

## 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**

REVISION OF CURRENT AND ADA STATEMENTS

#### Exercise and Type 2 Diabetes

The American College of Sports Medicine and the American Diabetes Association: joint position statement.

Susan W. Coates, PhD, MS, RD, FRCN, FAHA, FICR, FCSRM, FIDSA, FISS, FISSD, FISSM, FISSP, FISSR, FISSW, FISSX, FISSY, FISSZ, FISSAA, FISSAB, FISSAC, FISSAD, FISSAE, FISSAF, FISSAG, FISSAH, FISSAI, FISSAJ, FISSAK, FISSAL, FISSAM, FISSAN, FISSAO, FISSAP, FISSAQ, FISSAR, FISSAS, FISSAT, FISSAU, FISSAV, FISSAW, FISSAX, FISSAY, FISSAZ, FISSBA, FISSBB, FISSBC, FISSBD, FISSBE, FISSBF, FISSBG, FISSBH, FISSBI, FISSBJ, FISSBK, FISSBL, FISSBM, FISSBN, FISSBO, FISSBP, FISSBQ, FISSBR, FISSBS, FISSBT, FISSBU, FISSBV, FISSBW, FISSBX, FISSBY, FISSBZ, FISSCA, FISSCB, FISSCC, FISSCD, FISSCE, FISSCF, FISSCG, FISSCH, FISSCI, FISSCJ, FISSCK, FISSCL, FISSCM, FISSCN, FISSCO, FISSCP, FISSCQ, FISSCR, FISSCS, FISSCT, FISSCU, FISSCV, FISSCW, FISSCX, FISSCY, FISSCZ, FISSDA, FISSDB, FISSDC, FISSDD, FISSDE, FISSDF, FISSDG, FISSDH, FISSDI, FISSDJ, FISSDK, FISSDL, FISSDM, FISSDN, FISSDO, FISSDP, FISSDQ, FISSDR, FISSDS, FISSDT, FISSDU, FISSDV, FISSDW, FISSDX, FISSDY, FISSDZ, FISSEA, FISSEB, FISSEC, FISSED, FISSEE, FISSEF, 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## Assess Knowledge, Self Management Skills



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



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## Medical Nutrition Therapy – ADA 2014



- 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.



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## Medical Nutrition Therapy – ADA 2014

- ▶ Focus on the Individual
- ▶ Maintain pleasure of eating
- ▶ Provide positive messages about food
- ▶ Limit food choices only when backed by science
- ▶ Provide practical tools
- ▶ Refer to a RD and Diabetes Education – Lowers A1c by 1-2%



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## 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



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## Approach Depends on Patient

- New Type 2
  - Portion Control
  - Plate Method
  - Record Keeping
  - Education
- On Insulin?
  - Carb counting
  - Post prandial checks



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## 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



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## Average American Consumes 25 teaspoons of sugar a day (400 cal)

- ▶ 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)



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## ADA recommendation Eat Less Junk Food & Sugary Drinks –

- ▶ Less Processed Foods
- ▶ Less Sugary Beverages
  - ▶ increase visceral adiposity
  - ▶ With sugar or
  - ▶ High fructose corn syrup
- ▶ Soda Tax?
- ▶ Junk Food Tax?



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## 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.*



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## Move toward the Tomato



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## 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



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## 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



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## 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




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## USDA [www.myplate.gov](http://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.




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## Another plate example

### Mi planificador de plato Una comida saludable sabe buenísima




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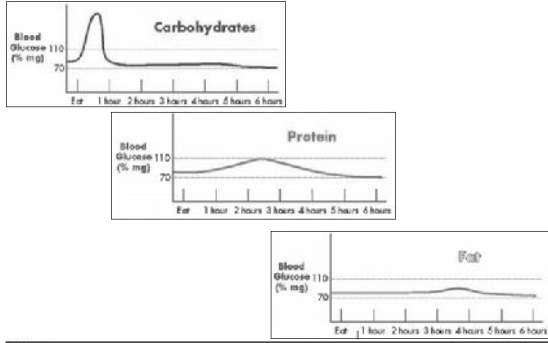
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## How nutrients affect blood sugar



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## Carbs affect Post meal Blood Glucose

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



\*ADAM

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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

1/2 cup cooked beans

1 small ear of corn or 1/2 cup corn

1/3 cup cooked pasta

3/4 cup cold cereal

1/3 cup cooked rice

1 slice bread

1 small potato

1/2 English muffin

5-6 small crackers

1 small tortilla

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### Carb counting- fruit

Each Food has:  
60 Calories  
15 grams carb

1 small fresh fruit

1/2 cup fruit juice

1/2 banana

1/2 cup unsweetened apple sauce

17 small grapes

1 slice bread

1 cup melon

1/4 cup dried fruit

2 tsp raisins

1 1/4 cup strawberries

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### Carb Counting - Milk

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

8 oz buttermilk

1 packet diet hot cocoa

6 oz plain yogurt

8 oz milk

1 slice bread

8 oz soy milk

6 oz light fruit yogurt

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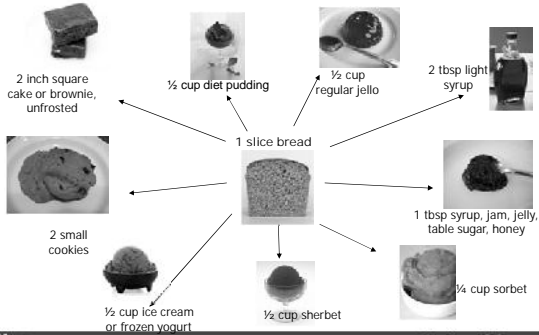
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## Carb Counting - Sweets

Each Food has:  
Calories vary  
15 grams carb




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## Choose Healthy 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




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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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Nutrition Facts	
Serving Size 1/2 cup (114 g)	
Servings Per Container 4	
<b>Amount Per Serving</b>	
Calories 90	Calories from Fat 30
% Daily Value*	
<b>Total Fat</b> 3g	5%
Saturated Fat 0g	0%
<b>Cholesterol</b> 0g	0%
<b>Sodium</b> 300mg	13%
<b>Total Carbohydrate</b> 13g	4%
Dietary Fiber 3g	12%
Sugars 3g	
<b>Protein</b> 3g	
Vitamin A 80%	Vitamin C 60%
Calcium 4%	Iron 4%

1 tsp sugar  $\Rightarrow$   
=4 gms

Fooducate App – gives grade and nutrition info.

Fooducate  
eat a bit better™

Calories	2000	2000
Total Fat	Less Than 65g	65g
Sat Fat	Less Than 20g	20g
Cholesterol	Less Than 300mg	300mg
Sodium	Less Than 2400mg	2400mg
Total Carbohydrate	300g	370g
Fiber	25g	30g

\* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

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Calories per gram: Fat 9 Carbohydrates 4 Protein 4

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## Dietary Fat and Cholesterol Guidelines

- ▶ Avg Calorie distribution for PWD
  - ▶ 45% of calories from carbs
  - ▶ 30-40% from fat,
  - ▶ 16-18% from protein
- ▶ Guidelines from ADA
  - ▶ Saturated fats <10% of calories
  - ▶ Limit trans fat as much as possible
  - ▶ Limit total dietary cholesterol to 300 mg/day



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## Fats- 9 calories per gram

- ▶ **Monounsaturated - healthy**
  - Olive & canola oils, Nuts, Avocado
  - Lowers total cholesterol and LDL
  - Raise HDL, high in omega 3 fatty acids
- ▶ **Polyunsaturated - healthy**
  - corn, walnut, safflower, soybean
  - Lowers total cholesterol and LDL
- ▶ **Saturated fats (limit <10%)**
  - Animal products – meat, chicken, pork, fish, skin, cheese butter, dairy
  - Plant products include: palm, coconut, palm kernel oil
  - Solid at room temp

**Serving sizes**

- 1 tsp butter, margarine, oil, mayonnaise
- 1 Tbsp salad dressing, cream cheese, seeds
- 2 Tbsp avocado, cream, sour cream
- 1 slice bacon

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## Unhealthy Dietary Fats

- ▶ Trans Fat – strong link between diet high in trans fat and heart disease
  - ▶ 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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## 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 -2014

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



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## Protein – 4 cal per gram

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



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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



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## 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
<b>Avg BG</b> 120's	<b>Avg BG</b> 200's	<b>Avg BG</b> 200's	<b>Avg BG</b> 180's



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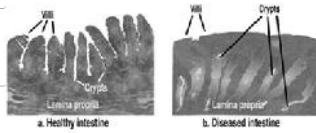
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## Celiac Disease



- ▶ 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.



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## 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



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## Ex of Gluten Containing Foods

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



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## 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



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## 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



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## 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



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## Physical Activity - Kids

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



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## 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



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## 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



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## 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



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## 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



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## 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.



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## 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.



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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.*



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## Hormone Response –Type 1

- ▶ Exogenous insulin remains high
- ▶ Increased insulin sensitivity
- ▶ Increased insulin absorption

What is this group at risk for?  
What strategies to stay safe before, during and after exercise?



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## Hormone Response –Type 2

- ▶ Decreased secretion of endogenous insulin
- ▶ Increased insulin sensitivity
- ▶ Increased glucose disposal



What is this group at risk for?  
What strategies to stay safe before, during and after exercise?



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## 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



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## 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.



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## 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



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## 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



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## 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?



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## 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.



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## Help Patients Prepare for Setbacks



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## Thank You



- ▶ Questions?
- ▶ Email [bev@diabetesed.net](mailto:bev@diabetesed.net)
- ▶ Web [www.diabetesed.net](http://www.diabetesed.net)



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