PREDIABETES EPIDEMIC
CAN WE PREVENT DIABETES?

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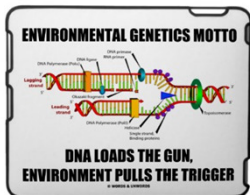
Planning Committee

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ACP American College of Physicians™
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ENVIRONMENTAL GENETICS MOTTO

DNA LOADS THE GUN, ENVIRONMENT PULLS THE TRIGGER

Lay off the burgers.

Objectives

- Review risk factors for pre-DMII
- Review treatment options for pre-DMII
- Provide practical tips in-office dietary counseling for pre-DMII

19 pound baby, heaviest born, Indonesia
September 23, 2009

Permissive v Restrictive; CPS

Creeping Calories
("Stealth" weight gain)

- To gain 1 pound/year =
  ***9 extra** kcal per day!*

- 100 calorie snack packs
  = 10 pounds/year
- Snickers bar =
  27 pounds/year

Creeping Calories
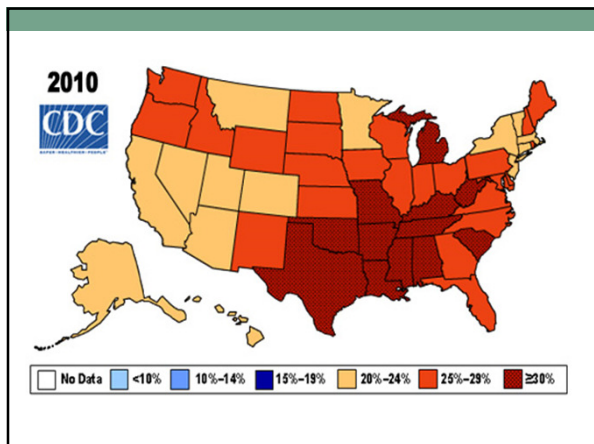*("Stealth" weight gain)*

- 100 calorie snack packs
  = 10 pounds/year

- BUT, you could **LOSE
  10 pounds a year** by
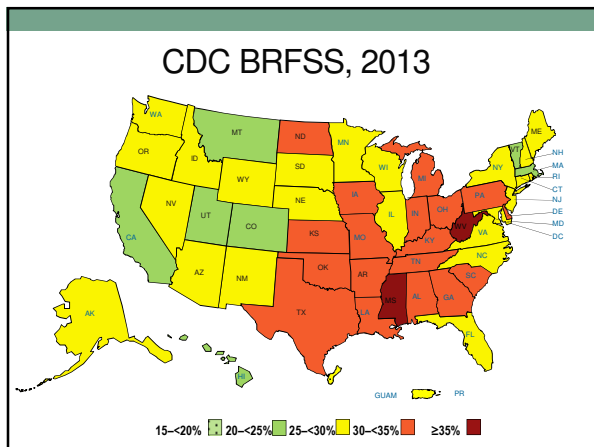 cutting back by 100
  calories!

April 8, 2007

"Severely obese are the fastest growing
 group of overweight people in the US"

From 2000 to 2005:
  BMI > 30 increased by 24%
  BMI > 40 increased by 50%   (100+#)
  BMI > 50 increased by 75% (175+#)

Journal of Public Health 2007

2010

CDC

| No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30% |

CDC BRFSS, 2013

15–<20%   20–<25%   25–<30%   30–<35%   ≥35%

EHR Review of Dx of Obesity

• For pts with a BMI of 30 or greater

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- **ONLY 22%** had the diagnosis in their chart
  (AMC 2012)

EHR Review of Dx of Obesity

- For pts with a BMI of 30 or greater
- ONLY 22% had the dx in their chart

- Pts with BMI > 30:
  - 70% were **not diagnosed**
  - 63% received no counseling for diet, exercise, or weight reduction
  (Ma J, Obesity, Feb 2009)

Vitals are "vital!"

- CAN'T USE YOUR EYES
  - **The adult "visual norm" of "average build" is overweight or obese**
    - *Especially in healthcare*

Vitals are "vital!"

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    - *Especially in healthcare*
  - Average Height and Weight stats US (CDC):
    - Women: 5'4 165#   BMI 28   **WC 37**
    - Men: 5'9 195#   BMI 28   **WC 39**

  "Average" ≠ healthy weight!!!

Patients lack understanding
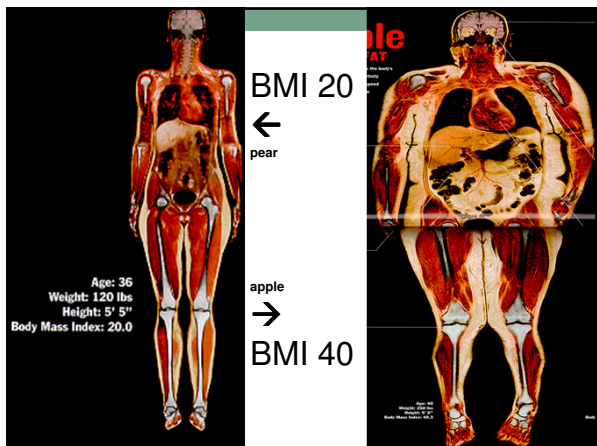
- What is healthy weight would be for them?
  - 57% OB men
  - 30% OB women
- do NOT choose a weight in the healthy BMI range

(McTigue, Diabetes Care, March 2006)

Apples v. Pears

BMI 20
← pear

apple →
BMI 40

Age: 36
Weight: 120 lbs
Height: 5' 5"
Body Mass Index: 20.0

Fat is the largest endocrine organ in the body

BRAIN CELLS come and go, but FAT CELLS live FOREVER!

Current added sugar intake

• 2005-2010 NHANES data (AHA.org)

• US average:
• Boys	362 kcal	16.4 tsp
• Men	335 kcal	20.9 tsp
• Girls	282 kcal	17.6 tsp
• Women	230 kcal	14.3 tsp

AHA – How much sugar is recommended per day

- Men:
  - 150 kcal per day (current 335 kcal)
  - 9 teaspoons
- Women:
  - 100 kcal per day (current 230 kcal)
  - 6 teaspoons

Fat, Salt and Sugar and the brain

- PET Scan data

- Normal   obese
- ETOH   cocaine

- Red = dopamine
- Loss in addiction
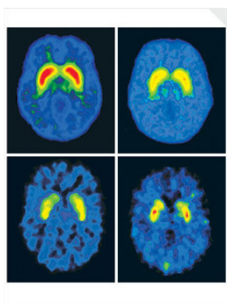
Prevalence of Pre-Diabetes

- In 2012, 86 million Americans **(1 in 3)** aged 20 years or older with pre-diabetes.

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- In 2012, 86 million Americans **(1 in 3)** aged 20 years or older with pre-diabetes.

- <u>Without lifestyle changes to improve their health</u>, **15% to 30%** of people with pre-diabetes will develop DMII **within five years.**

Risk Factors for pre-diabetes

- **#1 is weight status**

Risk Factors for pre-diabetes

- **#1 is weight status**
- Abdominal adiposity
  - MONW (BMI < 25 but *apple shaped*)
- Family history
- **High TG**, low HDL – <u>*missed opportunity*</u>
  - Especially with discordant lipids
    - Ie TG 150 but LDL 70

Risk Factors for pre-diabetes

- Inactivity
- "Advancing age"
  - After age 45 (!!)
- Race
  - African-Americans, Hispanics, American Indians, Asian-Americans and Pacific Islanders

Risk Factors for pre-diabetes

- GDM
- PCOS
- **Lack of sleep**
  - Increases insulin resistance
  - Undiagnosed OSA

Screening for pre-diabetes

- ADA in 2010 recommended A1c
  - Normal
  - Pre-DMII
  - DMII

Screening for pre-diabetes

- ADA in 2010 recommended A1c
  - Normal $\leq$ 5.6
  - **Pre-DMII   5.7-6.4**
  - DMII $\geq$ 6.5

Insurance issues

- CMS coverage is limited (private insurance has more lenient dx guidelines)
  - Secondary diabetes, GDM, abn GTT
  - Hypoglycemia
  - Glucagon or pancreatic d/o, HH/Fe
  - Abnormal BS
    - 100 or greater for fasting
  - Use of insulin

Insurance issues

- CMS coverage is limited (private insurance has more lenient dx guidelines)
  - "long term use of medication" V58.6
    - Antipsychotics
      - is a **HEDIS measure** to monitor lipids and blood sugar!
    - Steroids
    - HAART

Insurance issues

- CMS coverage is limited and <u>DOES NOT INCLUDE</u>
  - Obesity, morbid obesity
  - Hypertriglyceridemia
  - Abnormal weight gain, weight loss

- You can download CMS PDF for coverage questions

Current Dietary Trends

Calories US persons over age 2

- **Year:**   **1977**   **1991**   **2006**
- Cal: 2090   2297   2533

- Increased portion sizes
- More Na, sugar, fat and sugar sweetened beverages

Thermic Effect of Food

- How much energy it takes to break down the food
- <u>Meaning NET calories are NOT the same</u>

90 calories ≠ 90 calories

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Thermic Effect of Food

- How much energy it takes to break down the food
  - Raw food v. cooked food

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  - Complex CHO up to 20%
  - Simple/processed CHO 3%
  - Fat 3%

Satiety issues

- Protein more "filling" than carbohydrates
- Fats are filling/satisfying to taste buds
  - But high in calories
- Distention of the stomach
  - Liquids v. solids
- **Food affects your behavior!**
  - Cravings, preferences

The problem with liquid calories

- Purdue study (adults): (Dimeglio, Int J Obes Rel Metab DO, June 2000)
- 450 cals: jelly beans v. soda

The problem with liquid calories

- Purdue study (adults):
- 450 cals: jelly beans v. soda
  - Jelly bean   MORE food intake
  - Soda   LESS food intake

  - Relates to satiety signals

Change in SSB since 1970s

- Soda, fruit drinks, energy drinks, vitamin water
- 1977   64 calories
- 2006   141 calories

- *Because they elicit a weak compensatory dietary response, they increase the risk of positive energy balance.*

SSB

- Many pts have "gotten rid of soda"
- BUT….

SSB

- Many pts have "gotten rid of soda"
- BUT….
  - They drink JUICE, gatorade, sports drinks, energy drinks, lattes, sugared ice tea (Arnold Palmer)
- *Low sugar beverage = <10cal/8oz*
  - Artificial sweetener - do not cause cancer BUT…? alteration of gut bacteria, increase sweet cravings

Many cereals have more sugar than a twinkie or cookies

- Dec 2011 Environmental Working Group
  - analyzed the nutrition labels of 84 popular children's cereals and found that:
  - more half of the brands they reviewed deliver more sugar than three Chips Ahoy! Cookies
  - ("Sugar in Children's Cereals". http://static.ewg.org/reports/2011/cereals/pdf/2011-EWG-Cereals-Report.pdf)

Adult Exercise Recommendations

- ***Sedentary lifestyle is a risk factor for early death***
- CDC guidelines
  - ***150*** min/wk of **moderate-vigorous** activity
  - ***75*** min/wk of **vigorous** activity
  - Should be in <u>at least 10 min sessions</u>
  - 2 day week of strengthening exercises
    - **http://www.cdc.gov/nccdphp/dnpa/physical/pdf/PA_Intensity_table _2_1.pdf**

Adult Exercise Recommendations

- Cardio improves <u>*weight loss and WC*</u>
- Walking –
  - improves BP, glucose control, MetS, HTN
  - 10,000 steps (5 miles)
  - Ok to break up: two 15 minute sessions

What is a "brisk walk?"

- A pace fast enough to raise HR
  - Very de-conditioned pts may start out slow
- Paces:
  - 2 mph toddler pace
  - <u>3 mph "moderate" = 100 steps/min</u>
  - 4 mph "brisk"
  - 5 mph jogging

Lifestyle v. Metformin in DPP

- Metformin
  - Reduced risk of develop DMII by **31%**
  - *Was least effective in 45 and older*
- Lifestyle
  - Reduced risk of develop DMII by **58%**
  - *Was most effective in 60 and older*

Lifestyle v. Metformin in DPP

- Secondary analysis:
  - **weight loss** was the **main predictor** of **reduced risk for developing diabetes** in DPP lifestyle intervention group participants

Reduce Impact of Obesity Genes by Exercise

- Nov 2011 – PloS Medicine
  - Meta-analysis, 218,000 participants
  - FTO gene:
    - risk of becoming obese was **27% *lower* in those who were *physically active.***

Reduce Impact of Obesity Genes by Exercise

- April 2010 – 20,000 individuals. 3+ yr F/U
- a *physically active lifestyle* is associated with
  - **40% reduction in the genetic predisposition** to common obesity
    - for the 12 genetic markers.

What you eat and how you exercise…..

- Can CHANGE the expression of your genes
  - (epigenetics, growing area of research/interest)

- Gut flora studies

What to counsel patients

- ELIMINATE sugar sweetened beverages!

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- Reduce CHO and sweets
  - Portion sizes (Panera bagels, cereal)
  - Whole grain products only
  - Including SNACKS (most are CHO)

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What to counsel patients

- Start a cardio exercise program
  - OK to break up into 15 min sessions
  - **Consider PT if needed
  - Internet videos at home
  - Dancing
  - (treats mild to moderate depression)
  - (BEST treatment for fatigue)
  - **"23 ½ hours" TED talk – 9 minutes**

National Heart Lung and Blood Institute

OBESITY HAPPENS ONE POUND AT A TIME.
SO DOES PREVENTING IT.

Learn more »