MNT in Diabetes and Related Disorders

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Management of DM

The major components of the treatment of diabetes are:

A	• **Medical Nutrition Therapy (Diet and Exercise)**
B	• **Oral Antidiabetic Therapy**
C	• **Insulin & Incretinomimetic Therapy**

A diabetes diet — medically known as medical nutrition therapy (MNT) for diabetes simply translates into eating a variety of nutritious foods in moderate amounts and sticking to regular mealtimes. Rather than a restrictive diet, a diabetes diet or MNT is a healthy-eating plan that's naturally rich in nutrients and low in fat and calories, with an emphasis on fruits, vegetables and whole grains. In fact, a diabetes diet is the best eating plan for most everyone.

Expected Outcomes of MNT in Diabetes

- ↓ of 1% of A1C in patients with newly diagnosed Type 1 diabetes
- ↓ of about 2% of A1C in persons with newly diagnosed Type 2 diabetes
- ↓ of about 1% of A1C in persons with Type 2 diabetes of 4-year duration
- ↓ LDL-C by 15-25 mg/dL in 3-6 months

Nutrition recommendations and interventions for diabetes. Diabetes Care 2007;30;S48-S65

Goals of MNT in those with diabetes

- Normal or as near normal as possible glucose, lipids and blood pressure
- Prevent or slow down the rate of development of chronic complications
- Address individual nutrition needs (personal/cultural preferences and willingness to change)
- Maintain pleasure of eating by only limiting food choices when indicated by scientific evidence

ADA Position Statement: Nutrition Recommendations and Interventions for Diabetes. Diabetes Care 2008.

Special Considerations

- **Overweight/Obese**
- **Type 1 Diabetes**
- **Type 2 Diabetes**
- **Gestational Diabetes**

- **For youth with type 1 diabetes, youth with type 2 diabetes, pregnant and lactating women, and older adults with diabetes, to meet the nutritional needs of these unique times in the life cycle**

- **For individuals treated with insulin to provide self-management training for safe conduct of exercise, including the prevention and treatment of hypoglycemia and diabetes treatment during acute illness**

Diabetes Assessment: Referral Data

- Age
- Diagnosis of diabetes and other related medical history
- Medications, including diabetes and other pertinent meds
- Laboratory data (A1C, cholesterol/ lipid profile, albumin to creatinine ratio)
- Blood pressure
- Permission for exercise

Diabetes Assessment Data

- **Diabetes history:** previous diabetes education, use of blood glucose monitoring, diabetes problems/ concerns
- **Food/nutrient history:** current eating habits with beginning modifications
- **Social history:** occupation, hours worked/away from home, living situation, financial issues
- **Medications/supplements:** medications taken, vitamin/mineral/supplement use, herbal supplements

TYPE 1DIABETES MELLITUS

Nutritional-related problems

- **Under-/overweight**
  - **Energy not utilised**
  - **Obesity & insulin administration**
  - **Physical activity / exercise**
- **Hyperglycaemia**
  - **Poor balance between amount of CHO / timing of eating & insulin regimen**
- **Hypoglycaemia**
  - **Brain development**
  - **Illness / infection & food intake / absorption**
- **Dehydration (polyuria)**
- **Long-term complications**
  - **Macro vascular**
  - **Microvascular**

Basic Strategies for Type 1 Diabetes

- For individuals with type 1 diabetes, insulin therapy should be integrated into an individual's dietary and physical activity pattern.
- Individuals using rapid-acting insulin by injection or an insulin pump should adjust the meal and snack insulin doses based on the carbohydrate content of the meals and snacks.
- For individuals using fixed daily insulin doses, carbohydrate intake on a day-to-day basis should be kept consistent with respect to time and amount.
- For planned exercise, insulin doses can be adjusted. For unplanned exercise, extra carbohydrate may be needed.

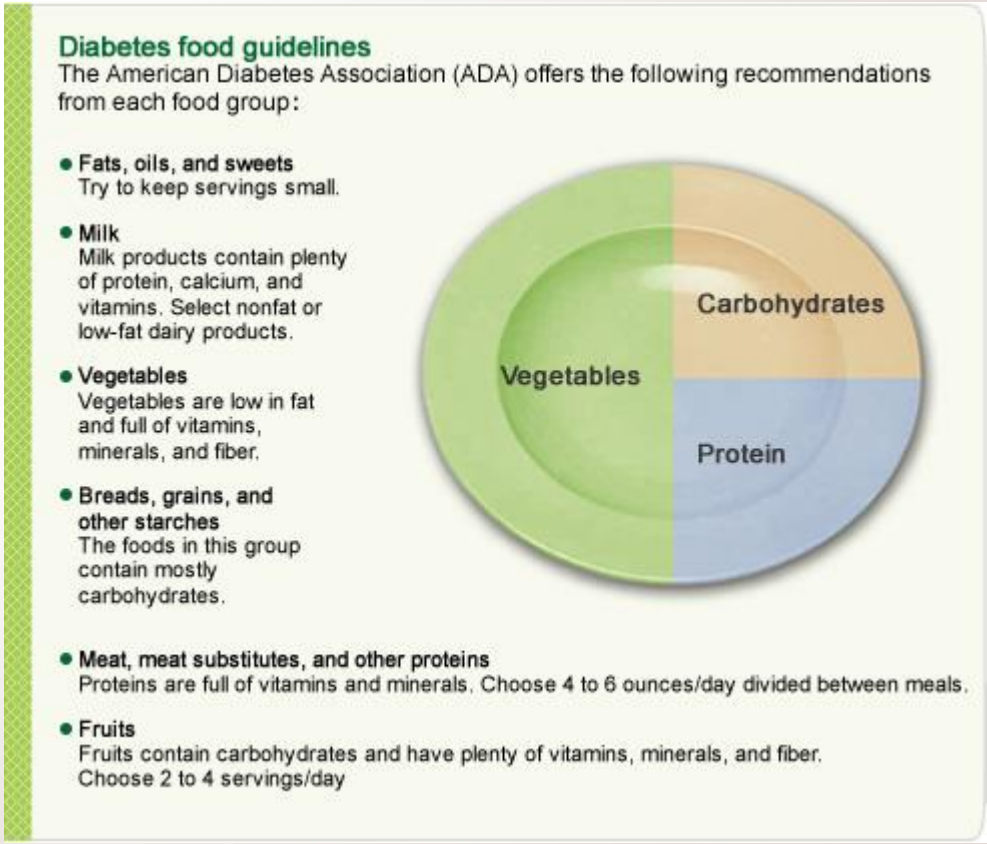
Basic Strategies for Type 2 Diabetes

- Encourage weight loss.
- Moderate calorie restriction (250–500 kcal/day less) is associated with improved control independent of weight loss.
- Spread nutrient intake, especially carbohydrate (CHO) throughout the day.
- Encourage physical activity.
- Decrease fat intake.
- Monitor BG, and add medications if needed.

- **Pregnancy**
  - **Adequate caloric intake and nutrients needed to provide appropriate weight gain for mother and fetus**
  - **Focus on food choices for a healthy and steady weight gain, glycemic control, and absence of ketones**
  - **Aim to develop healthy habits and lifestyle modifications (diet and exercise) for after delivery**

The Diabetes Meal Plan

- **The meal plan should be based on**
  - the patient's current eating habits
  - diabetes medications, if any
  - current weight status
  - collaborative goals (e.g., does the patient desire to lose weight?)

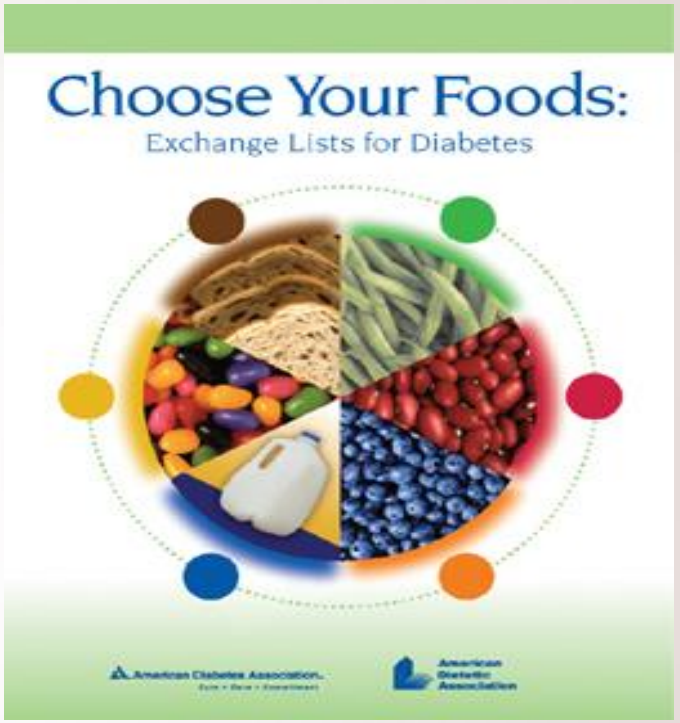


Meal Planning Strategies

- **Timing of meals**
  - **Timing of meals and snacks (no more than 4 hours without eating)**
- **Healthy choices and balanced meals**
- **Variety including nutrient-rich foods and high-fiber foods**
- **Moderation using portion control**
- **Limit refined sugars**

Macronutrients Based On

- Patient's current eating habits (CHO, fat, protein)
- Lipid levels and glycemic control
- Patient goals



Recommended Daily Nutrient Sources

Nutrient		Consensus guidelines
Carbohydrates		50-60 % of total energy
Proteins		15-20 % of total energy
Fats	Total fat	< 30 % of total energy
	Saturated fatty acids	< 10 %
	Trans fatty acids	< 1 %
	PUFAs	5-8 %
	MUFAs	10-15 %

Source : National Consensus Dietary Guidelines For Healthy Living and prevention of obesity, diabetes and related diseases (2009)

There are a few different approaches to creating a diabetes diet that keeps blood glucose level within a normal range.

- **Counting carbohydrates**
- **The exchange system**

Definition of Carb Counting

Definition

A method of teaching people how to "eat consistent amounts of carbohydrate at meals and snacks at similar times each day, with the end goal of achieving glycaemic control and other diabetes and metabolic nutrition goals."[1]It offers a little more freedom than exchange list. The reason why this way of eating is so popular is that it is simple. Have to count carbs per meal or snack.

1. Hope S. Warshaw and Karen M. Bolderrman, *Practical Carbohydrate Counging: A How-to-Teach Guide for Health Professionals,* American Diabetes Association 2008

Advantages:

Effectiveness[2]
Flexibility[3]
Ease of implementation[4]

2,3,4. Practical Carbohydrate Counting, American Diabetes Association, 2001

Carbohydrate Counting

Carbohydrate, or carb counting is a method of calculating grams of carbohydrate consumed at meals and snacks.

Foods that contain carb have the greatest effect on blood glucose compared to foods that contain protein or fat.

Carbohydrate counting can be used by anyone with diabetes, not just people taking insulin.

The amount of meal and snack carbohydrate is adjusted based on the pre-meal blood glucose reading.

Depending on the reading, more or less carbohydrate may be eaten. Likewise, insulin may be adjusted based on what the person wants to eat.

For example, if patient want to eat a much larger meal than usual, carb counting can help him determine how much extra insulin to take.

Most adults with diabetes should eat no more than 200 grams per day. But each person should have their own carbohydrate goal.

A place to start is at about 45-60 grams of carbohydrate at a meal.

What Foods Have Carbohydrate?

Foods that contain carbohydrate or "carbs" are:

- grains like rice, oatmeal, and barley
- grain-based foods like bread, cereal, pasta, and crackers
- starchy vegetables like potatoes, peas and corn
- fruit and juice
- milk and yogurt
- dried beans
- sweets and snack foods like sodas, juice drinks, cake, cookies, candy, and chips

- Non-starchy vegetables like lettuce, cucumbers, broccoli, and cauliflower have a little bit of carbohydrate but in general are very low.

➢The exchange system

The word exchange refers to the fact that each item on a particular list in the portion listed may be interchanged with any other food item on the same list.

- **An exchange can be explained as a substitution, choice, or serving.**
- **Each list is a group of measured or weighed foods of approximately the same nutritional value.**
- **Within each food list, one exchange is approximately equal to another in calories , carbohydrate , protein , and fat .**

Foods on each list have about the same amount of carbohydrate, protein, fat and calories.

To use the exchange lists, an individual needs an individualized meal plan that outlines the number of exchanges from each list for each meal and for snacks.

The meal plan is developed in cooperation with the person with diabetes and is based on an assessment of eating changes that would assist the individual in achieving his or her target metabolic goals and of changes the individual is willing and able to make.

Because of the accuracy and convenience of the exchange system, the exchange lists are used for weight management as well for diabetes management.

The exchange system categorizes foods into three main groups:

1-Carbohydrates

2-Meat and Meat Substitutes

3-Fats.

Foods are further subdivided in these three groups into specific exchange lists.

1-The Carbohydrate Group contains(6) the *Starch, *Fruit, *Milk, *Sweets and *desserts (other carbohydrates), and* Vegetable lists.

Foods from the Starch, Fruit, Milk, and Sweets lists can be interchanged in the meal plan, as they each contain foods with 60 to 90 calories and approximately 15 grams of carbohydrate.

Exchange Examples

1 Starch Exchange=
15 g carb, 3 g pro, 0-1 g fat, 80 kcals

- 1 slice bread
- 1 6-in tortilla
- ½ English Muffin
- ½ cup hot cereal
- 3 cups popcorn
- ½ cup corn
- ½ cup sweet potato

1 Fruit Exchange=
15 g carb, 0 g pro, 0 g fat, 60 kcals

- 1 small banana
- 1 small apple
- ½ cup canned fruit or fresh fruit
- ½ cup fruit juice
- ¼ cup dried fruit

2-The Meat and Meat Substitute Group

contains food sources of protein and fat.

The group is divided into four lists: *Very Lean Meats, *Lean Meats, *Medium-Fat Meats, and *High-Fat Meats.
Allowing the user to see which meats are low-fat and which meats are high-fat.

The lists have foods containing 35, 55, 75, and 100 calories, and 1, 3, 5, and 8 grams of fat, respectively.

3-The Fat Group contains three lists:
Monounsaturated Fats, Polyunsaturated Fats, and Saturated Fats.
Each food source contains an average of 45 calories and 5 grams of fat.

- **The exchange lists also identify foods that contribute significant amounts of sodium. A sodium symbol is shown next to foods that contain 400 mg or more of sodium per exchange serving.**

One Carbohydrate Exchange= 15 grams carbohydrate

1 cup or 8floz milk or plain yogurt

1/3 cup pasta, couscous, quinoa or rice, barley, beans, lentils

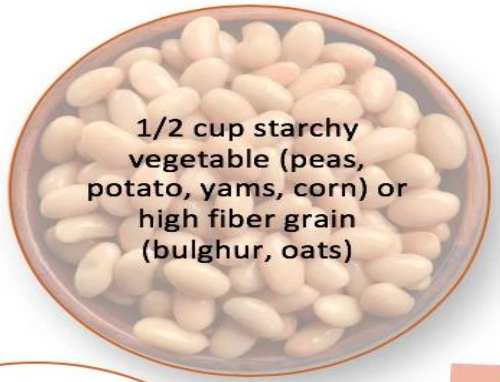
1 slice of bread, 1 6" tortilla or roti, or 1/2 hamburger or hotdog bun

1 tablespoon honey, syrup, or jam

1 cup fresh or frozen melon, berries or papaya, 1/2 cup all other fresh or canned fruit

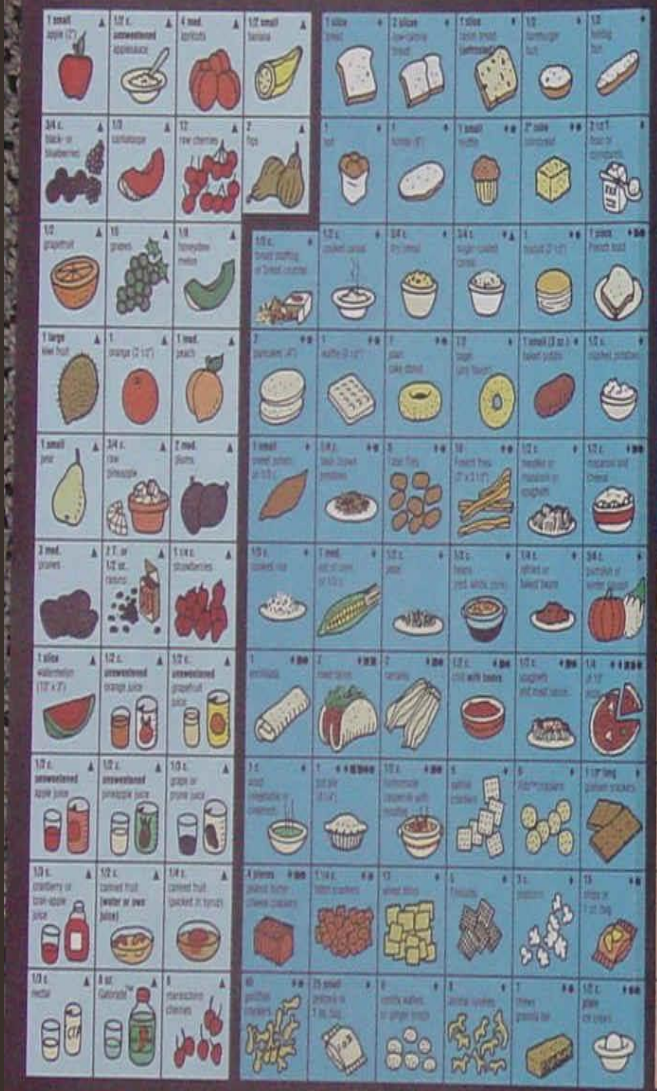
4-6 Crackers

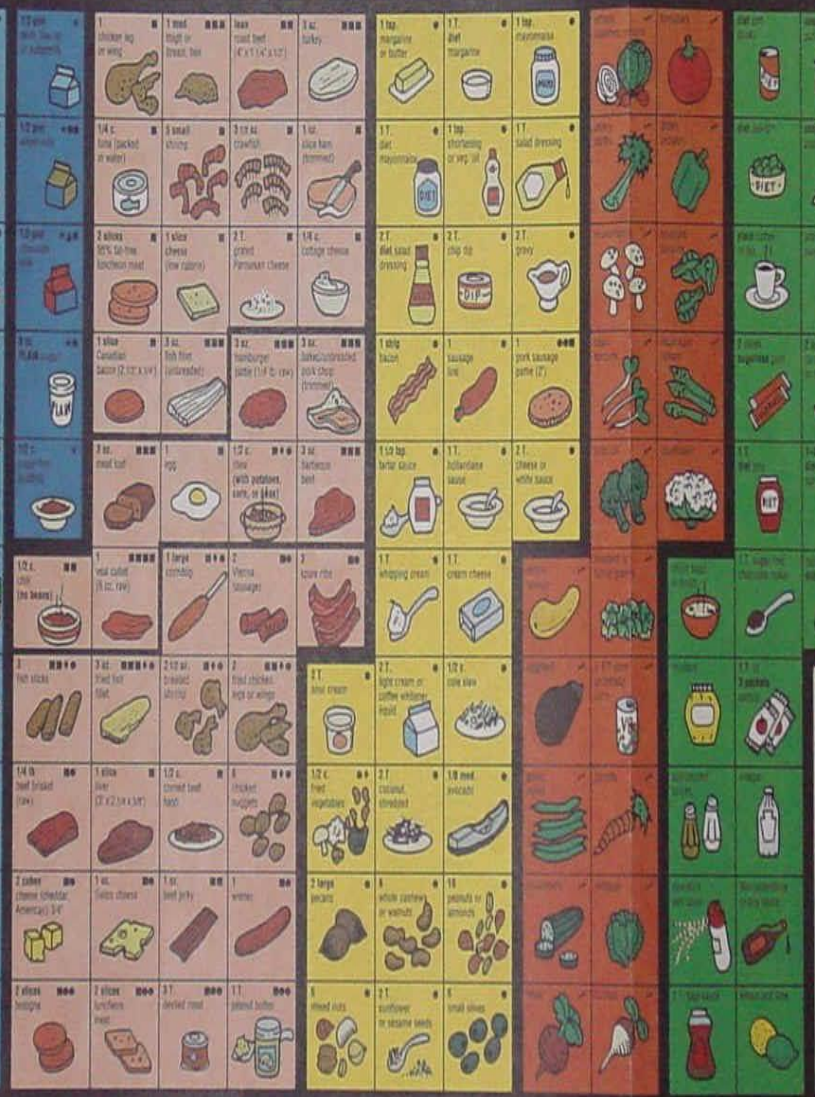
1/2 cup starchy vegetable (peas, potato, yams, corn) or high fiber grain (bulghur, oats)



YOUR DAILY MEAL PLAN

fruit ▲ exchange | starch/bread ♦ exchange | milk ★ exchange | protein ■ exchange | fat & oil ● exchange | free ✓ vegetables | free foods | _____'s daily meal plan





Age _____ CHO gms. _____

Height _____ (_____ cm % for age) Pro gms. _____

Weight _____ (_____ kg % for age) Fat gms. _____

Calories _____

Dietician _____

Phone _____

Time:	Breakfast	Snack	Lunch	Snack	Supper	Snack
FRUIT ▲						
STARCH/BREAD ♦						
MILK ★						
PROTEIN ■						
FAT ●						
FREE VEGETABLES ✓						

Legend

▲ One fruit exchange = 15 grams carbohydrates (60 calories).

△ One half fruit exchange.

♦ One starch exchange = 15 grams carbohydrates, 3 grams protein (80 calories).

◇ One half starch exchange.

★ One milk exchange=12 grams carbohydrates, 8 grams protein (90 calories) for skim milk, 1% milk, or buttermilk.

☆ One-half milk exchange.

■ One protein exchange = 7 grams protein; the amount of fat and number of calories vary, depending on what kind of protein you choose. The chart is divided into 3 parts from top (leanest) to the bottom (highest in fat): lean = 3 grams of fat, 55 calories; med. fat = 5 grams fat, 75 calories; high fat = 8 grams fat, 100 calories.

● One fat exchange = 5 grams fat (45 calories).

✓ Free vegetables may be eaten at mealtimes, but if you eat a large amount—more than 1-1/2 cups of the last six vegetables—then consider that amount as one starch/bread exchange (1/2 cup vegetables = 5 grams carbohydrates, 2 grams protein; 25 calories).

Free foods may be eaten as desired. Consult your dietitian for further recommendations regarding this group.

Measurements

1 tsp. = 1 level teaspoon
1 T. = 1 level tablespoon
2 T. = 1 fluid ounce
1 c. = 1 measured cup, 8 oz., or 1/2 pint
1/2 c. = 1/2 measured cup, 4 oz.

5 g = 1 tsp.
30 g = 1 oz.

* Whole milk has more calories because fat has not been removed.

Advantages and Disadvantages

An advantage of the food exchange system is that it provides a system in which a wide selection of foods can be included, thereby offering variety and flexibility to the person with diabetes. Other advantages of the lists are:

(1) They provide a framework to group foods with similar carbohydrate, protein, fat, and calorie contents.

(2) They emphasize important management concepts, such as carbohydrate amounts, fat modification, calorie control, and awareness of high-sodium foods.

(3) By making food choices from each of the different lists a variety of healthful food choices can be assured

(4) They provide a system that allows individuals to be accountable for what they eat.

Despite the many advantages the exchange lists offer, they may not be the most appropriate meal-planning tool for many persons.

They are not appropriate for those who cannot understand the concept of "exchanging" foods.

Because the exchange booklets are written at a ninth- to tenth-grade reading level, individuals must be able to either read at this level or understand the concept of exchanging foods. For an individual to use them effectively, several educational sessions, and practice, may be required.

Diet Plans: Exchange Groups

TABLE 2.5 Exchange Groups and Their Energy and Macronutrient Content (1 of 2)

Exchange List	Calories	Carbohydrate (g)	Fat (g)	Protein (g)	Serving Sizes
Starch/ Bread	80	15	Trace (0.5 to 1)	3	1 oz bread ¾ cup dry, unsweetened cereal ½ cup cooked cereal 4–5 snack crackers ½ cup pasta or starchy vegetable ½ cup rice, grains, stuffings 1 cup soup ½ cup cooked beans, peas, lentils 3 cups popcorn without added fat
Meat and Meat Substitutes					
Lean Meat	55	0	3	7	1 oz fish, poultry, lean beef (round sirloin, flank steak), processed hams, veal, cottage cheese, low-fat cheeses, lean luncheon meats
Medium-Fat Meat	75	0	5	7	1 oz of most beef and pork cuts, poultry with skin, skim-milk cheeses, 1 egg
High-Fat Meat	100	0	8	7	1 oz fried meats, poultry, or fish; 1 oz prime cuts of beef, corned beef, spareribs, regular cheeses, regular luncheon meats, sausages, hot dogs, and peanut butter
Vegetables	25	5	0	2	½ cup cooked vegetables ½ cup vegetable juice 1 cup raw vegetables

Table 2.5 (1 of 2)

Meal Plan: Oral Medications

- **May do well with smaller, more frequent meals and snacks.**
- **Snack servings should be taken from the meal plan**

Meal Plan: Insulin

- Can start with the meal plan and devise an insulin regimen to fit
- Many patients require a bedtime snack to prevent night-time hypoglycemia
- Patients who use morning intermediate-acting insulin (NPH) may require afternoon snack
- Patients on rapid-acting insulin do not need a snack

Carbohydrates in Diabetes

- Dietary pattern that includes CHO from fruits, vegetables, whole grains, legumes, and low fat milk is encouraged for good health
- Monitoring CHO, whether by CHO counting, exchange, or estimation remains a key strategy in achieving glycemic control

- Focuses on CHO as major driver of post-prandial blood glucose
- Can be used for intensive management or for basic meal planning
- May be most appropriate for Type 1 patients at desirable weight
- Must still address energy needs and composition of overall diet
- Allows increased flexibility
- 1 carbohydrate serving = 15 grams

- **Sucrose-containing foods can be substituted for other carbohydrates in the meal plan or, if added to the meal plan, covered with insulin or other glucose-lowering medications.**

- **Care should be taken to avoid excess energy intake.**

- **The use of glycemic index and load may provide a modest additional benefit over that observed when total CHO is considered alone**

Glycemic Index

- **The blood glucose response of a given food compared to an equal amount of a CHO standard (typically glucose or white bread)**

	Higher GI (55 and above)	Lower GI (below 55)
	Spaghetti *(white, cooked)*	**Spaghetti** *(whole grain, cooked)*
Amount	180 g • 1¼ cups	180 g • 1¼ cups
Carbohydrate	56 g	48 g
Glycemic Index	58	42
Glycemic Load	32	20
	Grapes	**Apple***
Amount	120 g • 1⅓ cups	102 g • small
Carbohydrate	22 g	17 g
Glycemic Index	59	39
Glycemic Load	13	6
	White Rice *(cooked)*	**Brown Rice** *(cooked)*
Amount	150 g • 1 cup	150 g • ¾ cup
Carbohydrate	42 g	34 g
Glycemic Index	89	50
Glycemic Load	38	17






*Weight is with core and stem removed.

SOURCES: U.S. Department of Agriculture; *Diabetes Care*, 2008

Examples of G.I. ratings

High-G.I.		Low-G.I.*	
Foods	Rating	Foods	Rating
Glucose	100	Grapefruit Juice	48
Baguette	95	All Bran	43
Cornflakes	84	Oatmeal	42
Rice Cakes	82	Spaghetti	41

Any food rating less than 55 in the G.I. is considered low

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Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

Grains / Starchs		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								
Bagel, White	103								

The glycemic index is a useful aid for diabetics or for anyone who wishes to control their blood glucose levels.

A diet based on foods with low glycemic response has been associated with diabetes management, improved blood lipids (cholesterol), reduced risk of heart disease, and weight management

Not only will foods with a low glycemic index take longer to digest (therefore prolonging satiety) they will also maintain blood glucose levels at a relatively constant state.

Foods with a high glycemic index not only digest quickly, they can cause extreme fluctuations in blood glucose.

There are some specific factors to look for in foods that can indicate their glycemic index:

Low glycemic foods contain: Fat, Whole grains, Protein, Raw Starches, legumes, vegetables, fruits and dairy products.

High Glycemic Foods contain: Refined grains, refined sugars, increased amylopectin: amylose ratio, and often high sugar fruits have a high glycemic index

Switching from a high glycemic index diet to a low glycemic index diet can be made relatively easy.

Switching white bread and pastas to whole grain, eating breakfast cereals from oats, bran or barley, add more fruits and vegetables when cooking and reducing potato consumption can all aid in lowering glycemic index.

GLYCEMIC INDEX

Influenced by various factors

- Starch structure
- Fiber content
- Cooking methods
- Degree of processing
- Whether it is eaten in the context of a meal
- Presence or absence of fat
- A given food can elicit highly variable responses

The glycemic load (GL) of food is a number that estimates how much the food will raise a person's blood glucose level after eating it.

One unit of glycemic load approximates the effect of consuming one gram of glucose.

Glycemic load accounts for how much carbohydrate is in the food and how much each gram of carbohydrate in the food raises blood glucose levels.

Glycemic load is based on the glycemic index (GI), and is defined as the grams of available carbohydrate in the food times the food's GI and divided by 100.

For one serving of a food, a GL greater than 20 is considered high, a GL of 11-19 is considered medium, and a GL of 10 or less is considered low.

Glycemic Index- examples

High GI ≥ 70 **potatoes, white bread**

Low GI ≤ 55 **whole grain pasta**

⇧ Glycemic index means ⇧ Glycemic load

Not just about *individual* foods – about your diet

GI: glycemic index; GL: glycemic load

Fiber and Diabetes

- As for the general population, people with diabetes are encouraged to consume a variety of fiber-containing foods.
- It requires very large amount of fiber (~50 grams) to have a beneficial effect on blood glucose level.

- Soluble fiber: 3 grams of soluble fiber (3 servings of oatmeal) or 3 apples can lower total cholesterol by 5 mg (2%)

Protein and Diabetes

- Evidence to suggest that usual protein intake (15-20% of energy) should be modified
- In individuals with Type 2 diabetes, ingested protein can increase insulin response without increasing plasma glucose concentrations.
- Therefore, protein should not be used to treat acute or prevent night time hypoglycemia

- **High-protein diets are not recommended as a method for weight loss at this time. The long-term effects of protein intake >20% of calories on diabetes management and its complications are unknown.**

- **Although such diets may produce short-term weight loss and improved glycaemia, it has not been established that these benefits are maintained long term, and long-term effects on kidney function for persons with diabetes are unknown.**

Dietary Fat

- **Saturated Fat: <7% of total calories**
- **Cholesterol: <200 mg/day in people with diabetes**
- **Minimize intake of trans-fatty acids**
- **Two or more servings of fish per week providing OMEGA-3 polyunsaturated fatty acids are recommended**

Lipid Goals in Diabetes

- **LDL cholesterol <100 mg/dl**
- **HDL cholesterol**

  Men >40 mg/dl

  Women >50 mg/dl
- **Triglycerides <150 mg/dl**

Blood Pressure Goals in Diabetes

- **Patients with diabetes should be treated to a systolic blood pressure <130 mmHg**

- **Patients with diabetes should be treated to a diastolic blood pressure of <80 mmHg**

Sodium

- Association between hypertension (HTN) and both types of diabetes mellitus (DM)
- Same intake as general population is recommended for otherwise healthy people with DM—less than 3000 mg/day
- For people with mild HTN and diabetes—should have less than 2400 mg/day
- For people with more serious HTN or edematous clients with nephropathy recommend 2000 mg/day or less

- **Weight loss**
  - **Weight loss has been shown to improve insulin resistance**
  - **Encourage dietary changes, increased physical activity, and behavior modification**

- **Physical activity and behavior modification are important components of weight loss programs and are most helpful in maintenance of weight loss.**

  - **Weight loss medications may be considered and can help with an additional 5-10% weight loss with lifestyle modifications**
  - **Bariatric surgery**

- **Short term weight loss in subjects with Type 2 diabetes is associated with improvement in insulin resistance, glycaemia, serum lipids, and blood pressure.**

Micronutrients

- There is no clear evidence of benefit from vitamin or mineral supplementation in people with diabetes (compared with the general population) who do not have underlying deficiencies.

- Routine supplementation with antioxidants such as vitamins E and C and carotene is not advised because of lack of evidence of efficacy and concern related to long term safety benefit from chromium supplementation in individuals with diabetes or obesity has not been clearly demonstrated and therefore can not be recommended

- Vitamin/mineral needs of people with diabetes who are healthy appear to be adequately met by the RDAs.

- Those who may need supplementation include those on extreme weight-reducing diets, strict vegetarians, the elderly, pregnant or lactating women, clients with malabsorption disorders, congestive heart failure (CHF) or myocardial infarction (MI)

- Chromium and magnesium are beneficial only if the client is deficient.

Goals of MNT for Diabetes in Children

- **Maintain normal growth and development**
  - **Evaluate using growth charts every 3-6 months**
- **Base nutrition prescription on the nutrition assessment**
  - **Re-evaluate every 3-6 months**
- **Meal planning approach can be based on CHO counting for increased flexibility or other systems**
- **Review blood glucose records and revise medication regimen as necessary**

- **Improved glycemic control with intensive insulin therapy sometimes results in weight gain**
- **Insulin therapy should be integrated into usual eating and exercise habits**
- **Overtreatment of hypoglycemia should be avoided**
- **Adjustments of insulin should be made for exercise**

MNT for Type 2 Diabetes in Youth

- **Cessation of excessive weight gain**
- **Promotion of normal growth and development**
- **Encourage healthy eating habits and increased activity for the whole family**
- **Address other health risk factors**
- **Add Metformin if lifestyle changes are insufficient to achieve goals**

MNT Essential Self-Management Skills

- Sources of CHO, pro, fat
- Understanding nutrition labels
- Modification of fat intake
- Use of BG monitoring data for problem solving

- Recipes, menu ideas, cookbooks
- Vitamin, mineral supplements
- Behavior modification techniques

- Adjustments of CHO or insulin for exercise
- Guidelines for eating out
- Snack choices
- Mealtime adjustments
- Use of sugar-containing foods and non-nutritive sweeteners
- Problem solving tips for special occasions
- Travel schedule changes
- Work shifts if applicable