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

08 07 2011

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 2010 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 Joslin Clinic Medical Director of Joslin Diabetes Center. The Clinical Guidelines are established after careful review of current evidence, medical literature and sound clinical practice. 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.

Joslin's Guidelines are evidence-based; in order to allow the user to evaluate the quality of the evidence used to support each standard of care, a modification of the GRADE system has been adopted. The table provided on page 5 describes the categories in which methodological quality and strength of recommendations have been classified. Evidence levels are graded 1A through 2C, as indicated in brackets.

Target Individuals and General Goals of Clinical Nutrition Guideline

***Target Population**	**BMI**	> 25 kg/m^2	***and***	**Type 2 Diabetes**
	or **Waistline**	> 40"/102 cm (men) [1B]		***or***
		> 35"/88 cm (women)		**Prediabetes** IGT (impaired glucose tolerance) [1A] IFG (impaired fasting glucose)
				or
				High Risk for The Metabolic Syndrome (AHA/NHLBI criteria) [1B]
				Type 2 Diabetes Family history of type 2 DM (first degree relative) Confirmed diagnosis of insulin resistance (e.g., high basal insulin)

* For Asian populations (South Asian Indians, East Asians and Malays) a BMI >23 kg/m2 and a waistline >35"/90 cm in men or >31"/80 cm in women is considered. **[1B]**

General Guidelines

- There is strong evidence that weight reduction improves insulin sensitivity and glycemic control, lipid profile, and blood pressure in type 2 diabetes and decreases the risk of developing type 2 diabetes in pre-diabetes and high-risk populations.
- To select an approach for medical nutrition therapy (MNT), target individuals should be referred to a registered dietitian (RD) or a qualified healthcare provider for assessment and review of medical management and treatment goals. [1B]
- Priorities of MNT for this population include:
    1. Weight reduction
    2. Meal to meal consistency in carbohydrate distribution for those with fixed medication/insulin programs
    3. Consideration of other nutrition related co-morbidities such as hypertension and dyslipidemia
- The meal plan composition, described below, is for general guidance only and may be individualized by the RD or other healthcare provider according to clinical judgment, individual (patient) preferences and needs, and metabolic response. The plan should be re-evaluated and modified to respond to changes in parameters such as blood pressure, A1C and frequency of hypo/hyperglycemia. Modification of goals may be needed for those requiring additional dietary considerations such as those with hyperkalemia or who are vegetarian.

Weight Reduction

1. A structured lifestyle plan that combines dietary modification, activity, and behavioral modification is necessary for weight reduction. [1B]
2. A modest and gradual weight reduction of one to two pounds every one to two weeks should be the optimal target. [2A]. Reduction of daily caloric intake should be by range between 250 - 500 calories. [1C] Total daily caloric intake should not be less than 1000-1200 for women and 1200-1600 for men, or based on a RD assessment of usual intake. [1C]
3. A 5-10% weight loss may result in significant improvement in blood glucose control among patients with diabetes and help prevent the onset of diabetes among individual with pre-diabetes. Weight reduction should be individualized and continued until an agreed upon BMI and/or other metabolic goals are reached. [2B]
4. Target individuals should meet with RD to learn and practice portion control as an effective way of weight management. [1B]
5. Meal replacements (MR)** 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]
    - Meal replacements should be used under the supervision of a RD.
    - When meal replacements are initiated, glucose levels should be carefully monitored and if needed, antihyperglycemic medications should be adjusted

** meal replacements should be used with caution by those with hyperkalemia

7. Bariatric surgeries, although not without medical and nutrition risks, are effective options and may be discussed when indicated (consider in individuals with BMI >40 kg/m2 and those with BMI >35 kg/m2 with other comorbidities). [2B]. To date, there is limited evidence to support the recommendation of bariatric surgeries for patients with BMI <35 kg/m^2 even if they have diabetes or other co-morbid conditions.

Macronutrient Composition

Fat	***Percentage***	There is general agreement that fat quality rather than quantity is important. The total fat intake should be generally limited to less than 35 % of total daily caloric intake [2B] • Saturated fat should be limited to < 7% of total caloric intake.[1B] • Polyunsaturated and monounsaturated fats should comprise the rest of the fat intake [2B)] • Cholesterol limited to <300 mg/day or <200 mg/day in individuals with LDL-Cholesterol >100 mg/dl. [1C]
	Recommended	Mono and polyunsaturated fats (e.g., olive oil, canola oil, nuts/seeds, avocado and fish, particularly those high in omega-3 fatty acids). 4 oz of oily fish (e.g., salmon, herring, trout, sardines, fresh tuna) 2 times/week, as a source of omega-3 fatty acids. [1B]
	Not Recommended	Foods high in saturated fat, including beef, pork, lamb and high-fat dairy products (e.g., cream cheese, whole milk or yogurt) Foods high in trans-fats (e.g., fast foods, commercially baked goods, some margarines) Foods high in dietary cholesterol such as egg yolks, and organ meats.
Protein	***Grams/day***	Protein intake should not be less than 1.2 gm/kg of adjusted body weight Adjusted Body Weight = IBW (Ideal Body Weight) + 0.25 (Current Weight - IBW). This amount generally accounts for 20-30% of total caloric intake [2B] There are no reliable scientific findings to support a protein intake that exceeds 2 gm/kg of adjusted body weight. Emerging data suggest that protein aids in the sensation of fullness (low-protein meal plans are associated with increased hunger). A modest increase in protein reduces appetite and assists in achieving and maintaining weight reduction. [2B] Protein also helps to minimize loss of lean body mass. [2 B]
	Recommended	Fish, skinless poultry, nonfat or low-fat dairy, nuts, seeds, and legumes [2B]
	Not Recommended	High saturated fat protein sources in excess (e.g., beef, pork, lamb and high-fat dairy products), as they may be associated with increased cardiovascular risk.
	Patients with Renal Issues	Although reducing total calories may result in a reduction of the absolute total amount of protein intake, patients with signs of kidney disease (i.e., one or more of the following: proteinuria, GFR<60 ml/min) should consult a nephrologist before increasing total or percentage protein in their diet. [1B] Protein intake for these patients should be modified, but not lowered to a level that may jeopardize their overall health or increase their risk for malnutrition or hypoalbuminemia.

Macronutrient Composition (continued)		
Carbohydrate	***Percentage***	• Intake should be adjusted to meet the cultural and food preferences of the individual. • The total daily intake of carbohydrate should be at least 130 gm/day and ideally 40-45% of the total caloric intake[1C]
	Consideration of Glycemic Index/Glycemic Load	The glycemic index/glycemic load is an important factor that patients should apply in their daily selection of carbohydrates foods. Foods with a low glycemic index should be selected [2B] (e.g.,whole grains, legumes, fruits, green salad with olive oil-based dressing, and most vegetables)
	Recommended	Vegetables and fruits, legumes, whole and minimally processed grains. [2B]
	Not Recommended	Sugar, refined carbohydrates or processed grains and starchy foods especially sugary beverages, most pastas, white bread, white rice, low-fiber cereal and white potatoes should be consumed in limited quantities. [2B]
	Fiber	• Approximately 14gm of fiber /1000 cal (20-35 gm) per day is recommended. [**1B**] If tolerated, ~50 gm/day is effective in improving postprandial hyperglycemia and should be encouraged. [2A] • Fiber from unprocessed food, such as vegetables, fruits, seeds, nuts, and legumes is preferable but, if needed, fiber supplements such as psyllium, resistant starch and β-glucan can be added. [1B]
Micronutrient Composition		
	Sodium	• Daily consumption should be < 2300 mg (about 1 tsp of salt) per day. (1A) Further reduction to 1500 mg is recommended in people > 50 yr of age including those with chronic kidney disease. [2B] • Slow acclimatization to lower sodium intakes is advisable.
	Potassium	• Daily consumption should be a minimum of 4,700 mg unless potassium excretion is impaired • Potassium helps offset high sodium intake by triggering more sodium excretion by the kidneys. • Potassium-rich foods include fruits and vegetables like bananas, mushrooms, spinach, and almonds.

Dietary Supplements

In individuals who are not deficient, data do not support the use of vitamins or minerals to improve glucose control or the use of herbal supplements or spices to improve glucose control.

Non-nutritive Sweeteners

All FDA- approved non-nutritive sweeteners are permissible in moderate quantities (e.g., one diet soda daily)

Alcohol

- If consumed, alcohol consumption must be moderate. No more than 1 drink a day for women and no more than 2 drinks a day for men (one drink is equal to 12 ounces of regular beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled alcohol). [2C]
- Alcoholic beverages contain calories and are low in nutritional value.
- It is not advisable to increase alcohol consumption for the purpose of deriving purported health benefit.

Physical Activity and Behavioral Modification

- Physical activity should be included in the nutrition prescription described above. Increased physical activity should be an integral component of any weight reduction plan as it helps maximize the benefits of weight reduction on diabetes control and may prevent coronary and cerebral vascular disease. [1B]
- 60-90 minutes of moderately intensive activity, at least 5 days of the week, is encouraged for weight loss, unless contraindicated. [1B]
- Physical activity should be a mix of cardiovascular, flexibility, and resistance training to maintain or increase lean body mass.

Appendix A

Suggested Approximate Macronutrient Distribution According to Clinical Guideline

Calorie Level	Carbohydrate		Protein		Fat	
	Grams	%	Grams	%	Grams	%
1000	130	~50 *	75	30	27	20
1200	135	45	75-90	25-30	40	30
1500	150-170	40-45	75-110	20-30	50	30
1800	180-200	40-45	90-135	20-30	60	30
2000	200-225	40-45	100-150	20-30	70	~30

*A minimum of 130grams of carbohydrate per day, in a 1000 calorie meal plan, calculates to ~50% of the total daily calories.

Approved by the Joslin Clinical Oversight Committee on 08 07 2011

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Grading System Used in Guideline

Grade of Recommendation	Clarity of risk/benefit	Quality of supporting evidence
1A Strong recommendation High quality of evidence	Benefits clearly outweigh risk and vice versa.	Consistent evidence from well performed randomized, controlled trails or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.
1B Strong recommendation Moderate quality of evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodological flaws, indirect or imprecise), or very strong evidence of some other research design. Further research is likely to have an impact on our confidence in the estimate of the benefit and risk and may change the estimate.
1C Strong recommendation Low quality of evidence	Benefits outweigh risk and burdens, or vice versa.	Evidence from observational studies, unsystematic clinical experience, or from randomized controlled trails with serious flaws. Any estimate of effect is uncertain.
2A Weak recommendation High quality of evidence	Benefits closely balanced with risks and burdens.	Consistent evidence from well performed randomized controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.
2B Weak recommendation Moderate quality of evidence	Benefits closely balanced with risks and burdens; some uncertainly in the estimates of benefits, risks and burdens.	Evidence from randomized controlled trials with important limitations (inconsistent results, methodological flaws, indirect or imprecise), or very strong evidence of some other research design. Further research is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.
2C Weak recommendation Low quality of evidence	Uncertainty in the estimates of benefits, risks and burdens; benefits may be closely balanced with risks and burdens.	Evidence from observational studies, unsystematic clinical experience, or from randomized controlled trails with serious flaws. Any estimate of effect is uncertain.

Evidence graded less than "A" is acceptable to support clinical recommendations in a guideline. It is also assumed that for many important clinical recommendations, it would be unlikely that level A evidence be obtained because appropriate studies may never be performed.

[1] Guyatt G et al. Grading strength of recommendations and quality of evidence in clinical guidelines: Report from an American College of Physicians Task Force. *Chest* 129:174-181, 2006.

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