Obesity: The problem and potential targets

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Overview

1. Problem
2. Food-related Trends
3. Treatment
4. Issues to Consider
STOP Overeating
Control Your Appetite
EFFECTIVE IMMEDIATELY
No Caffeine

THE 90’s WAY TO:
• Lose Weight
• Control Your Appetite
• Freshen Your Breath

SPRAY-U-THIN®
IT WORKS!

Easy to Use 30 Day Supply
Net 1.5 fl oz (44 ml)
Prevalence of Obesity and Overweight for Adults ≥ 20 yrs (2007-2008)

Flegal KM, et al. JAMA 2010
Obesity Trends* Among U.S. Adults

BRFSS, 2009

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

Source: Behavioral Risk Factor Surveillance System, CDC.
Prevalence of Class II and Class III Obesity for Adults ≥ 20 yrs (2007-2008)

Flegal KM, et al. JAMA 2010
Prevalence of Overweight and Obesity in Adults

Flegal KM, et al.  JAMA. 2010
Ogden CL, et al. JAMA. 2006
Prevalence of Obesity in Adults

Ogden CL, et al. JAMA. 2006
Prevalence of Obesity in Men

Flegal KM, et al.  JAMA. 2010

Percent of Adults

All  Non-Hispanic White  Non-Hispanic Black  Mexican American

Prevalence of Obesity

Flegal KM, et al.  JAMA. 2010
Prevalence of Obesity in Women

Flegal KM, et al. JAMA. 2010
Medical Complications of Obesity

- **Pulmonary disease**
  - abnormal function
  - obstructive sleep apnea
  - hypoventilation syndrome

- **Nonalcoholic fatty liver disease**
  - steatosis
  - steatohepatitis
  - cirrhosis

- **Gall bladder disease**

- **Gynecologic abnormalities**
  - abnormal menses
  - infertility
  - polycystic ovarian syndrome

- **Osteoarthritis**

- **Skin**

- **Gout**

- **Idiopathic intracranial hypertension**

- **Stroke**

- **Cataracts**

- **Coronary heart disease**

- **Diabetes**

- **Dyslipidemia**

- **Hypertension**

- **Severe pancreatitis**

- **Cancer**
  - breast, uterus, cervix
  - colon, esophagus, pancreas
  - kidney, prostate

- **Phlebitis**
  - venous stasis
The Annual Medical Spending Attributable to Obesity

- In aggregate, the annual medical burden of obesity has increased from 6.5% to 9.1% of annual medical spending (1998-2006)

- Per capita medical spending for the obese is $1,429 (42%) higher than for someone of normal weight

- In 2006, the per capita percentage increase in annual costs attributable to obesity
  - 36% for Medicare
  - 47% for Medicaid
  - 58% for private payers

- The 37% increase in obesity prevalence, not per capita cost increases, was the main driver of the increase in obesity-attributable costs between 1998-2006

Prevalence of Obesity in Children & Adolescents

Centers for Disease Control and Prevention, http://www.cdc.gov
Childhood Obesity

• Current consequences
  – Medical
    • Increased prevalence of “adult” conditions
      – Hypertension
      – Increased cholesterol
      – Type 2 Diabetes
  – Psychosocial
    • Peer rejection
    • Bullying
    • Academic performance
• Obese kids become obese adults
• Among equally obese adults, those who were overweight as children have greater prevalence of medical conditions.

Available Daily Energy Per Capita
(US Food Supply)

<table>
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<tr>
<th>Year</th>
<th>Calories</th>
<th>Carbohydrate</th>
<th>Fiber</th>
<th>Protein</th>
<th>Fat</th>
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<td>2004</td>
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USDA. Research Report Number 57. 2007
Percentage of kilocalories from major food groups

USDA. Research Report Number 57. 2007
Percent of adolescents age 12-19 yr consuming specified number of snacks in a day

Excludes snacks consisting of plain water only. Snack frequency and survey year significantly related using X² test (p<.001).

USDA. Food Survey Research Group. Dietary Data Brief No. 2. 2010
How much of their daily nutrients do adolescents obtain from snacks?

USDA. Food Survey Research Group. Dietary Data Brief No. 2. 2010
Mean calorie intake by snacking frequency, adolescents aged 12-19, 2005-2006

USDA. Food Survey Research Group. Dietary Data Brief No. 2. 2010
Mean BMI by snacking frequency, adolescents aged 12-19, 2005-2006

USDA. Food Survey Research Group. Dietary Data Brief No. 2. 2010
How often do Americans eat out?

Kant SK, Graubard BI. Prev Med. 2003
Restaurant Sales

Restaurant Sales
1970–2010
Food-and-Drink Sales
(Billions of Current Dollars)

$42.8
$119.6
$239.3
$379.0
$580.1

* Projected

National Restaurant Association. 2010
# Guide for Selecting Obesity Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>BMI Category (kg/m²)</th>
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<tr>
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<td>25-26.9</td>
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<td>Diet, Exercise, Behavior Tx</td>
<td>+</td>
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<tr>
<td>Pharmacotherapy</td>
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<td>Surgery</td>
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Portion-Controlled Meals

- Provide fixed-portion and calorie amounts
- Reduce choices and contact with problem foods
- Are convenient to use
- Satisfy appetite (monotony and sensory specific satiety)
- Facilitate dietary adherence
**Meal Replacements Enhance Initial and Long-term Weight Loss**

*1200–1500 kcal/d diet prescription.*

CF=conventional foods.

MR-2=replacements for 2 meals, 2 snacks daily.

MR-1=replacements for 1 meal, 1 snack daily.


Meta-Analysis of Partial Meal Replacements (PMR) vs. Reduced Calorie Diets (RCD)

Mean Weight Losses for Completers

- 3 months: RCD -4 kg, PMR -6.5 kg
- 12 months: RCD -4.4 kg, PMR -7 kg

*p<.001

Heymsfeld et al. *IJO*, 2003
It's simple. I have a shake for breakfast, a shake for lunch, and a rodent of my choice for dinner.
The most frequent outcome of obesity treatment is weight regain.

LaGrotte CA, Foster GD. 2011
Antecedent $\rightarrow$ Behavior $\rightarrow$ Consequence
Possibilities

• **Food Supply**
  – Calories
  – Macronutrients
  – Portions

• **Meal types/patterns**
  – Portions
  – Snacking
  – Restaurant eating

• **Maladaptive habits**
  – Increased availability
  – Exposure to highly reinforcing (taste, cost) foods
  – Greater opportunity to be reinforced and conditioned
  – Stronger habit formation
How Can Technology Help?

- Improving food supply
- Marketing
- Portions
- Perceptual barriers (fresh, processed)
Questions to Consider

1) What can technology do?
   a) In home
   b) Out of home
   c) Snacks

2) A plea for simplicity
   a) Calories
   b) Messages (health, weight, none) to consumers
A Public Health Framework to Prevent and Control Overweight and Obesity

Energy Intake

Energy Expenditure

Energy Balance

Individual Factors

Behavioral Settings

Social Norms and Values

Sectors of Influence

Individual Factors

Food and Beverage Intake

Physical Activity

Food and Beverage Industry

Agriculture

Education

Media

Government

Public Health Systems

Healthcare Industry

Business and Workers

Land Use and Transportation

Leisure and Recreation

Community- and Faith-based Organizations

Foundations and Other Funders

Home and Family

School

Community

Work Site

Healthcare

Genetics

Psychosocial

Other Personal Factors

Food and Beverage Industry

Agriculture

Education

Media

Government

Public Health Systems

Healthcare Industry

Business and Workers

Land Use and Transportation

Leisure and Recreation

Community- and Faith-based Organizations

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Leisure and Recreation

Community- and Faith-based Organizations

Foundations and Other Funders

Adapted from Institute of Medicine, 2005.
“Well, I see my time is up . . .”