contact with problem foods
- Convenience
- Simplicity of use

### **EXPERT RECOMMENDATIONS**

For more than 20 years, clinical evidence has supported the benefits of calorie replacements as part of a weight loss program. These products have been associated with significantly greater weight loss than is achieved with an isocaloric diet. Based on rigorous evidence analysis by scientists from the Academy of Nutrition and Dietetic (AND), 12 studies reported equivalent or greater weight loss in subjects receiving a diet containing 1 – 3 daily calorie replacements, leading the AND to strongly recommend the use of calorie replacements. AND states:

*For people who have difficulty with self-selection and/or portion control, meal replacements (e.g., liquid meals, meal bars, and calorie-controlled packaged meals) may be used as part of the diet component of a comprehensive weight management program. Substituting one or two daily*



*meals or snacks with meal replacements is a successful weight loss and weight maintenance strategy.<sup>13</sup>*

Other expert organizations also support the use of calorie replacements to support weight management. See Table 1.

**Table 1: Professional Organization statements regarding calorie replacements**

Organization	Statement
<b>American Heart Association (AHA) American College of Cardiology(ACC) The Obesity Society(TOS)(2013)</b>	Alternative options such as meal replacements should be considered if unable to lose weight with current treatments (expert opinion) <sup>14</sup>
<b>Canadian Clinical Practice Guidelines for management and prevention of obesity</b>	Meal replacements may be considered as a component of an energy-reduced diet for selected adults interested in commencing a dietary weight-loss program [grade C level 259,60] <sup>15</sup>
<b>AACE-American Association of Clinical Endocrinologist</b>	Substituting 1 or 2 daily meals or snacks with meal replacements is a successful weight-loss and weight-maintenance strategy <sup>16</sup>
<b>British Dietetic Association</b>	Meal replacements can be an effective alternative to weight control for some people. <sup>17</sup>
<b>Joslin Diabetes Center</b>	Meal replacements in the form of shakes, bars, ready-to-mix powders, and pre-packaged meals that match these nutrition guidelines may be effective in initiating and maintaining weight loss [2 B] <sup>18</sup>
<b>National Health and Medical Research Council’s Obesity Consortium Australia</b>	Clinically significant weight loss can be achieved using meal-replacement programs <sup>19</sup>

**LIFESTYLE INTERVENTION INCLUDING CALORIE REPLACEMENTS IN PEOPLE WITH DIABETES**

Calorie replacements as part of lifestyle intervention have also been associated with positive outcomes in people with diabetes, including reduced weight, improved A1c levels and reduced need for insulin<sup>6,20-22</sup>.

The use of meal replacements was an important part of the Look AHEAD trial, the largest trial evaluating long-term lifestyle intervention on health outcomes in overweight and obese individuals with type 2 diabetes. In Look AHEAD, 5,145 subjects were randomized to either an intensive Lifestyle Intervention (ILI) group, or a Diabetes Support and Education (DSE) group. The ILI arm of the Look AHEAD study involved a weight loss goal of 10%, physical activity, ongoing group and individual sessions and a portion controlled diet that included meal replacements. Meal replacements were included based on the scientific findings that this approach significantly increased weight loss compared to a self-selected diet of conventional foods with the same calorie goal.<sup>23,24</sup> Participants were initially instructed to replace two



meals and one snack per day with a meal replacement. In months 7-12 this was decreased and patients were encouraged to replace one meal and one snack daily.

At year one, ILI participants lost a mean of 8.5% of initial weight, compared with 0.6% for DSE (P < .001). In addition, there was a statistically significant reduction of A1C, and reduction in several CVD risk factors, with benefits sustained at four years and eight years. Factors contributing to successful loss included physical activity, individual contact, and use of meal replacements. Analysis showed that the more meal replacements used, the greater the success in reaching weight loss goals<sup>24</sup>.

At year eight, ILI participants were able to maintain a loss 4.7% of initial weight, compared with 2.1% for DSE (P < 0.001). While the ILI group did not show improvements in the primary endpoint of CVD events, important health outcomes such as reduced need for medication for glycemic control and management of CVD, reduced sleep apnea, less depression and improved health-related quality of life were reported in the ILI group.<sup>25-27</sup> The use of meal replacements was reported as one of the weight control behaviors among the most successful participants: i.e., those able to maintain a >10% of initial weight loss achieved at year one.

**RECOMMENDING CALORIE REPLACEMENTS IN CLINICAL PRACTICE**

Based on an evaluation of the evidence, diabetes experts have provided guidance on the use of diabetes-specific calorie replacements as part of lifestyle intervention in the management of diabetes and pre-diabetes. Mechanik et al., reported the use of calorie replacements should be based on individual assessment with consideration for weight and level of glycemic control.<sup>28</sup> The table below, based on expert opinion, provides guidance for incorporating diabetes-specific formulas (up to three servings per day) into a meal plan for people with diabetes and pre-diabetes<sup>28</sup>

**Table 2. Guidance on recommending calorie replacements<sup>28</sup>**

Overweight or Obese	Use 2 to 3 servings of diabetes-specific formulas as part of a reduced calorie meal plan, as a calorie replacement for a meal, partial meal or snack. <250lb =1200 to 1500 calories >250lb = 1500 to 1800 calories	
Normal weight	Uncontrolled Diabetes A1c>7%	1 to 2 diabetes-specific formulas per day to be incorporated into a meal plan, as a calorie replacement for a meal partial meal or snack
	Controlled Diabetes	Use of diabetes-specific formula should be based on clinical judgment and individual assessment



### **AREAS FOR CONSIDERATION**

Clinical research has demonstrated meal replacements provided free as part of a comprehensive program can significantly reduce weight loss and support weight maintenance. But we need more information to better understand how these benefits translate to an individual in the community setting.

In addition, as with any weight loss program, long-term maintenance after weight reduction can be challenging. The emphasis should be on education and counseling to develop behaviors that are associated with better long-term weight maintenance outcomes. For individuals using meal replacements to support initial weight loss, it is important to teach behaviors and healthy meal planning, to build a foundation when meal replacements are not being used.

### **SUMMARY**

As the prevalence of diabetes and its consequences continues to grow around the world, so does the need for effective diabetes management. Medical Nutrition Therapy as part of lifestyle intervention is a critical component to managing diabetes effectively. When considering a meal plan for people with diabetes, a one size fits all approach is not recommended. Medical Nutrition Therapy should be tailored to the individual needs with consideration for many eating patterns and weight management approaches. The use of calorie replacements have been clinically shown to be an effective tool to support weight loss and weight maintenance as part of a diabetes weight management program.

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