Diabetes Fundamentals 2
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
Critical Points to Provide Self-Management Education

- At diagnosis
- Annually to assess education, nutrition and emotional needs
- When new complicating factors arise that influence self-management
- Transitions in care
Diabetes Self Management Ed/Benefits

- Facilitates knowledge, skills, abilities needed for optimal diabetes self-care.
- Incorporates the needs, goals, and life experiences of the individual.
- Supports informed decision making, self-care behavior, problem solving and active collaboration.

- Supports informed decision making
- Lowers A1c
- Lose weight
- Improved quality of life
- Reduced all cause mortality
- Reduced health care costs
Diabetes Self Management Ed Benefits

- Increased primary care and preventive services
- Less frequent use of acute care and inpatient admissions
- More likely to follow best practice recommendations (especially those with Medicare)
  - Only 5-7% of Medicare patients receive DSME)
Quick Question - 1

What do you think is contributing to the increasing prevalence of type 2 diabetes?

A. Junk food  
B. Lack of exercise  
C. Changes in gut bacteria  
D. Environment  
E. All of the above
## BMI Chart with Ranges

### Body Mass Index Table

<table>
<thead>
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<th>Height (inches)</th>
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<th>Obese</th>
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</table>

Poll Question 2

For overweight patients with new type 2 diabetes, which would be appropriate nutrition goals? (multiple)

A. Avoid all desserts and processed foods
B. Try to lose 5-7% of current body weight
C. Eat less than 7% saturated fat
D. Eat breakfast
E. Limit sugary beverages
Assess Knowledge, Self Management Skills

- All people with diabetes should be offered a referral for individualized MNT by a Registered Dietitian.
- Individualized MNT Plan
- Eating Patterns
  - Preferences, portion sizes, timing on meals and snacks, eating environment, disordered eating
Medical Nutrition Therapy – What Medicare Covers

- Must be ADA/AADE Recognized
- 3 hours initial benefit in first calendar year
- 2 hours follow-up annually
- Only 10% of patients are referred
- MNT provided by RD can reduce A1c 1-2% points
Medical Nutrition Therapy – ADA

- 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.
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
Sodium, Vitamins, Fat and Fiber

- Sodium  – Try and keep less than 2,300 mg a day (one tsp a day)
- Vitamin and mineral supplements not recommended -lack of evidence.
  - Consider B12 replacement therapy for those on metformin if level is low
- 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
Average American Consumes 22 teaspoons of added sugar a day

- WHO and AHA – Goal 6 teaspoons a Day
- 1 tsp = 4 gms sugar (15 cals)
- 15 cals x 22 teaspoons a day =
  - 330 cals a day just from added sugars

- One soda has 12 tsps sugar
- New labels will list added sugar
Reduce refined Carbs, Added Sugars - ADA

- To control wt, reduce risk of CVD and fatty liver disease
- ADA strongly discourages consumption of:
  - Sugar sweetened beverages
  - Processed “low-fat” or “non-fat” foods with high amounts of refined grains & added sugar

Sugary and processed foods can displace healthier, more nutrient dense food choices
Your health can only get better

Download FREE toolkit and Resources on our Website
diabetesed.net/joy-six-take-pledge/
Non-Nutritive Sweeteners

- Use can reduce overall calorie intake if substituting for sugary beverages
- But overall, people are encouraged to decrease both sweetened and non-sweetened beverages.
- Emphasize water intake.
Limit refined carbs and added sugars – Instead eat more:

- High fiber carbs loaded, vitamins, minerals and phytonutrients
- 25 gms of fiber a day
- Power Carbs include:
  - Beans
  - Veggies
  - Fruits
  - Whole grain foods
Approach Depends on Patient

• Type 2
  • Portion Control – lose 5%
  • Plate Method
  • More fiber rich foods
  • Education

• On Insulin?
  • Intensive insulin therapy with carb counting should be offered
  • On fixed insulin dose, teach consistent carbs
Healthy Eating Patterns

- Mediterranean Diet
- DASH Diet
- Plant based eating
- Diabetes Plate Method
- Weight Watchers or other groups
Move toward the Tomato
The DASH diet emphasizes vegetables, fruits and low-fat dairy foods — and moderate amounts of whole grains, fish, poultry and nuts.

Pt recommendations

- Eat lots of whole grains, fruits, vegetables and low-fat dairy products.
- Also includes some fish, poultry and legumes, and encourages a small amount of nuts and seeds a few times a week.
- Red meat, sweets and fats in small amounts. Focus on low saturated fat, cholesterol and total fat.
The Mediterranean diet emphasizes:

- Eating primarily plant-based foods, such as fruits and vegetables, whole grains, legumes and nuts
- Replacing butter with healthy fats such as olive oil and canola oil
- Using herbs and spices instead of salt to flavor foods
- Limiting red meat to no more than a few times a month
- Eating fish and poultry at least twice a week
- Enjoying meals with family and friends
- Drinking red wine in moderation (optional)
- Getting plenty of exercise
**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.
El Método del Plato es una manera simple de planificar las comidas para usted y su familia. No necesita contar nada ni leer largas listas de alimentos. Todo lo que necesita es un plato de 9 pulgadas.
Weight Loss is Important – Type 2

- Strong evidence that in overwt/obese pts, a 5% *initial* body wt loss:
  - Delays progression from Pre-diabetes to Diabetes
  - Improves glycemic control
  - Improve triglycerides
  - Reduces need for medications

- Optimal goal – Sustained weight loss of 7%
How to Achieve Weight Loss?

- Diet, physical activity and behavioral therapy
- Interventions should be high intensity (16+ sessions in 6 months)
- Goal: 500 - 700 kcal/day energy deficit (3,500 kcals = 1 pound)
- What is 500 kcals?
  - 4 slices bacon, a Big Mac, bagel w/ cream cheese, 4 oz’s tortilla chips, 3 sodas, 9 Oreo cookies, blueberry muffin
  - 5 apples, 5 bananas, 5 eggs, 2 cups of beans, 1 cup almonds
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
- Drink Water
- Get Sleep
Long Term Weight Loss is the Goal

- Comprehensive wt loss maintenance program prescription:
  - Provide monthly contact
  - Encourage ongoing body weight monitoring (weekly)
  - Continued consumption of reduced calorie diet
  - Participation in high levels of physical activity:
    - 200 – 300 minutes a week
    - 40- 50 minutes, 5 times a week
Metabolic Surgery Benefits

- Increases gut hormone availability
- More likely to cause remission* with recently diagnosed diabetes (more beta cell mass)
  - 30 - 63% remission over 1-5 years
  - 35 – 50% redeveloped diabetes
    - Avg remission time 8.3 years
  - Most pts who undergo surgery maintain substantial improvement of BG control from baseline for ~5 yrs
- Trials demonstrate metabolic surgery achieves superior BG control and reduction of CV risk factors in obese pts with type 2 compared to lifestyle/medical intervention
- Improvements in micro and macro disease and cancer have been observed.
- Procedure may reduce long term mortality
  - *remission = BG levels normal without meds
How nutrients affect blood sugar

- **Carbohydrates**
  - Blood glucose levels rise sharply after eating carbohydrates and return to normal within 2 hours.
  - Impact on blood sugar is immediate and temporary.

- **Protein**
  - Blood glucose levels remain relatively stable after eating protein.
  - Moderate impact on blood sugar over a longer period.

- **Fat**
  - Blood glucose levels show a small increase after eating fat, which then returns to normal.
  - Slow and mild effect on blood sugar.

These graphs illustrate the effects of different nutrients on blood glucose levels, emphasizing the importance of dietary choices for blood sugar management.
Carbs affect Post meal Blood Glucose

- Starch
- Fruit
- Milk
- Desserts
Poll Question 3

- Which of the following servings equals ~ 15 gms of carbohydrate? (multiple)
  A. Bagel
  B. 1 ¼ cup strawberries
  C. Cup of milk
  D. ½ cup of rice
  E. ½ cup of jello
# Carbohydrate Needs Estimate for Most Adults

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<thead>
<tr>
<th>Breakfast</th>
<th>Lunch</th>
<th>Snacks</th>
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<tr>
<td>Each Meal</td>
<td>45-60 gm</td>
<td>15-30 gm</td>
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<tr>
<td>Servings</td>
<td>3 - 4</td>
<td>1- 2</td>
</tr>
</tbody>
</table>

Carbs affect Post Meal Blood Glucose
RDA – at least 130 gms of Carb a day
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 slice bread
1/3 cup cooked pasta
3/4 cup cold cereal
1 small potato
1/2 English muffin
1/3 cup cooked rice
5-6 small crackers
1 small tortilla
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
- 1 slice bread
- 17 small grapes
- 1/4 cup dried fruit
- 2 tbsp raisins
- 1 1/4 cup strawberries
- 1 cup melon
Carb Counting - Milk

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

Each Food has: 90-150 calories, 12-15 grams carb
Carb Counting - Sweets

Each Food has:
Calories vary
15 grams carb

2 inch square cake or brownie, unfrosted
½ cup diet pudding
½ cup regular jello
2 tbsp light syrup
½ cup ice cream or frozen yogurt
½ cup sherbet
1 slice bread
1 tbsp syrup, jam, jelly, table sugar, honey
2 small cookies
¼ cup sorbet

Diabetes Education Services
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
**Nutrition Facts**

Servings: 8 servings per container  
Serving size: 2/3 cup (55g)  

<table>
<thead>
<tr>
<th>Amount per serving</th>
<th>Calories</th>
<th>230</th>
</tr>
</thead>
</table>

| % Daily Value* |  
|----------------|----------|
| **Total Fat** 8g | 10%      |
| Saturated Fat 1g | 5%       |
| Trans Fat 0g    |          |
| **Cholesterol** 0mg | 0% |
| **Sodium** 160mg | 7%       |
| **Total Carbohydrate** 37g | 13% |
| Dietary Fiber 4g | 14%      |
| Total Sugars 12g |          |
| Includes 10g Added Sugars | 20% |
| **Protein** 3g |          |

| Vitamin D 2mcg | 10% |
| Calcium 260mg | 20% |
| Iron 8mg | 45% |
| Potassium 235mg | 6% |

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

| Calories per gram: Fat 9 Carbohydrates 4 Protein 4 | Diabetes Education Services |
Poll Question 4

Which of the following is true about alcohol and diabetes? (multiple)

- a. White wine increases blood sugars
- B. Men can have 2 drinks and women can have one drink a day
- C. Alcohol increases risk of hypoglycemia
- D. "If you are going to drink, eat a starchy food"
- E. A shot of tequila is better than a margarita.
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

<table>
<thead>
<tr>
<th>Time</th>
<th>Meal</th>
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<th>Lunch</th>
<th>Dinner</th>
<th>Night</th>
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<tbody>
<tr>
<td></td>
<td>Break</td>
<td>5 corn tortillas, 1/2 c. beans, salsa, peppers, egg beaters</td>
<td>Sandwich, low fat potato chips, 1c. juice, 2-4 lowfat cookies</td>
<td>Lg bowl low salt soup, 1c. rice, BBQ meat, salad &amp; cooked vegs</td>
<td>1 bowl of cereal</td>
</tr>
<tr>
<td></td>
<td>Avg BG</td>
<td>Avg BG 120’s</td>
<td>Avg BG 200’s</td>
<td>Avg BG 200’s</td>
<td>Avg BG 180’s</td>
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</table>

**Avg BG**
- 120’s
- 200’s
- 200’s
- 180’s
Poll Question 5

If someone with diabetes is underweight, what are some possible causes? (multiple)

A. Not taking meds / insulin
B. Celiac disease
C. Undereating
D. Poor dentition
E. Gastroparesis
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
Poll question 6

- 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
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
Physical Activity – Key areas

- ADA Physical Activity Position Statement
- Benefits, barriers precautions
- Exercise and activity plan (aerobic, resistance training, etc)
- Adjustment and monitoring of food and/or meds
Where are your patients on this continuum?
Poll Question 7

Which of the following is an accurate exercise recommendation for people with diabetes?

- a. Exercise must be done daily for 30 mins to be effective
- b. Must get stress test before starting an exercise program
- c. Try not to miss more than 2 consecutive days of exercise
- d. Incorporate resistance training 2 days a week
- E. C and D
Exercise Standards

- Adults – 150 min/wk moderate intensity
  - over 3 days a week.
  - Don’t miss > 2 consecutive days w/out exercise
  - Get up every 30 mins - Reduce sedentary time
- T1 and T2 – resistance training 2 -3 xs a week
- Flexibility and balance training 2-3 xs a week (Yoga and Tai Chi)
Physical Activity - Kids

- Children should be encouraged to engage in at least 60 minutes of moderate/vigorous physical activity a day.
- Plus bone/muscle strengthening 3 times a week.
A hard truth

- Exercise alone doesn’t cause weight loss

- But....
  - It helps keep weight off
  - Decreases visceral fat
  - Decreases CV Risk

- To combat obesity, we need to change the food environment
- “You cannot outrun a bad diet”
Benefits of Exercise and Diabetes

- Increase muscle glucose uptake 5-fold
- Glucose uptake remains elevated for 24 - 48 hours (depending on exercise duration)
- Increases insulin sensitivity in muscle, fat, liver.
- Reduce CV Risk factors (BP, cholesterol, A1c)
- Maintain wt loss
- Contribute to well being
- Muscle strength
- Better physical mobility
Exercise decreases:

- Sleep apnea
- Diabetic kidney disease, retinopathy
- Depression
- Sexual dysfunction
- Urinary incontinence
- Knee pain
- Need for medications
- Health care costs
Importance of Exercise with Diabetes

- Vital component of prevention as well as the management of type 2 diabetes
- Greatest impact in improving metabolic abnormalities when started early (prediabetes, diabetes)
- Type 1 – emphasis on adjusting insulin to allow for safe participation in all forms of activity.
What Medication works best to prevent and treat type 2 Diabetes?

This medication has been around since beginning of time, but lost popularity due to new life styles, technology and public transportation.

**Major side effects:** sore muscles, improved energy, less depression, increased strength and balance.

**Main action:** improved insulin sensitivity and one dose can lower blood glucose for up to 48 hours.

**Dosing:** Patients can use treatment on most days with instruction to gradually increase dose as tolerated.
What Medication works best to prevent and treat type 2 Diabetes?

**Cost**: Free with or without a prescription. Actually, due to its effect on blood pressure and lipid reduction, it may end up saving money as the need for other medications diminishes.

**Safety**: Safe and effective for those at risk for diabetes and those diagnosed with diabetes.

**Availability**: Generic - Walking 30 minutes on most days. Designer brands: Dancing, Water Aerobics, Juggling, Gardening, Shopping ++
After dinner stroll “Passaggiata”

- Walk 10-15 minutes after dinner (and other meals if possible)
- Maximize the walking benefit
- Get the most BG lowering effect
- Especially after high carb meals

Each minute of activity lowers BG by 1 point

- Each minute of exercise lowers BG 1 point
  - 15 minutes of walking drops BG 15 points
  - 30 minutes of biking drops BG 30 points
  - 40 minutes of housework drops BG 40 points
  - 50 minutes of walking and window shopping lowers BG 50 points
Good Exercise Info / Quotes

- “Passagiata” – take an after meal stroll
- Exercise decreases A1c 0.7%
- No change in body wt, but 48% loss in visceral fat
  - ADA PostGrad 2010

- “Every minute of activity lowers blood sugar one point.”
- “I don’t have time to exercise, I MAKE time.” Mike Huckabee
Best Shake For People with Diabetes

“The only diet shake I recommend is the shake your booty makes when you exercise.”

From Debbie Nagata’s slide collection
People are more likely to keep active

- Motivated by keeping healthy
- Benefits are beyond physical
- Host of psychological benefits
  - More energized
  - Less stressed
- Encourage exercise to promote well being
- These effects keep people on track
Progressive Resistance exercise

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

Remember the Following Guidelines:
- Only do the exercises you can.
- Maintain proper posture.
- Keep movements slow and controlled.
- Breathe with each repetition.
- Keep to a comfortable range of motion.

Resistance Exercise Guidelines

Do 2 sets of 8 repetitions for each of the 8 exercises, and do this 2 times a week. Work up to 2-3 sets of 12 repetitions of each exercise (up to 12), and do this 3 times a week.

It is recommended you see a diabetes care provider or a qualified exercise professional, or refer to the resistance training video, to learn how to do the exercises provided in this handout.

RPE = Rating of Perceived Exertion

Pick the number matching the word or phrase that best reflects your total amount of physical stress, effort, and fatigue while doing an exercise. This number identifies your exercise intensity. Record on your exercise log after each session.

RPE

<table>
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<th>Rest</th>
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<tr>
<td>1</td>
<td>Very light</td>
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<tr>
<td>2</td>
<td>Light</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Somewhat hard</td>
</tr>
<tr>
<td>5</td>
<td>Hard (breathing deeply)</td>
</tr>
<tr>
<td>6</td>
<td>Very hard (out of breath)</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>Maximal</td>
</tr>
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Intensity is Important

Your resistance training should be in the moderate (RPE 3 - 5) range. Use a weight or resistance band that feels somewhat strong to strong for you.
General Rules of Thumb

- Perform 2-3 Sets of 8-12 Repetitions, 2-3 Days a week
- If it hurts, stop. Talk to a physical therapist.
- If difficulty with balance, use a chair to stabilize
- Start slow with eventual goal of moderate intensity
- The last few repetitions should be slightly difficult
- Have fun
Poll Question 8

- What are some exercise precautions for people with diabetes? (multiple)
  a. Carry some form of ID on you at all times
  b. Always have a snack if BG <100
  c. Look for signs of hypo for up to 24 hrs after exercise
  d. Carry a snack with you during exercise.
  e. Let someone know your route
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.
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
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.
Hypoglycemia Prevention Strategies for Patients on Insulin/Secretagogues

- Carry carb snack/ glucagon ER Kit
- Extra Carb in post exercise period
- Caution with alcohol post exercise
- Adjust carbohydrate prior to planned activity:
  - If using insulin and/or secretagogues
    - BG < 90, consume 15 -30 gms
Behavior Change Strategies

- Five key techniques for success:
  1. Prompt focus on past success
  2. Barrier identification/problem-solving
  3. Use of follow-up prompts
  4. Provision of information on where & when to perform the behavior
  5. Prompt review of behavioral goals.
Help Patients Prepare for Setbacks

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

~Nelson Mandela
Thank You

- Questions?
- Email bev@diabetesed.net
- Web DiabetsEd.net