



**Diabetes Fundamentals
Nutrition and Exercise**

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Diabetes Fundamentals



- ▶ Nutrition guidelines
 - ▶ Describe current MNT recommendations
 - ▶ List 3 teaching strategies to help patients succeed
- ▶ Exercise Guidelines
 - ▶ Discuss exercise goals for people with diabetes
 - ▶ Describe safety precautions

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Good Resources

- ▶ Review Exchange List
- ▶ Review ADA Standards of Care:

Nutrition Therapy Recommendations for the Management of Adults With Diabetes

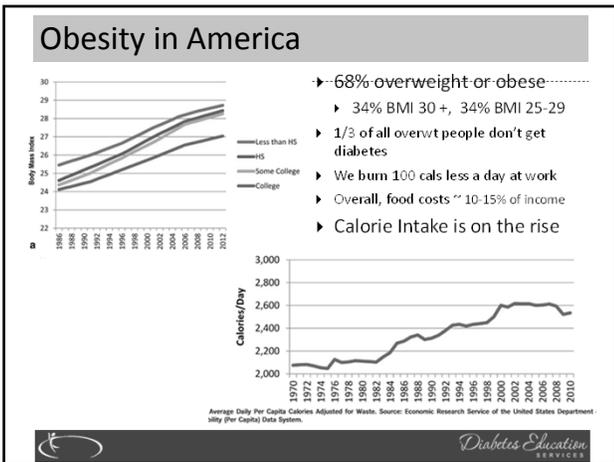
Reviews/Commentaries/ADA Statements

Exercise and Type 2 Diabetes
The American College of Sports Medicine and the American Diabetes Association: joint position statement

Susan R. Coxson, PhD, FACSM¹ Richard E. Ryan, PhD² *Exercise (CV05), Diabetes, kidney and*
 Ronald J. Sacks, MD, MPH, FACSM³ Lisa Coates-Lewis, PhD, FACSM⁴ *nerve disease, and angiotensin (201). All*
 Ed Snellen, PhD, FACSM⁵ David L. Americano, PhD, MS⁶ *through regular physical activity (19) (long*
 Patricia A. Brackley, PhD⁷ Brian Buman, PhD, FACSM⁸ *papers) in *Diabetes Mellitus and its Complications**
 Beverly J. Reusker, PhD⁹ *(ISSN 0149-0531) 119, 208, 210, 208.*
 most recent with issue 2. Diabetes care can see

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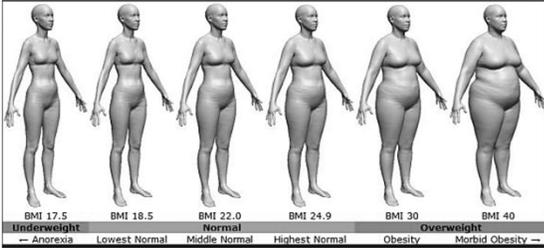


BMI Chart with Ranges

Body Mass Index Table

Height (inches)	Normal				Overweight				Obese				Extreme Obesity																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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BMI – Visual Image



Diabetes Education SERVICES

Poll Question 1

▶ For overwt patient with new type 2 diabetes, what would be appropriate nutrition goals? (multiple)

- A. Avoid all desserts and processed foods
- B. Try to lose 5-10% of current body weight
- C. Eat less than 7% saturated fat
- D. Eat breakfast
- E. Avoid sugary beverages



Diabetes Education SERVICES

Assess Knowledge, Self Management Skills



- ▶ Eating Patterns
 - ▶ Preferences, portion sizes, timing on meals and snacks, eating environment, disordered eating



Diabetes Education SERVICES

Medical Nutrition Therapy – ADA 2015



- No ideal percentage of calories from protein, carbohydrate and fat for people with diabetes.
- Macronutrient distribution should be based on an *individualized assessment* of eating patterns, preferences and metabolic goals.



Diabetes Education SERVICES

4. Goals of Medical Nutrition Therapy – ADA Promote and support healthful eating patterns

- ▶ Emphasize eating a variety of nutrient dense foods in appropriate portions to:
 - ▶ Attain individualized B/P, BG and lipid goals
 - ▶ Attain and maintain body wt goals
 - ▶ Delay and/or prevent complications
- ▶ Address individual nutrition needs based on
 - ▶ personal and cultural preferences, access to food, willingness and barriers
- ▶ Maintain pleasure of eating by providing positive messages about food
 - ▶ Limit food choices only when backed by science
- ▶ Provide practical tools for day-to-day planning rather than focusing on individual macronutrients.



Diabetes Education SERVICES

Medical Nutrition Therapy – What Medicare Covers

- ▶ 3 hours initial benefit in first calendar year
- ▶ 2 hours follow-up annually
- ▶ Must be ADA/AADE Recognized
- ▶ MNT for diabetes and renal



Diabetes Education SERVICES

Approach Depends on Patient

- New Type 2

- Portion Control
- Plate Method
- Record Keeping
- Education



- On Insulin?

- Intensive insulin therapy with carb counting should be offered
- Simpler approach may be required for some patients



Diabetes Education SERVICES

Sodium, Fat and Fiber

- ▶ Sodium – Try and keep less than 2,300 mg a day
- ▶ Vitamin and mineral supplements not recommended -lack of evidence.
- ▶ Fat - same as recommended for general population
 - ▶ Less than 10% saturated fat,
 - ▶ Limit trans fats
 - ▶ Less than 300 mg cholesterol daily
 - ▶ Mediterranean Diet looks like good option
- ▶ Fiber 25 -38 gms a day



Diabetes Education SERVICES

Choose Healthy, High Fiber Carbs

- o Carbs have fiber, vitamins, minerals and phytonutrients
- o 25 gms of fiber a day
- o Power Carbs include:
 - o Beans
 - o Veggies
 - o Fruits
 - o Whole grain foods



Diabetes Education SERVICES

Average American Consumes 22 teaspoons of sugar a day

- ▶ Warning label on sodas proposed
- ▶ One soda has 12 teaspoons sugar
- ▶ On avg, 1 person consumes 40 gallons of soda each year
- ▶ ADA guidelines "limit sodas and beverages with sugar, High Fructose Corn Syrup, (HFCS)



Diabetes Education SERVICES

WHO limits on Sodas

- ▶ According to Harvard researchers, drinking 1-2 sugary beverages per day increases a person's risk of developing Type 2 by 26%.
- ▶ Mexico's soda tax took effect Jan. 1 2014, and sales of sugar-sweetened drinks fell 10% in the next 3 months and people drank more water and milk
- ▶ Drinking a 20 ounce soda a day was equivalent to an average of 4.6 years of telomere shortening UCSF 2014
- ▶ World Health Organization
 - ▶ Reduce daily free sugar intake to 10% ~around 12tsp.
 - ▶ Ideally < 5% of total energy intake for additional health benefits
- ▶ ADA - Sugary beverages associated with possibly visceral adiposity



Diabetes Education SERVICES

Teaching About Eating Healthy

Major food groups

"Handy Diet"



Plate Method

Exchange Lists

Food Diaries / Glucose Records

Carbohydrate Counting

Assess what is best for the situation.



Choose **MyPlate** gov



Diabetes Education SERVICES

Move toward the Tomato

Losing 2-8kg Early in diagnosis Type 2 Helpful
ADA 2014

- ▶ **Weight Loss –**
 - ▶ *The optimal macronutrient intake to lose weight not known*
 - ▶ *The literature does not support one particular nutrition therapy to reduce weight, but rather a spectrum of eating patterns that result in reduced energy intake.*
- ▶ **To lose one pound – avoid 3,500 cal**
 - ▶ **Decrease intake 250-500 cal daily + exercise**

Diabetes Education SERVICES

Successful weight loss strategies include

- ▶ Weekly self-weighing
- ▶ Eat breakfast
- ▶ Reduce fast food intake.
- ▶ Decrease portion size
- ▶ Increase physical activity
- ▶ Use meal replacements
- ▶ Eat healthy foods

Diabetes Education SERVICES

Bariatric Surgery

- ▶ Consider for adults with BMI 35 or greater
- ▶ Increases gut hormone availability
- ▶ Need life long support and monitoring
- ▶ More likely to cause remission* with recently diagnosed diabetes (more beta cell mass)
 - ▶ 68% remission within 5 years
 - ▶ 35% redeveloped diabetes
- ▶ Long term benefits still under investigation

*remission = BG levels normal without meds



Diabetes Education SERVICES

USDA www.myplate.gov

Balancing Calories

- ▶ Enjoy your food, but eat less.
- ▶ Avoid oversized portions.

Foods to Increase

- ▶ Make half your plate fruits and vegetables.
- ▶ Make at least half your grains whole grains.
- ▶ Switch to fat-free or low-fat (1%) milk.

Foods to Reduce

- ▶ Compare sodium in foods like soup, bread, and frozen meals — and choose the foods with lower numbers.
- Drink water instead of sugary drinks.



Diabetes Education SERVICES

Another plate example

Mi planificador de plato Una comida saludable sabe buenísima



El tamaño del Plato es una manera simple de planificar las comidas para usted y su familia. No necesita contar nada ni hacer largas listas de alimentos. Todo lo que necesita es un plato de 9 pulgadas.

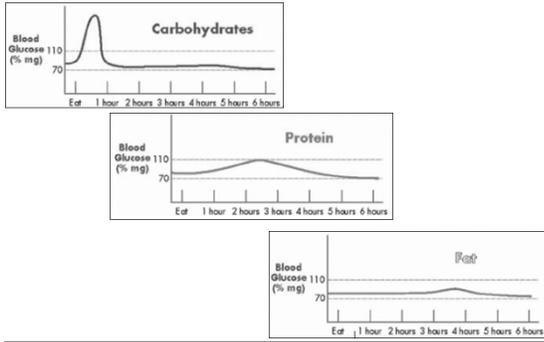


1/4 de proteína. 1/4 de almidón. 1/2 de vegetales. Plato de 9 pulgadas



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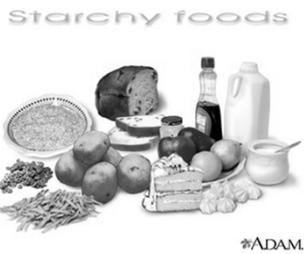
How nutrients affect blood sugar



Diabetes Education SERVICES

Carbs affect Post meal Blood Glucose

- o Starch
- o Fruit
- o Milk
- o Desserts



ADAM



Diabetes Education SERVICES

Poll Question 2

- ▶ Which of the following servings equals ~ 15 gms of carbohydrate? (multiple)
- A. Small bagel
 - B. 1 ¼ cup strawberries
 - C. Cup of milk
 - D. ½ cup of rice
 - E. ½ cup of jello



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Carbohydrate Needs for Most Adults

	<u>Grams</u>	<u>Servings</u>
Each Meal	45-60 gm	3 - 4
Snacks	15-30 gm	1- 2



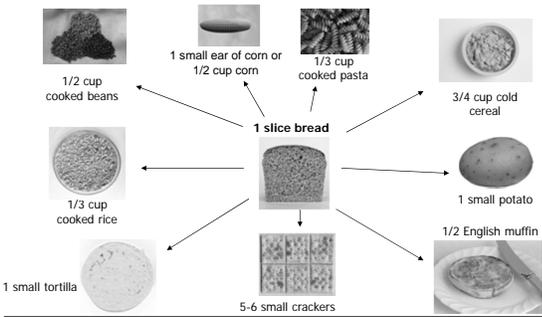
Carbs affect Post Meal Blood Glucose
RDA – at least 130 gms of Carb a day



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Carb Counting - Starch

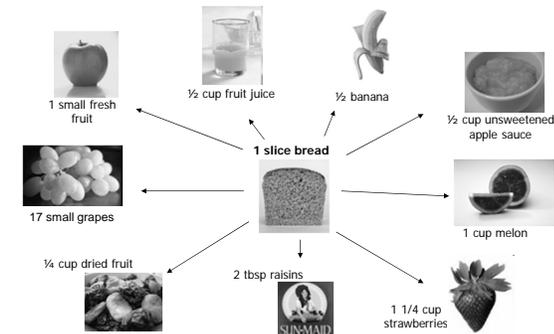
Each Food has:
80 Calories
15 grams carb



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Carb counting- fruit

Each Food has:
60 Calories
15 grams carb



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Carb Counting - Milk

Each Food has:
90-150 calories
12-15 grams carb

1 slice bread

- 8 oz buttermilk
- 1 packet diet hot cocoa
- 8 oz milk
- 8 oz soy milk
- 6 oz plain yogurt
- 6 oz light fruit yogurt

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Carb Counting - Sweets

Each Food has:
Calories vary
15 grams carb

1 slice bread

- 2 inch square cake or brownie, unfrosted
- 1/2 cup diet pudding
- 1/2 cup regular jello
- 2 tsp light syrup
- 2 small cookies
- 1/2 cup ice cream or frozen yogurt
- 1/2 cup sherbet
- 1/4 cup sorbet
- 1 tbsp syrup, jam, jelly, table sugar, honey

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10 Superfoods

- ▶ Beans
- ▶ Dark Green Leafy Veggies
- ▶ Citrus Fruit
- ▶ Sweet Potatoes
- ▶ Berries
- ▶ Tomatoes
- ▶ Fish High in Omega-3 Fatty Acids
- ▶ Whole Grains
- ▶ Nuts
- ▶ Fat-Free Milk and Yogurt

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Unhealthy Dietary Fats

- ▶ Trans Fat – strong link between diet high in trans fat and heart disease – law to eliminate by 2016
 - ▶ Lowers HDL
 - ▶ Increases LDL
 - ▶ May increase wt gain and abdominal fat
 - ▶ May contribute to type 2 diabetes
- ▶ Look on label and look for words “hydrogenated” or “partially hydrogenated”.



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Saturated Fatty Acids – Not all equal

- ▶ The odds of incident type 2 diabetes is lower in people who have high plasma levels of odd-chain saturated fatty acids that come primarily from dairy fats
- ▶ In contrast, even-chain saturated fatty acids, such as those that come from consuming alcohol, soft drinks, or margarine, were associated with a greater likelihood of diabetes in the study, published online August 6 in *Lancet Diabetes & Endocrinology*. These fatty acids include palmitic acid, the most common saturated fatty acid in the US diet.
- ▶ "These results add to growing evidence that dairy fat might reduce insulin resistance and type 2 diabetes; benefits that might be greatest for cheese and yogurt,"
 - ▶ Dr. Mozzafarian -



Diabetes Education SERVICES

Diabetes Prevention Program Focus on fat = wt loss success

To help you lose weight and improve your health, stay as close as possible to your fat and calorie goals.
Find your starting weight below. Your fat and calorie goals are in the same row. Circle your fat and calorie goals.

Weight (lb)	Fat Goal (grams)	Calorie Goal
120-174	33	1,200
175-219	42	1,500
220-249	50	1,800
>250	55	2,000

<http://www.cdc.gov/diabetes/prevention/recognition/curriculum.htm>



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Protein Recommendations -2015

- ▶ Diabetes and no diabetes kidney disease, evidence is inconclusive for ideal amount of protein, goals should be individualized.
- ▶ Diabetes and kidney failure, reducing the amount of dietary protein is **not** recommended. Does not improve outcomes.
- ▶ RDA – 0.8gm good quality protein/kg/day
 - ▶ Protein seems to stimulate insulin response, do not use to treat hypoglycemia



Diabetes Education SERVICES

Protein – 4 cal per gram

- Choose lean protein
 - Poultry, fish, egg, lean beef
 - Plant sources- beans, lentils, nuts
 - Low fat cheese- cottage cheese, mozzarella cheese
- Limit high fat protein
 - Bacon & sausage
 - High fat cuts of beef
 - Whole milk cheese
- Serving size
 - 1 oz = ¼ cup
 - 3 oz = deck of cards



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Poll Question 3

- ▶ Which of the following is true about alcohol and diabetes? (multiple)
 - White wine increases blood sugars
 - Men can have 2 drinks and women can have one drink a day
 - Alcohol increases risk of hypoglycemia
 - "If you are going to drink, eat a starchy food"
 - A shot of tequila is better than a margarita.



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Using Alcohol Safely

- ▶ Women- 1 or fewer alcoholic drinks a day
- ▶ Men 2 or fewer alcoholic drinks a day
 - ▶ 1 alcoholic drink equals
 - ▶ 12 oz beer, 5 oz glass of wine, or 1.5 oz distilled spirits (vodka, gin etc)
- ▶ If drink, limit amount and drink w/ food.
- ▶ Can cause hypo and worsen neuropathy



Ms. Gonzales' Daily Meal plan

Break	Lunch	Dinner	Night
5 corn tortillas, 1/2 c. beans, salsa, peppers, egg beaters	Sandwich, low fat potato chips, 1c. juice, 2-4 lowfat cookies	Lg bowl low salt soup, 1c. rice, BBQ meat, salad & cooked vegs 1 glass wine	1 bowl of cereal
Avg BG 120's	Avg BG 200's	Avg BG 200's	Avg BG 180's



Poll Question 4

- ▶ If someone with type 1 is underweight, what are some possible causes? (multiple)
 - A. Eating too much junk food
 - B. Celiac disease
 - C. A sit down job
 - D. DiaBulimia
 - E. Gastroparesis.



Celiac Disease



- ▶ Type 1 – Affects ~10 \%
- ▶ Immune reaction to gluten - affects function of villi in intestine, decreasing nutrient absorption
- ▶ S/S: bloating, malabsorption, wt loss, fatty stools, diarrhea, muscle tenderness, failure to thrive
- ▶ Diagnosis: measure either anti-endomysial antibodies (EMA) titers or tissue transglutaminase.
- ▶ If positive, refer to GI specialist for endoscopy and biopsy of small intestine to confirm diagnosis.



Diabetes Education SERVICES

Treatment – Gluten Free for Life



- ▶ Avoid
 - ▶ Wheat (einkorn, durum, faro, graham, kamut, semolina, spelt),
 - ▶ Rye
 - ▶ Barley
- ▶ Refer to a dietitian

ASSOCIATED AUTOIMMUNE DISORDERS

- ▶ Insulin-dependent Type 1 Diabetes Mellitus, Liver diseases, Thyroid Disease-Hashimoto's Thyroiditis, Lupus (SLE), Addison's Disease, Chronic Active Hepatitis, Rheumatoid Arthritis



Diabetes Education SERVICES

Ex of Gluten Containing Foods

- | | |
|--|--|
| <ul style="list-style-type: none"> •Brown rice syrup •Breading & coating mixes •Croutons •Energy Bars •Flour or cereal products •Imitation bacon •Imitation seafood •Marinades | <ul style="list-style-type: none"> •Pastas •Processed luncheon meats •Sauces, gravies •Self-basting poultry •Soy sauce or soy sauce solids •Soup bases •Stuffings, dressing •Thickeners (Roux) •Communion wafers And more! |
|--|--|



Diabetes Education SERVICES

Poll question 5

- ▶ John has gastroparesis. What is the best recommendation?
- a. Eat raw vegetables and limit fruit
- b. Eat low fiber, small meals
- c. Always take insulin after meals
- d. Avoid foods containing wheat



Diabetes Education SERVICES

Gastroparesis



- ▶ Gastroparesis: affects 20 – 30% of pt's w/ longstanding dm
- ▶ Delayed emptying of stomach contents due to nerve damage
- ▶ S/S include early satiety, fullness, postprandial hypo, vomiting
- ▶ Diagnosis: gastric emptying studies, post-prandial hypoglycemia
- ▶ Tx: improve BG, small, low fat & fiber meals meds: reglan, erythromycin



Diabetes Education SERVICES

Disordered Eating

- ▶ “DiaBulimia”
- ▶ People with type 1 diabetes give themselves less insulin than needed to lose weight
- ▶ Tends to start in adolescence, more likely to occur in women than men.
- ▶ Signs: unexplainable spikes, A1c, weight loss, lack of marks from fingerpricks, lack of prescription refills for diabetes meds, records that don't match A1c.
- ▶ Treatment – Mental health specialist and team



Diabetes Education SERVICES

Physical Activity – Key areas

- ▶ ADA and American College of Sports Medicine recommendations
- ▶ Benefits, barriers precautions
- ▶ Exercise and activity plan (aerobic, resistance training, etc)
- ▶ Adjustment and monitoring of food and/or meds



Diabetes Education SERVICES

Poll Question 6

- ▶ Which of the following are accurate exercise recommendations for people with diabetes? (multiple)
 - Exercise must be done daily for 30 mins to be effective
 - Must get stress test before starting an exercise program
 - Try not to miss more than 2 consecutive days of exercise
 - Incorporate resistance training 2 days a week
 - Both a and b



Diabetes Education SERVICES

Physical Activity - Kids

- ▶ Children should be encouraged to engage in at least 60 minutes of physical activity a day.



Diabetes Education SERVICES

Physical Activity - ADA

- ▶ Adults with diabetes –
 - ▶ 150 minutes a week of moderate-intensity aerobic physical activity
 - ▶ spread over at least 3 days/wk
 - ▶ Don't miss more than 2 consecutive days of exercise.
- ▶ In absence of contraindications, type 2 adults should engage in resistance training 2x's a wk



Diabetes Education SERVICES

Definitions

- ▶ Physical activity
 - ▶ Bodily movement produced by the contraction of skeletal muscle that requires more energy than when resting
- ▶ Exercise
 - ▶ Subset of physical activity that is planned, structured and includes repetitive body movements
 - ▶ Performed to improve or maintain physical fitness
- ▶ Sedentary behavior
 - ▶ Little or no movement or physical activity



Diabetes Education SERVICES

Progressive Resistance exercise

- ▶ Improves insulin sensitivity
- ▶ Goal is 2 sessions a week
- ▶ Examples include:
 - ▶ Exercise with free weights, wt machines
- ▶ Each session consisting of least:
 - ▶ One set of five or more resistance exercises using large muscle groups



Diabetes Education SERVICES

Benefits of Exercise

- ▶ Improve BG
 - ▶ Improves insulin sensitivity
- ▶ Reduce CV Risk factors
- ▶ Maintain wt loss
- ▶ Contribute to well being
- ▶ Muscle strength
- ▶ Slows decline in mobility



Diabetes Education SERVICES

Importance of Exercise with Diabetes

- ▶ Vital component of prevention as well of the management of type 2 diabetes
- ▶ Greatest impact in improving metabolic abnormalities in type 2 when started early in progression from IR to Pre Diabetes to DM
- ▶ Type 1 – emphasis on adjusting insulin to allow for safe participation in all forms of activity.



Diabetes Education SERVICES

Pre-exercise Eval

- ▶ Use clinical judgment when making physical activity suggestions and check in with provider if unsure.
- ▶ Encourage high risk pts to start with low intensity and short time.
 - ▶ Increase duration and intensity slowly
- ▶ Contraindications to certain types of exercise:
 - ▶ Uncontrolled HTN, severe autonomic or peripheral neuropathy, history of foot lesions, unstable proliferative retinopathy.
 - ▶ Pt w/ complications require a more thorough assessment.



Diabetes Education SERVICES

Patients to discuss symptoms with provider before starting exercise

- ▶ Chest pain and/or shortness of breath
- ▶ Leg cramps that go away with rest
- ▶ Head, shoulder, neck and or back aches.
- ▶ *Any unexplained pain above the belt line should be considered cardiac in origin until proven otherwise.*



Diabetes Education SERVICES

Poll Question 7

- ▶ What are some exercise precautions for people with diabetes? (multiple)
 - a. Always have a snack if BG <100
 - b. Look for signs of hypo for up to 24 hrs after exercise
 - c. Carry a snack with you during exercise.
 - d. Let someone know your route



Diabetes Education SERVICES

Duration of Hypoglycemia Risk

- ▶ During exercise
- ▶ Immediately after exercise
- ▶ Post exercise late onset hypo
 - ▶ More often in type 1
 - ▶ More often at night
 - ▶ Moderate to high intensity exercise > 30 min
 - ▶ 4 to 15 hours following an exercise session



Diabetes Education SERVICES

Hypoglycemia Prevention Strategies

- ▶ If planned activity, adjust insulin in anticipation of activities
- ▶ Reduce insulin in post exercise period
- ▶ Frequent monitoring in post exercise period
- ▶ Pt to keep log to determine how responds to different activities, duration and intensity.



Diabetes Education SERVICES

Hypoglycemia Prevention Strategies

- ▶ Carry fast acting carb/ glucagon ER Kit
- ▶ Extra CHO in post exercise period
- ▶ Caution with alcohol post exercise
- ▶ Adjust carbohydrate prior to planned activity:
 - ▶ If BG < 100 prior to exercise
 - ▶ If using insulin and /or secretagogues
 - ▶ 15 gms carb snack



Diabetes Education SERVICES

Hypoglycemia Prevention

CARBOHYDRATE REPLACEMENT DURING PHYSICAL ACTIVITY

Intensity	Duration	Carbohydrate Replacement	Frequency
Mild to Moderate	<30 min	May not be needed	N/A
Moderate	30 to 60 minutes	15 grams	Each hour
High	>60 min	30 to 50 grams	Each hour



Diabetes & Nutrition Support Services



Diabetes Education SERVICES

Poll Question 8

- ▶ Which of the following is a SMART Goal?
 - a. I will lose 5% of my body weight
 - b. I will eat less sugary foods during the week.
 - c. I will monitor my blood sugars on a regular basis.
 - d. I will eat one less bag of chips every day for 1 week.
 - e. Not sure



Diabetes Education SERVICES

Behavior Change and Smart Goals



- ▶ Julie currently walks her dog 3 times a week around the block.
- ▶ Is this exercise?
- ▶ What new and revised SMART Goal could you set with her?



Diabetes Education SERVICES

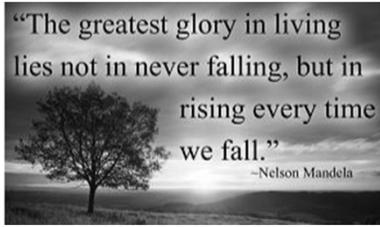
Setting SMART Goals

- ▶ Specific
- ▶ Measurable
- ▶ Attainable
- ▶ Realistic
- ▶ Timely
- ▶ Behavioral Goal –
 - ▶ Walk the dog around the block 4 days a week.
 - ▶ Walk the dog around the block two times.
 - ▶ Do 10 minutes of weight bearing activity on 2 of the days you don't walk the dog.



Diabetes Education SERVICES

Help Patients Prepare for Setbacks



“The greatest glory in living
lies not in never falling, but in
rising every time
we fall.”

—Nelson Mandela



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Thank You



- ▶ Questions?
- ▶ Email
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- ▶ Web
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