

**JOSLIN DIABETES CENTER & JOSLIN CLINIC**  
**CLINICAL NUTRITION GUIDELINE FOR OVERWEIGHT AND OBESE ADULTS WITH TYPE 2 DIABETES, PREDIABETES OR AT HIGH RISK FOR DEVELOPING TYPE 2 DIABETES**

The Joslin Clinical Nutrition Guideline For Overweight and Obese Adults With Type 2 Diabetes, Prediabetes or at High Risk for Developing Type 2 Diabetes is designed to assist primary care physicians, specialists, and other healthcare providers in individualizing the care of and set goals for adult, non-pregnant patients with type 2 diabetes or individuals at high risk for developing type 2 diabetes. This guideline focuses on the unique needs of those individuals, and complements the 2005 Dietary Guidelines for Americans, which is jointly developed by the Department of Health and Human Services and the Department of Agriculture. It is not intended to replace sound medical judgment or clinical decision-making and may need to be adapted for certain patient care situations where more or less stringent interventions are necessary.

The objectives of the Joslin Clinical Diabetes Guidelines are to support clinical practice and to influence clinical behaviors in order to improve clinical outcomes and assure that patient expectations are reasonable and informed. Guidelines are developed and approved through the Clinical Oversight Committee that reports to the Chief Medical Officer of the Joslin Diabetes Center, Joslin Clinic Inc. The Clinical Guidelines are established after careful review of current evidence, medical literature and sound clinical practice.

**As general guidance, the following symbols indicate the strength of scientific evidence:**

- \*\* indicates strong scientific evidence to support this recommendation
- \* indicates some scientific evidence to support this recommendation
- § indicates limited scientific evidence to support this recommendation
- ¶ indicates no available evidence but clinical experience and expert consensus support this recommendation

These Guidelines will be reviewed periodically and the Joslin Diabetes Center will maintain, upgrade or downgrade the rating for each recommendation when new evidence mandates such changes.

**Target Individuals and General Goals of Clinical Nutrition Guideline**

<b>Target Population</b>	<p><b>BMI</b> &gt; 25 kg/m<sup>2</sup>  <b>or Waistline</b> &gt; 40"/102 cm (men)          &gt; 35"/88 cm (women)</p> <p style="text-align: center;"><i>and</i></p> <p style="text-align: center;"><b>Type 2 Diabetes</b>  <i>or</i></p> <p><b>Prediabetes</b> IGT (impaired glucose tolerance)          IFG (impaired fasting glucose)</p> <p style="text-align: center;"><i>or</i></p> <p><b>High Risk for Type 2 Diabetes</b> The Metabolic Syndrome (ATP III Criteria)          Family history of type 2 DM (first degree relative)          Confirmed diagnosis of insulin resistance          (e.g., high basal insulin)</p>
<b>Goals</b>	<ol style="list-style-type: none"> <li>1. To improve overall metabolic control while achieving gradual weight reduction and maintaining achieved weight loss.</li> <li>2. To improve postprandial hyperglycemia and overall glycemic control in order to prevent or reduce complications of diabetes.</li> <li>3. To improve postprandial hypertriglyceridemia as a major lipid abnormality in the target population.</li> <li>4. To improve lipid profile including increase of HDL-cholesterol and decrease of LDL-cholesterol.</li> <li>5. To improve insulin sensitivity as a major precursor of type 2 diabetes.</li> <li>6. To improve body fat distribution and to reduce visceral fat burden.</li> <li>7. To reduce cardiovascular risk as evidenced by improvement of endothelial function and endothelial markers.</li> <li>8. To reduce inflammatory cytokines, and markers of inflammation and increased coagulation.</li> <li>9. To improve blood pressure as a contributing risk factor for cardiovascular and renal complications.</li> <li>10. To enhance thermogenesis and maintain lean body mass.</li> <li>11. To improve overall health through increased physical activity.</li> <li>12. To prevent and treat the chronic complications of diabetes.</li> </ol>

## General Guidelines

1. Consideration of recent consistent and strong evidence that weight reduction improves insulin sensitivity and glycemic control in type 2 diabetes and decreases the risk of developing type 2 diabetes in prediabetes and high-risk populations. **Weight reduction** should be considered one of the prime objectives of any nutrition recommendations suggested to the target population.\*\*
2. Any meal plan modifications should first be discussed with a **Registered Dietitian (RD)** or a qualified healthcare provider.¶
3. Target individuals should meet with an **RD** for assessment and review of medical management and treatment goals to select approach for medical nutrition therapy.\*
4. The diet composition, described below, is for general guidance only and may be individualized by the RD or the healthcare provider according to clinical judgment. (See Appendix A).
5. Meal plans do not need to include between-meal or evening snacks.¶
6. Meal-to-meal consistency in carbohydrate is of primary importance to patients with fixed medication/insulin programs.¶

## Weight Reduction

1. A structured lifestyle plan that combines dietary modification and exercise is necessary for weight reduction.
2. A modest and gradual weight reduction of one pound every one to two weeks should be the optimal target.\*
3. Reduction of daily caloric intake should be by 250 to 500 calories.¶ Total daily caloric intake should not be less than 1000-1200 for women and 1200-1600 for men, or based on an RD assessment of usual intake.¶
4. Weight reduction should be individualized and continued until BMI reaches  $\leq 25$  Kg/m<sup>2</sup> or an until an agreed upon BMI goal is reached.
5. Target individuals should meet with RD to learn and practice portion control as an effective way of weight control.¶
6. Meal replacements (MR) in the form of shakes, bars, ready-to-mix powders, and pre-packaged meals that match these nutrition guidelines are helpful for some patients.\* Blood glucose patterns frequently change with the initiation of meal replacements, and diabetes medications may need adjustment. Patients should be told to monitor their blood glucose carefully to identify hypoglycemia.\*
7. FDA approved weight management medications should be prescribed, if indicated. Approved medications are an adjunct to dietary and lifestyle changes\*.
8. Bariatric surgeries are effective options and should be encouraged when indicated (consider in individuals with BMI  $>40$  kg/m<sup>2</sup> and those with BMI  $>35$  kg/m<sup>2</sup> with other comorbidities.).\*

## Macronutrient Composition

<b>Carbohydrate</b>	<b>Percentage</b>	~ 40% of total caloric intake.* The total should not be less than <u>130 gm/day</u> .*
	<b>Glycemic Index and Glycemic Load</b>	Reduction of the quality (Glycemic Index, GI) and quantity (Glycemic Load, GL) of carbohydrate choices is essential for blood glucose control. The GI/GL concept is an important factor that patients should apply in their daily selection of carbohydrates foods.
	<b>Recommended</b>	Fresh vegetables and fruits, legumes, whole and minimally processed grains.
	<b>Not Recommended</b>	Refined carbohydrates or processed grains and starchy foods especially pasta, white bread, low-fiber cereal and white potatoes should be consumed in very limited quantities.**
	<b>Fiber</b>	Fiber intake of ~50 gm/day, if tolerated, is effective in improving postprandial hyperglycemia and should be encouraged.* A minimum of 20-35 gm/day is recommended.** Fiber supplements such as psyllium and $\beta$ -glucan can be added. §
<b>Fat</b>	<b>Percentage</b>	~ 30 – 35 % of total caloric intake;* saturated fat should be limited to $< 10\%$ of total caloric intake or $< 7\%$ in individuals with LDL-Cholesterol $> 100$ mg/dl.**
	<b>Recommended</b>	Mono- and polyunsaturated fats (e.g., olive oil, canola oil, nuts/seeds and fish, particularly those high in omega-3 fatty acids).
	<b>Not Recommended</b>	Foods high in saturated fat, including beef, pork, lamb and high-fat dairy products (e.g., cream cheese, whole milk or yogurt) should be consumed only in small amounts. Foods high in trans-fats (e.g., fast foods, commercially baked goods, some margarines) should be avoided.**
	<b>Cholesterol</b>	$<300$ mg/day or $<200$ mg/day in individuals with LDL-Cholesterol $>100$ mg/dL. ¶

<b>Protein</b>	<b>Percentage</b>	~ 20-30% of total caloric intake.*
	<b>Favorable Protein</b>	Fish, skinless poultry, nonfat or low-fat dairy, and legumes. Emerging data suggest that protein aids in the sensation of fullness and that low-protein meal plans are associated with increased hunger. Thus, lean protein together with healthy fats may serve to reduce appetite and assist patients in achieving and maintaining a lower calorie level.** Protein also helps to maintain lean body mass during weight reduction.*
	<b>Patients with renal issues</b>	Although reducing total calories may result in a reduction of the absolute total amount of protein intake, any patient with signs of kidney disease (i.e., one or more of the following: albuminuria, proteinuria, creatinine clearance <60 ml/min) should consult a nephrologist before increasing total or percentage protein in their diet.* Protein intake for these patients should be modified, but not lowered to a level which may jeopardize their overall health or increase their risk for malnutrition.†

## Physical Activity and Behavioral Modification

- 1- Physical activity, behavior modification and good support systems are extremely important and should be included in the nutrition prescription described above. Increased physical activity, in particular, should be an integral component of any weight reduction plan to maximize the benefits of weight reduction on diabetes control and to prevent coronary and cerebral vascular disease.\*\*
- 2- A minimum of 150-175 minutes of moderate intensity physical activity/week should be achieved unless contraindicated.\*\*A target of 60-90 minutes most days of the week is encouraged.†
- 3- Exercise should be a mix of cardiovascular, stretching and resistance exercises to maintain or increase lean body mass.\*

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**Approved by the Joslin Clinical Oversight Committee on 2/4/05**

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