



Who Might Get Diabetes

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Goals of Presentation

- Who is at risk for prediabetes?
- How can it be prevented?
- How can it be treated?



Cause of Death

- **65-70% of people with diabetes die of cardiovascular disease**

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Prevalence

- **20 million people in US;**
 - 14.6 million diagnosed;
 - 6.2 million undiagnosed
- **7% of the population**
- **9.6% of pop. >20 yoa**
- **20.9% of pop. >60 yoa**

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Cost

- **\$132 billion in 2002**
 - 92 billion in direct costs**
 - 40 billion in indirect costs**
- **1 in 10 of our health care dollars**
- **1 in 4 of our Medicare dollars**



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Increasing Prevalence

1990 - 1998

- **Diabetes increased by 33%**
- **Age 30 – 39 by 70%**
- **Some college ed. by 63%**
- **Obesity (BMI>30) by 50%**

Diabetes Care 2000; 23:1278-1283



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Worldwide Epidemic

- **By 2025 it is estimated there will be 300 million people with diabetes worldwide**



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Complications

- **Leading cause of:**
 - New cases of blindness**
 - Non-traumatic amputations**
 - ESRD**



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Impaired Glucose Tolerance

(IGT)

- Blood sugar of 141 to 199 at 2 hours on an OGTT

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Impaired Fasting Glucose

(IFG)

- Fasting blood sugar between 100 and 125mg%

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Prediabetes

- Is defined as IFG or IGT
- Relates to Type 2 diabetes, not Type 1
- Usually there are NO SYMPTOMS!

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Metabolic Syndrome

- There are at least 3 definitions:
NCEP ATP III
WHO
AACE

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NCEP ATP III

- **3 of the following 5 criteria:**
 - ✓ **Waist** ♂ ≥ 40 in.; ♀ ≥ 35 in.
 - ✓ **TG** ≥ 150 mg
 - ✓ **HDL** ♂ <40 mg%; ♀ <50 mg%
 - ✓ **BP** $\geq 130/85$ or medication
 - ✓ **FBS** ≥ 100 mg%

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Metabolic Syndrome

- **Insulin resistance**
- **Whole is not greater than the sum of its parts**
- **May take away from paying attention to the individual abnormalities**

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Assoc w/ Prediabetes

- Type 2 DM
- CVD
- ↑ BP
- PCOD
- Sleep apnea
- NAFLD
- GBD
- Cancer

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Prediabetes

- 54 million people
- 12% of people age 25-74 had prediabetes by 2000
- In DPP 11%/year progressed to diabetes

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Prediabetes Prevalence

- The prevalence of IFG, IGT, or undiagnosed diabetes in people >45 yoa is 9.3%, 12.8% and 7.3% respectively

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Progression to Diabetes

Over 5-6 years:

- | | |
|----------------------|--------|
| ▪ Neither IGT or IFG | 4-5% |
| ▪ IFG only | 20-34% |
| ▪ IGT only | 20-34% |
| ▪ Both IFG & IGT | 38-65% |

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Higher Risk: Age

- **DPP: age >60 increased risk of prediabetes or diabetes (DC 28:150, 2005)**
- **ADA Risk Test: age >65 adds 9 pts. (3-9 pts.=moderate risk)**

(www.diabetes.org)

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Higher Risk: Inactivity

- **Male physicians – 5 periods exercise/week – RR=.58 (JAMA 268:63, 1992)**
- **Nurses Health Study – lowest risk w/ 30 min. every day (NEJM 345:790, 2001)**

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Higher Risk: Ethnicity

Risk of Type 2 Diabetes greater in most non-Caucasians:

- **Blacks 1.8x as likely**
- **Hispanics 1.7x as likely**
- **Native Americans 2.2x as likely**
- **Asians 1.5 to >2x as likely**

(www.diabetes.org)

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Obesity, Inactivity, Ethnicity

Pima Indians

	<u>US</u>	<u>Mexico</u>
▪ Obesity	64%,75%	7%,20%
▪ Activity	Low	High
▪ Diabetes	38%	6.9%

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Higher Risk: GDM

- **17 to 23 years later Type 2 diabetes occurs in 40 to 60% of women who had GDM**
- **Increased risk for women who have had a child weighing > 9 lbs. at birth**

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Higher Risk

- **Hypertension**
- **↓HDL, ↑TG**
- **Polycystic Ovarian Disease**

All related to insulin resistance

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Prevention: Finnish Study

- 522, middle aged, ave. BMI 31
- All had IGT
- Controls vs. intensive wt., food intake and exercise instruction
- 58% reduction of incidence of diabetes after 3.2 years ave. f/u

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Prevention: Finnish Study

- Strong correlation of prevention of diabetes with:
 - 5% wt. reduction
 - Fat < 30% of cal.; sat. fat < 10% of cal.
 - Fiber \geq 15g/1,000 cal. or
 - Exercise > 150 min./week

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Prevention: DPP

- **3,234; mean age 51; mean BMI 34**
- **All had IGT or IFG**
- **3 groups: placebo, Metformin or intensive lifestyle**
- **Ave. f/u 2.8 years: 58% reduction in progression to diabetes in lifestyle group; 31% in Metformin group**

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Prevention: DPP

- **50% of lifestyle group achieved goal of $\geq 7\%$ weight reduction**
- **74% maintained at least 150 min./week of moderate exercise**

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Prevention: TRIPOD study

- **235 Hispanic women; previous GDM**
- **Placebo or Rezulin (troglitazone)**
- **2.5 years, 58% relative reduction in progression to diabetes**
- **Maintained for 8 mos. washout period after Rezulin stopped**

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Prevention: STOP-NIDDM

- **1,429; mean age 55; mean BMI 31**
- **All had IGT**
- **Placebo or Acarbose (Precose)**
- **Mean f/u 3.3 years; 36% reduction in progression to diabetes if confirmed by two OGTTs**

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Prevention

- **The cost effectiveness of preventing diabetes is not known**

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Test Whom?

- **Over age 45 & BMI > 25**
- **Do FBS**
- **Test every 3 years**
- **Do OGTT if has IFG or age > 60**

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Test Whom?

- Under age 45 & BMI > 25
- Do FBS every 3 years IF
 - HBP H/O GDM
 - HDL<40/50 9 lb. baby
 - TG>150 1° relative w/ DM
 - or non-Caucasian
- Do OGTT if suspicious of result

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If Positive for Prediabetes

- Do FBS (or OGTT) every 2 years, at least...

besides treatment.....

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Treatment: Goals

- **5-10% loss of body weight**
- **Achieve and maintain 150 minutes/week of aerobic exercise**

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Treatment: Goals

- **Prevent diabetes**
- **Prevent prediabetes**
- **Have diabetic or prediabetic revert to normal**

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Treatment: Diet

- **Food labels**
- **How to eat out**
- **Healthy food choices**

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Healthy Food Choices

- **Non-starchy veg. & fruits**
- **Whole grain foods**
- **Beans & lentils**
- **Fish 2-3x/week**
- **Lean meat**
- **Non-fat dairy**

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Healthy Food Choices, cont'd

- **Avoid regular sweetened drinks**
- **Minimize fat intake**
- **Use liquid oils**
- **Minimize high calorie snacks**
- **Watch portion sizes**

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Exercise

- **Strength training – in class or lift at home**
- **Gentle stretching – 5-10 minutes/day**
- **Aerobic exercise – 150 minutes/week**

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Aerobic Exercise

- Dancing
- Low impact aerobics
- Swimming or water aerobics
- Skating –(ice or roller)
- Tennis
- Exercise bicycle
- Brisk walking

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ClubPed

- **Small Steps Big Rewards
Walking Kit (pedometer)
\$19.95 from
www.diabetes.org**
- **Online Tracker**

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Treatment: Medication

- **Metformin – in DPP was more effective in 25-44yr. age group or those w/ BMI \geq 35**
- **Thiazolidinedione – one study positive – weight gain**

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Review

- **Diabetes as a public health and a personal problem**
- **Defined prediabetes**
- **How to test for prediabetes**
- **Who is at higher risk for prediabetes**
- **How to prevent prediabetes**
- **How to treat prediabetes**

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Resources

- www.diabetes.org
American Diabetes Association-for patients
- www2.niddk.nih.gov
National Institutes of Health-for patients
- www.betterdiabetescare.nih.gov
National Diabetes Education Program – for health care professionals
- <http://wdh.state.wy.us/DIABETES/index.asp> -
Wyoming Department of Health Diabetes Prevention and Control Program

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Resources continued

- **Refer EqualityCare (Medicaid) clients to the *Healthy Together!* Health Management program**

1-888-545-1710

www.wyoming.apshealthcare.com

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For additional educational opportunities on the topic of prediabetes....

- **www.ndei.org
National Diabetes Education Initiative**
- **www.freeCME.com
Thomson Healthcare**
- **www.diabeteseducator.org
American Association of Diabetic Educators**
- **http://professionaled.joslin.org/CMEWeb/CMEActivities_2250.asp
Joslin Diabetes Center**