Obesity: The Growing Epidemic

Dr. Rohn Rigby, AAFP, ABOM
Disclaimer

None
## Evolving Definitions of Obesity

<table>
<thead>
<tr>
<th>Weight Categories</th>
<th>BMI, kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>&gt;18.5 and &lt;25</td>
</tr>
<tr>
<td>Overweight</td>
<td>&gt;25 and &lt;30</td>
</tr>
<tr>
<td>Obesity Class I</td>
<td>&gt;30 and &lt;35</td>
</tr>
<tr>
<td>Obesity Class II</td>
<td>&gt;35 and &lt;40</td>
</tr>
<tr>
<td>Obesity Class III</td>
<td>&gt;40</td>
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</tbody>
</table>

“Obesity is defined as a chronic, relapsing, multifactorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences.”
Obesity: A Multifactorial Disease

- Genetics/Epigenetics
- Neurobehavioral
- Medical
- Environment
- Immune
- Endocrine
Obesity Trends* Among U.S. Adults
BRFSS, 1985

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

Derived from NHANES data (http://www.cdc.gov/nchs/data/hestat/obesity_adult_09_10/obesity_adult_09_10.html#table1)
“If more than 50% of the population is obese, then I’m not overweight, I’m average!”
Direct medical spending due to obesity and its comorbidities is estimated to $210-$316 billion annually: 21-28% of total U.S. healthcare spending.

When also accounting for the indirect, non-medical costs of obesity, the overall annual cost is estimated to be $450-$556 billion.

**Economic burden of obesity**

- **Direct medical costs** (U.S. healthcare spending) 21%
- **Indirect, non-medical costs** (food, clothing, employer costs: absenteeism, lost productivity)
- **Overall cost of obesity:** $450-556 billion/year
What is Weight Bias?

• Negative attitudes toward individuals with obesity

• Stereotypes leading to:
  • stigma
  • rejection
  • prejudice
  • discrimination

• Verbal, physical, relational, cyber

• Subtle and overt
Why Weight Bias is a Problem

- It keeps patients affected by obesity from seeking help and professionals from offering it.

- Weight bias is the last socially acceptable form of discrimination.

- Bias hampers our nation’s efforts to effectively combat the obesity epidemic.

- Bias is a primary driver around the current limitations of access to treatment.

- Recognizing and combatting bias, both your own and in the community, is an important step in addressing obesity.
Few People in the U. S. are being Treated

~80 million adults with obesity

<1% receive a prescription (Rx) For Anti Obesity Medication in a given month

~195,000 people per year receive bariatric surgery
Obesity, Adiposopathy, Fat Mass Disease

Obesity may be assessed using several criteria (thresholds vary based on ethnicity)

<table>
<thead>
<tr>
<th>Body Mass Index (BMI)</th>
<th>18.5-24.9</th>
<th>25.0-29.9</th>
<th>≥30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Body Fat</td>
<td>Male: &lt;25% Female: &lt;32%</td>
<td></td>
<td>Male: &gt;25% Female: &gt;32%</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>Male: &lt;40 in. Female: &lt;35 in.</td>
<td></td>
<td>Male: &gt;40 in. Female: &gt;35 in.</td>
</tr>
</tbody>
</table>

Edmonton Obesity Staging System

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Obesity</td>
</tr>
<tr>
<td>1</td>
<td>Overweight</td>
</tr>
<tr>
<td>2</td>
<td>Class I: BMI 30.0-34.9</td>
</tr>
<tr>
<td>3</td>
<td>Class II: BMI 35-39.9</td>
</tr>
<tr>
<td>4</td>
<td>Class III: BMI &gt; 40.0</td>
</tr>
</tbody>
</table>

No Obesity → Prevention → Primary care provider or dietitian

If treatment is ineffective, refer to an obesity medicine specialist.

Consider referring to an obesity medicine specialist.

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3 Ways To Measure Body Fat

- Percent Body Fat
- Waist Circumference
- Body Mass Index (BMI)

71.6% of Americans adults are overweight or obese (CDC) (2016)
The Best Measure of Obesity

- % body fat may be useful in patients with extremes in muscle mass and thus may be a more accurate measure of body composition when assessing the efficacy of interventions directed towards change in muscle mass.

- Waist circumference provides additional information regarding adipose tissue function/dysfunction and predisposition to metabolic disease among individuals with BMI < 35kg/m2.

- BMI is a reasonable initial screening measurement for most patients.
### Individualized Diagnostic Testing

#### Body Composition
- Dual-energy X-ray absorptiometry (DXA), ideally with visceral fat assessment (gold standard)
- MRI
- Bioelectric impedance
- Near-infrared interactance
- Whole-body air displacement plethysmography (Bod Pod)
- Myotape measurements
- Caliper percent body fat measurements
- Underwater weighing
- Quantitative magnetic resonance (QMR)
- Computerized tomography
- Deuterium dilution

#### Newer Metabolic Tests
- Leptin
- Adiponectin
- Leptin-to-adiponectin ratio
- Free fatty acids
- Immune markers
  - Tumor necrosis factor
  - Interleukin 1 and 6
- Infectious testing
Figure 2. Adiposopathy and the genesis of type 2 diabetes mellitus, dyslipidemia, and atherosclerosis. FFA—free fatty acid.
(Adapted from Bays et al. [1••]; with permission.)
Fat Distribution
Adiposopathy Stress Cycle

1. Obesity, Adiposopathy, and Metabolic Disease
2. Worsening Adipose Tissue Function
3. Chronic Stress
4. Increasing Body Fat
5. Behavior Changes, Endocrinopathies, and Immunopathies

Adiposopathy Stress Cycle
Nutritional Therapy

Efficacy factors

- Evidence-based
- Quantitative
- Qualitative
- Patient preference
- Patient adherence

It is not simply calories in and calories out!
Metabolic Syndrome

Waist circumference (M >40 in; F> 35 in)

Hypertension

Abnormal glucose

Abnormal HDL (M <40; F<50)

Abnormal triglycerides (> 150)

(Risk factors for Type 2 diabetes)
Metabolic Syndrome Evolution
Hormonal signals

- Hormonal stimulatory effects
- Hormonal inhibitory effects

Paraventricular nucleus
- Thyrotropin-releasing, corticotropin-releasing, and melanin-concentrating hormones produced in different neurons of the paraventricular nucleus and lateral hypothalamic area
- To forebrain and pituitary and adrenal gland
- Ingestive and autonomic responses

Arcuate nucleus
- Y2R, NPY, AGRP
- Y1R, MC4R
- POMC (α-MSH)
- LepR, INSR

Insulin leptin

Ghrelin

Large intestine
- Stomach
- Adipose tissue
- Small intestine

Pancreas

PYY
SUGAR ADDICTION: THE PERPETUAL CYCLE

1. YOU EAT SUGAR
   - You like it, you crave it
   - It has addictive properties

2. BLOOD SUGAR LEVELS SPIKE
   - Dopamine is released in the brain = addiction
   - Mass insulin secreted to drop blood sugar levels

3. BLOOD SUGAR LEVELS FALL RAPIDLY
   - High insulin levels cause immediate fat storage
   - Body craves the lost sugar 'high'

4. HUNGER & CRAVINGS
   - Low blood sugar levels cause increased appetite and cravings
   - Thus the cycle is repeated
Positive Feedback Mechanism: Drives Weight Up

High Fat/High Carb Food

Increased endocannabinoids and resistance to leptin and insulin

1. Increased food intake
   2. Weight gain

Hypothalamic injury – CNS insulin and leptin resistance

“Brain can’t tell how much fat is stored, how much food is eaten”

1. Reduced sense of satiety
   2. Craving
Low Carb/Keto Food Pyramid
Current Treatment Options for Obesity

Lifestyle
Includes nutrition, exercise, and behavioral programs

Lifestyle + Medication
May include lifestyle, very low-carbohydrate/keto diets with supplements, and anti-obesity medications

Surgery
(In order of lowest risk/cost and potency):
gastric banding < gastric sleeve < gastric bypass (Roux-en-Y)

Potency*

Risk/Cost
"Would walking into McDonald's instead of using the drive-thru be considered more exercise?"
Which Works Better?

“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”

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Pharmacotherapy

Anti-obesity medications: (approved before 1999)

- Phentermine
- Diethylpropion
- Phendimetrazine
- Benzphetamine
- Orlistat

Anti-obesity medications: (approved since 2012)

- Lorcaserin
- Phentermine HCL/topiramate extended release
- Naltrexone HCL/bupropion HCL extended release
- Liraglutide
Weight Positive Medication

- Medication Classes:
  - Cardiovascular
  - Diabetic
  - Hormones
  - Neurological (anti-seizure, migraine)
  - Psychiatric (mood stabilizer, antidepressants)
  - Infectious disease (HIV)
  - Chemotherapy
  - Others
Overall Management Goals

Adult patient with overweight or obesity

- Improve patient health
- Improve quality of life
- Improve body weight & composition
# Guidelines for Surgery

## Table 2: Bariatric surgery: current indications

<table>
<thead>
<tr>
<th>BMI ≥ 40 kg/m²</th>
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<tbody>
<tr>
<td>In any case, providing surgery risk acceptable (well established)</td>
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<table>
<thead>
<tr>
<th>BMI ≥ 35 kg/m²</th>
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<tbody>
<tr>
<td>If there are ≥ 1 obesity-related morbidities (well established)</td>
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<tr>
<td>- Type 2 diabetes, hypertension, dyslipidemia, CV disease</td>
</tr>
<tr>
<td>- Sleep apnea, obesity-hypoventilation, Pickwick’s syndrome</td>
</tr>
<tr>
<td>- Fatty liver disease</td>
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<tr>
<td>- Idiopathic intracraneal hypertension (<em>pseudotumor cerebri</em>)</td>
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<tr>
<td>- Gastro-esophageal reflux</td>
</tr>
<tr>
<td>- Asthma</td>
</tr>
<tr>
<td>- Lower extremities venous insufficiency</td>
</tr>
<tr>
<td>- Severe urinary incontinence</td>
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<tr>
<td>- Disabling osteoarthritis</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>BMI between 30 and 34.9 kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>If type 2 diabetes or metabolic syndrome (“metabolic surgery”)</td>
</tr>
<tr>
<td>(Under scrutiny; less established indication)</td>
</tr>
</tbody>
</table>
Comparing Cases

- 56-year-old male PMH obstructive sleep apnea, degenerative joint disease, GERD, chronic fatigue
- Fam Hx: of coronary artery disease, cancer
- Weight 407.2 lbs.
- BMI 61.46, waist circumference 65, neck circumference 20.5
- Tx: Phentermine/topiramate, Glucophage
- Low carbohydrate healthy fat
- Starting to incorporate some low impact exercise, increased energy
- Current weight 317 lbs.
- Current BMI 47.84, waist circumference 55, neck circumference 18.5, visceral fat 39

- 54 y/o Female PMH migraine headaches, seasonal allergies, depression (escitalopram), obesity
- Fam Hx: cancer and hypertension
- Weight 254
- BMI 37.51, waist circumference 46.8, neck circumference 14, visceral fat 13
- Tx: phentermine, bupropion, low carbohydrate healthy fat
- More physically active (has ridden in several bike centuries) faster time and faster recovery
- Current weight 203 lbs.
- BMI 29.97, waist circumference 30.5, neck circumference 13, visceral fat 9
Case Study: 38 y/o male with chest pain

- 250lb. male in the ER with complaints of chest pain.
- Family HX of coronary artery disease, diabetes mellitus, hyperlipidemia, obstructive sleep apnea, depression, osteoarthritis & obesity.
- Workup in ER was negative.
- Change lifestyle to eat smaller volumes at each meal and increase exercise.
- Decreased weight from 250lbs (BMI 36.4) down to 210lbs.
- Continued increase activity, implement low carb diet and weight decreased from 210lbs. down to 170lbs (BMI 24.7)
Case Study: 38 y/o male with chest pain
Summary

• Diagnose. Then treat or refer
• Dietary changes can reverse diabetes and other chronic metabolic problems
• 2019 ADA guidelines added low carb diets as an option for treatment
Summary

• Offer all the non-surgical options before sending for weight loss surgery
• Patients can only choose a treatment they are offered!
Contact Me

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