The Problem

Diabetes is the single fastest-growing disease in human history! As many as 29.1 million Americans have diabetes, costing Americans $245 billion annually to treat; more than AIDS and every form of Cancer combined! For most people, diabetes is preventable, treatable, and even reversible. Diabetes is a group of diseases which disrupts the way the body uses digested food for growth and energy. In diabetes, the pancreas either produces little or no insulin, or the body cells do not respond to the insulin that is produced; as a result, glucose cannot enter the body's cells.

Know the Terms

1. **Insulin:** Fat soluble hormone secreted by the pancreas which binds to a cell wall allowing sugar to enter the cell.
2. **Pancreas:** Organ or gland that secretes hormones (insulin) and enzymes into the bloodstream.
3. **Hypoglycemia:** Low blood sugar. The prefix hyper denotes below or beneath the root word; the root word glycemia refers to blood sugar.
4. **Hyperglycemia:** High blood sugar. The prefix hyper denotes above the root word; the root word glycemia refers to blood sugar.
5. **Pre-Diabetic:** Blood sugar levels higher than normal, but not high enough to be diagnosed as diabetes.
6. **Insulin Resistance:** Inability of cells to respond to and use insulin. Insulin resistance may be linked to obesity, hypertension, and high levels of fat in the blood.
7. **“ose”:** Suffix used to form the various names of sugar.
8. **Type 1 Diabetes:** Condition characterized by high blood sugar levels caused by a total lack of insulin; it is also referred to as Insulin Dependent Diabetes.
9. **Type 2 Diabetes:** Condition characterized by high blood sugar levels caused by either a lack of insulin or the body's inability to use insulin efficiently.
10. **Gestational Diabetes:** Type of diabetes that develops only during pregnancy; usually disappears upon delivery. However, it increases the risk that the mother will develop diabetes later. Gestational Diabetes is managed with meal planning, activity, and in some cases, insulin.
11. **Ketone:** Chemical produced when there is a shortage of insulin in the blood and the body breaks down body fat for energy. High levels of ketones can lead to diabetic ketoacidosis and coma. Ketone is sometimes referred to as ketone bodies.
12. **Glucose:** Another name for Blood Sugar. Glucose is one of the simplest forms of sugar.
13. **A1C Test:** The A1C test measures your average blood glucose control for the past 2 to 3 months. It is determined by measuring the percentage of glycated hemoglobin, or HbA1c, in the blood.
14. **Fasting Plasma Glucose Test:** A fasting plasma glucose (FPG) test measures blood glucose in a person who has not eaten anything for at least 8 hours.
15. **Oral Glucose Tolerance Test:** The Oral Glucose Tolerance Test (OGTT) measures your body's response to sugar. Glucose is given and blood samples taken afterward to determine how quickly it is cleared from the blood.

Diabetes: Basic Training

- **Diabetes Defined:**
  o Diabetes Mellitus is a group of diseases characterized by persistently high blood sugar levels (hyperglycemia).
  o In diabetes, the pancreas either produces little or no insulin, or the body cells do not respond to the insulin that is produced; this prevents glucose from entering and being used by cells of the body.

- **Blood Sugar and Energy:**
  o When food is digested glucose is released into the bloodstream and is available to all body cells.
  o Insulin, a fat soluble hormone secreted by the pancreas, attaches to a cell wall “unlocking” the cell to allow glucose to enter and be used as energy.
• **Type 1 Diabetes:**
  o *Type 1 Diabetes, or Insulin Dependent Diabetes, is an autoimmune disease* in which an individual's immune system attacks and destroys healthy insulin making cells (beta cells) in the pancreas; this prevents the production and secretion of Insulin. Without Insulin, sugar cannot enter a cell and blood sugar levels become permanently elevated.
  o Individuals with Type 1 Diabetes require outside sources of daily insulin in the form of injections or infusions.
  o Type 1 diabetes is usually diagnosed in children and young adults, and was previously known as juvenile diabetes. Only 5% of people with diabetes are Type 1.

• **Type 2 Diabetes:**
  o *Type 2 Diabetes, or Non-Insulin Dependent Diabetes, is a metabolic disorder* in which the pancreas secretes insufficient insulin, or the body cells become resistant to insulin (insulin resistance) preventing cells from accessing blood sugar.
  o Type 2 Diabetes accounts for 90-95 percent of all diabetes cases.
  o Risk factors surrounding Type 2 Diabetes are both controllable and non-controllable:
    - **Uncontrollable Risk Factors:** (see *Talk'n Numbers* below)
      - Age:
      - Ethnicities
      - Biological Family (Genetics)
      - Biological
    - **Controllable Risk Factors:**
      - Body Fat (visceral or omental fat deep within the abdomen)
      - Eating Habits
      - Habits of Physical Activity
      - Sleep Patterns
      - Levels of Stress
      - Blood Pressure and Cholesterol Levels.

• **Gestational Diabetes:**
  o Gestational Diabetes develops during pregnancy (gestation).
  o It is thought that pregnancy hormones can block insulin from doing its job. When this happens, glucose levels may increase in a pregnant woman's blood.
  o Blood sugar levels usually return to normal soon after delivery.
  o However, women who have had gestational diabetes are at increased risk for future type 2 diabetes.
  o American Diabetes Association estimates that gestational diabetes affects 18% of pregnancies.

• **Pre-Diabetes:**
  o Pre-Diabetes is defined as blood glucose levels that are higher than normal, but not yet high enough to be diagnosed as diabetes.
  o Much like having pre-cancerous skin cells removed to prevent cancer, Pre-Diabetes represents an opportunity to alter lifestyle or behavior to prevent diabetes, or at least delay its onset.
  o An estimated 79 million people in the United States have Pre-Diabetes. (American Diabetic Association)

• **Metabolic Syndrome:**
  o Metabolic Syndrome, formerly known as Syndrome X, is a group of risk factors that affects as many as 47 million Americans, many of whom, don't even know it.
  o The list of health problems that metabolic syndrome can lead to is long and concerning:
    - Metabolic Syndrome doubles a person's risk of both Heart Attack and Stroke (Cardiovascular Disease)
    - Type 2 Diabetes
    - Polycystic Ovary Syndrome (PCOS)
    - Fatty liver disease
    - Cholesterol gallstones
    - Asthma
  o **Diagnosing Metabolic Syndrome consists of Assessing a Cluster of Five Primary Factors.** In addition to these five factors, increasing concern has been given to the level of C-Reactive Protein in a person's blood; indicating the presence of inflammation.
    - **Abdominal Obesity** is the most obvious mark of metabolic syndrome, specifically around the waistline (apple shape).
• For Men, a waistline of 40 inches or more is considered high risk.  
• For Women, a waistline of 35 inches or more is high risk.
• **Elevated Blood Pressure** is another characteristic of metabolic syndrome. (≥130/85 may be a risk factor).
• **High Blood Triglycerides** (or blood fats) also puts you at risk. Anything above normal, (healthy level 150 mg/dL) is a marker of metabolic syndrome.
• **Low HDL (good) Cholesterol** is an important factor in diagnosing metabolic syndrome.
  • For men, low HDL is below 40 mg/dL.
  • For women, low HDL is below 50 mg/dL.
• **Insulin Resistance or High Blood Sugar Levels** is the defining risk factor for metabolic syndrome.
  • If your body is not able to process blood sugar efficiently, or if your fasting blood glucose level is at or above 110 mg/dL, then it is likely that you have insulin resistance.

**Signs Symptoms:**
• Diabetes often goes undiagnosed because many of its symptoms seem so harmless. Recent studies indicate that the early detection of diabetes symptoms and treatment can decrease the chance of developing the complications of diabetes.
  • **Type 1 Diabetes**
    • Frequent urination
    • Unusual thirst
    • Extreme hunger
    • Unusual weight loss
    • Extreme fatigue and Irritability
  • **Type 2 Diabetes** (Often people with type 2 diabetes have no symptoms)
    • Any of the type 1 symptoms
    • Frequent infections
    • Blurred vision
    • Cuts/bruises that are slow to heal
    • Tingling/numbness in the hands/feet
    • Recurring skin, gum, or bladder infections

**Talk’n Stats**

- **Total Prevalence of Diabetes**
  o Total: 29.1 million children and adults in the United States (9.3% of the population have diabetes)
  o Diagnosed: 21 million people
  o Undiagnosed: 8.1 million people
  o Pre-diabetes: 86 million people
  o New Cases: 1.7 million new cases of diabetes are diagnosed in people aged 20 years and older in 2012
- **Under 20 years of Age**
  o 208,000, or 0.25% of all people in this age group have diabetes
  o About 1 in every 400 children and adolescents has diabetes
- **Age 20 Years or Older**
  o 28.9 million, or 12.3% of all people in this age group have diabetes
- **Age 65 Years or Older**
  o 11.2 million, or 25.9% of all people in this age group have diabetes
- **Men**
  o 15.5 million, or 13.6% of all men aged 20 years or older have diabetes

**Diabetes in Washington State:**

- Diabetes affects around 2 million adults in Washington State:
  - About 444,000 people in Washington have diagnosed diabetes
  - More than 162,000 people have undiagnosed diabetes
  - About 1.4 million people have pre-diabetes
- **Women**
  - 13.4 million, or 11.2% of all women aged 20 years or older have diabetes

- **Race and Ethnic Differences** in prevalence of diagnosed diabetes
  - 7.6% of non-Hispanic whites
  - 9.0% of Asian Americans
  - 13.2% of non-Hispanic blacks
  - 15.9% of American Indians/Alaska Natives
  - 12.8% of Hispanics
  - Among Hispanics rates were:
    - 7.6% for Cubans
    - 13.3% for Mexican Americans
    - 13.8% for Puerto Ricans.

- **Morbidity and Mortality**
  - In 2010, diabetes was listed as the underlying cause on 69,071 death certificates and was listed as a contributing factor on an additional 164,980 death certificates. This means that diabetes contributed to a total of 234,051 deaths.

**Know Your Numbers:**

**Common Diagnostic Tests for Diabetes:**

1. **A1C:** Test that measures a person's average blood glucose level over the past 2 to 3 months. Hemoglobin (HEE-mo-glo-bin) is the part of a red blood cell that carries oxygen to the cells and sometimes joins with the glucose in the bloodstream. Also called hemoglobin A1C or glycosylated (gly-KOH-sih-lay-ted) hemoglobin, the test shows the amount of glucose that sticks to the red blood cell, which is proportional to the amount of glucose in the blood.

2. **Fasting Blood Glucose Test (FBGT):** Also called a fasting plasma glucose, or FPG test, this exam measures blood glucose levels after you've gone without food for at least eight hours (usually overnight). This test is used to diagnose pre-diabetes and diabetes. It is also used to monitor people with diabetes.

3. **Oral Glucose Tolerance Test (OGTT):** The oral glucose tolerance test is given by a health care professional after an overnight fast. A blood sample is taken, then the patient drinks a high-glucose beverage. Blood samples are taken at intervals for 2 to 3 hours. Test results are compared with a standard and show how the body uses glucose over time.

<table>
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<tr>
<th>Condition</th>
<th>A1C</th>
<th>Fasting Plasma Glucose (FPG)</th>
<th>Oral Glucose Tolerance Test (OGTT)</th>
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</thead>
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<tr>
<td>Diabetes</td>
<td>≥ 6.5%</td>
<td>≥ 126 mg/dl</td>
<td>≥ 200 mg/dl</td>
</tr>
<tr>
<td>Pre-Diabetes</td>
<td>5.7%-6.4%</td>
<td>100-125 mg/dl</td>
<td>140-199 mg/dl</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt; 5.7%</td>
<td>&lt; 100 mg/dl</td>
<td>&lt; 140 mg/dl</td>
</tr>
</tbody>
</table>

**Thoughts for Living:**
Learning that you have borderline Diabetes or Pre-diabetes can be shocking. But there's an upside to this wakeup call - you have time to make a Lifestyle-U-Turn that can prevent full-blown diabetes - along with its devastating consequences. Consequences such as heart attack, stroke, nerve damage, vision loss, kidney failure, and even limb amputation (diabetes alters circulation, preventing small injuries from healing). Making small lifestyle changes can have a big impact on your health and prevent Diabetes. Let's get started!

1. Control Your Weight:
   - Excess weight is the single most important cause of type 2 diabetes.
     - Being overweight increases the chances of developing type 2 diabetes seven fold.
     - Losing just 7-10 percent of your current weight can cut your chances of developing type 2 diabetes in half.
     - Contact your campus Wellness Director or Fitness Center Staff today.

2. Food Can Kill or Cure:
   - **Reduce Your Intake of Processed Foods**
     - Along with a multitude of chemicals (words that we cannot pronounce), most processed foods are high in sugar, salt, or both.
   - **Pump Up the Fiber**
     - High fiber foods (fruits, veggies, whole grains) can cut your diabetes risk by 24% or more.
     - As the non-digestible part of plant foods, fiber keeps food moving along the digestive track; it delays sugar absorption, helping to better control blood sugar levels.
     - The average person should eat between 25-35 grams of fiber each day. Most Americans eat about half that amount.
   - **Cut Your Sugar Consumption**
     - These include anything ending in -ose (like sucrose, dextrose, glucose, maltose, and fructose) as well as sugar alcohols (these end in -ol, such as sorbitol).
     - Even natural sugars, such as honey and molasses, are still sugar, so you should also keep them to fewer than 4 grams per serving, unless it's pure fruit (because fruit loaded with nutrients).
     - Syrups (maple, corn, blueberry) are also simple sugars, so stay away from those, too.
     - Take time to Read Product Labels! If sugar is listed in the first five items on the package ingredients list, steer clear.
     - Sugar comes in many forms with many names. **Click Here for a "watch list" of the many forms of sugar.**
     - Most "fat-free" packaged foods increase the sugar content when reducing fat!
   - **Stop Drinking Soda**
     - Strong evidence indicates that sugar-sweetened soft drinks contribute to the development of type 2 diabetes.
     - The Nurses’ Health Study explored this connection by following the health of more than 90,000 women for eight years.
     - The nurses who said they had one or more servings a day of a sugar-sweetened soft drink or fruit punch were nearly twice as likely to have developed type 2 diabetes during the study than those who rarely had these beverages.
   - **Get Control of Your Portion Sizes**
     - Food portions in America have doubled or tripled over the last 20 years, a key factor that is contributing to the high levels of Obesity and Diabetes in children and adults.
     - Most American dinners include a meat-based main course which takes up half of a dinner plate.
     - At least half of the plate should be produce.
     - The other half can be divided between protein, (e.g. lean chicken, fish, beans) and high-fiber starches, (whole-wheat pasta or potatoes with the skin).
   - **No Processed Meats**
     - The nitrites and saturated fats in processed meats (hot dogs, knockwurst, bacon, sausage) boost diabetes risk by 19% (and fuel cancer and heart troubles, too.)
   - **Fiber, Fiber, Fiber (With Every Meal)**
     - The term fiber refers to carbohydrates that cannot be digested, thus, has no caloric value (zero calories).
- Fiber is present in all plants that are eaten for food, including fruits, vegetables, grains, legumes, and nuts.
- Whole grains are nutrient-rich, high in fiber, and low on the Glycemic Index. (click to review Glycemic Index).
  - Several large studies, including more than 700,000 men and women, found that eating an extra 2 servings of whole grains a day decreased the risk of type 2 diabetes by 21 percent.
- Fiber is commonly classified into two categories: those that don't dissolve in water (insoluble fiber) and those that do (soluble fiber).
  - **Insoluble fiber.** Type of fiber that promotes the movement of material through your digestive system and increases stool bulk, so it can be of benefit to those who struggle with constipation or irregular stools. Whole-wheat flour, wheat bran, nuts and many vegetables are good sources of insoluble fiber.
  - **Soluble fiber.** This type of fiber dissolves in water to form a gel-like material. It can help lower blood cholesterol and glucose levels. Soluble fiber is found in oats, peas, beans, apples, citrus fruits, carrots, barley and psyllium.
- **Daily Fiber Recommendations:**
  - American Dietetic Association: 25-30 grams
  - American Diabetic Association: 25-50 grams (rich in soluble fiber)
  - American Heart Association: 25-30 grams (rich in soluble fiber)

3. **Move Your Body**
   - One of the most effective ways to lower your risk of diabetes is to be physically active. You don't have to join a gym (unless you want to!), just get your body moving and your heart pumping; for at least 30 minutes a day, 5 days a week. Exercise ramps up fat burning and improves insulin sensitivity, which helps your body use glucose efficiently. So, make time in your schedule to run, bike or even dance. Just be sure you get a mix of strength, stamina, and flexibility into your exercise routine.

4. **Reduce Stress and Get Your Sleep:**
   - Both unmanaged stress and lack of sleep impact the absorption of blood sugar.
   - Getting less than 6 hours of sleep a night doubles diabetes risk, as does uncontrolled stress.
     - Develop the habit of getting to bed earlier
     - Exercise helps to blow off steam and reduce blood sugar
     - Consider managing stress through Meditation or Yoga.
   - For Tips and additional information, see your campus Wellness Director.

5. **Know the Risk Factors**
   - Although healthy lifestyle changes can go a long way toward preventing diabetes, it's important to be aware of aspects in your life that are uncontrollable, such as family history, age, and ethnic background.

6. **Avoid the Hazards of Habit:**
   - Smokers are roughly 50 percent more likely to develop diabetes than nonsmokers, and heavy smokers have an even higher risk.
   - Keep Alcohol Consumption Moderate.

7. **Understand the Glycemic Index** The Glycemic index, or GI, is a system that ranks the potential of a food to raise your blood sugar level, relative to pure glucose. Pure glucose is arbitrarily assigned a score of 100; foods that score below 55 are considered low-GI foods, foods that score between 55 and 69 are medium-GI foods and foods that score above 70 are considered high-GI foods and will rapidly spike your blood sugar.