American Society of Bariatric Physicians (ASBP)

ASBP Obesity Algorithm: Adult Adiposity Evaluation and Treatment 2013

ASBP Obesity Algorithm: 
Adult Adiposity Evaluation and Treatment 2013

Disclaimer
The American Society of Bariatric Physicians® (ASBP) Obesity Algorithm was developed to assist health care professionals in medical decision making; however, it is in no way a substitute for a medical professional’s independent judgment and should not be considered medical advice. Most of the content herein is based on the medical literature and the clinical experience of obesity medicine specialists. In areas of uncertainty, professional judgment of the authors was applied. The Obesity Algorithm is a working document that reflects the state of the field of obesity medicine at the time of publication. Because rapid changes in this area are expected, periodic revisions are inevitable. We encourage medical professionals to use this information in conjunction with, and not as a replacement for, their best clinical judgment. The presented recommendations may not be appropriate in all situations. Any decision by practitioners to apply these guidelines must be made in light of local resources and individual patient circumstances.

Permissions
The American Society of Bariatric Physicians® (ASBP) Obesity Algorithm is protected by copyright and may not be altered in any form. This copyrighted material may be accessed for personal research, scientific and/or information purposes only. No part of this algorithm may be distributed for sale or sold in any form or by any means without prior written permission from the Society.

Ordering Reprints and/or Requesting Permissions for use of ASBP Obesity Algorithm
For reprints or other permissions, please contact:
E-mail: info@asbp.org
Phone: 303.770.2526

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
ASBP Obesity Algorithm:
Adult Adiposity Evaluation and Treatment 2013

Jennifer Seger, MD & Deborah Bade Horn, DO, MPH, FASBP Co-Chairs

Co-authors:
Eric C. Westman, MD, MHS
Richard Lindquist, MD, ABFM
Wendy Scinta, MD, MS
Larry A. Richardson, MD, FASBP
Craig Primack, MD, FACP, FAAP
David A. Bryman DO
William McCarthy, MD
Ed Hendricks MD, FASBP
Brian N. Sabowitz, MD, FACP
Stacy L. Schmidt, PhD
Harold E Bays MD, FTOS, FACE, FNLA

Administrative assistance:
Laurie Traetow, CAE

Citation:

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
ASBP Obesity Algorithm:  
Adult Adiposity Evaluation and Treatment 2013

Purpose

• To provide clinicians an overview of principles important to the care of patients with increased body fat, based upon scientific evidence, supported by the medical literature, and derived from the clinical experiences of members of the American Society of Bariatric Physicians.
ASBP Obesity Algorithm:
Adult Adiposity Evaluation and Treatment 2013

Process

The ASBP Algorithm was derived from input by volunteer ASBP members consisting of:

- Academicians
- Clinicians
- Clinical trialists
- Researchers

The ASBP Algorithm did not receive industry funding, had no input from industry, and the authors received no payment for their contributions.
ASBP Obesity Algorithm: 
Adult Adiposity Evaluation and Treatment 2013

Intent of use

The ASBP Algorithm 2013 is intended to be a “living document” updated once a year (as needed), and intended as an educational tool to assist in the translation of medical science and the clinical experience of the authors towards assisting clinicians better manage their overweight and obese patients.

This algorithm is not intended to be interpreted as “rules” and/or directives regarding medical care of an individual patient.

While it is hoped many clinicians may find this algorithm helpful, the final decision regarding the optimal care of the overweight and obese patient is dependent upon the individual clinical presentation, and the judgment of the clinician who is tasked with directing a treatment plan that is in the best interest of the patient.
ASBP Obesity Algorithm: Adult Adiposity Evaluation and Treatment 2013

Contents:

• Overall management goals
• Obesity classification
• Obesity as a disease
• Diagnosis
• Overall approach
• Fat mass disease
• Sick fat disease (adiposopathy)
• History
• Physical exam
• Laboratory evaluation
• Treatment
• Nutritional therapy
• Physical activity
• Behavior therapy
• Weight management pharmacotherapy
• Early versus late weight management intervention
• Bariatric surgery
• Executive summary
• References
• Disclosures
Overall Management Goals

Adult patient with overweight or obesity

- Improve patient health
- Improve quality of life
- Improve body weight and body composition
Obesity classification: BMI

Increased body fat (adiposity)

Overweight and obesity classification: Body Mass Index (BMI) in kg/m²

- Normal weight (18.5 - 24.9)
- Overweight (25.0 - 29.9)
- Class I obesity (30.0 - 34.9)
- Class II obesity (35.0 - 39.9)
- Class III obesity (≥ 40)
Obesity classification: % body fat

Increased body fat (adiposity)

Overweight and obesity classifications:
Percent Body Fat

Essential Fat
Women = 10-13%
Men = 2 - 5%

Athletes
Women = 14 - 20%
Men = 6 - 13%

Fitness
Women = 21 - 24%
Men = 14 - 17%

Acceptable
Women = 25 - 31%
Men = 18 - 24%

Obesity
Women = > 32%
Men = > 25%
**Obesity classification: waist circumference**

**Increased body fat (adiposity)**

**Overweight and obesity classification: Waist Circumference (WC)**

- **Men Abdominal Obesity**
  
  $\geq 40$ inches ($\geq 102$ cm)*

- **Women Abdominal Obesity**
  
  $\geq 35$ inches ($\geq 88$ cm)*

* Different WC abdominal obesity cut-off points may be appropriate for different races, such as $\geq 90$ cm for Asian men and $\geq 80$ cm for Asian women
Increased body fat (adiposity)

Body mass index (BMI)
- Advantages
  - Increased BMI generally correlates with metabolic and fat mass diseases in population studies
  - Commonly used
  - Reasonably reproducible
  - Low cost
- Disadvantages
  - May not correlate to metabolic and fat mass diseases in an individual patient
  - Does not account for muscle mass
  - BMI cut-off points do not distinguish between men and women, nor ethnic and racial considerations

Percent body fat
- Advantages
  - More specific assessment of body fat (not muscle, etc.)
  - May be a reasonable longitudinal measure in patients adhering to resistance exercise training
- Disadvantages
  - Some measures are not always accurate and/or easily reproducible (e.g., single site skinfold calipers)
  - Electronic/machine body fat measures may be expensive
  - Cut-off points not as validated to correlate to metabolic disease as waist circumference

Waist circumference
- Advantages
  - Well correlated to metabolic disease
  - Direct anatomical measure of adipose tissue deposition, with an increase in waist circumference reflective of adipose tissue dysfunction
  - Low cost
- Disadvantages
  - Measurement not always reproducible
  - Not clear that waist circumference is clinically superior to BMI in correlating to metabolic disease, especially at BMI > 35 kg/m²
  - Racial differences

Reference/s: [1] [2] [3]
Obesity as a Disease

Increased body fat both directly and indirectly promotes and/or causes adverse health consequences, and thus by definition, is a disease.

General Definition of a disease

- A disordered or incorrectly functioning organ, part, structure, or system of the body
- Results from the effect of genetic or developmental errors, infection, poisons, nutritional deficiency or imbalance, toxicity, or unfavorable environmental factors
- Manifests as illness, sickness, or ailments

Reference/s: [204]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Obesity as a disease

Obesity is a disease when . . .

- The patient has an abnormal increase in body fat as assessed by a reliable measure
- Increased body fat is caused by genetic or developmental errors, infections, hypothalamic injury, adverse reactions to medications, nutritional imbalance, and/or unfavorable environmental factors
- Pathogenic adipocyte and/or adipose tissue endocrine and immune function contribute to metabolic disease (adiposopathy or "sick fat" disease) and/or;
  - Pathogenic physical forces from excessive body fat cause damage to other body tissues (fat mass disease)

The adverse health consequences of increased body fat are not simply "co-morbidities" or "associated risk factors"
Obesity as a disease

Overweight and obese adult patients

Does clinical evidence exist that the increase in body fat is pathogenic?

- Yes
  - Sick fat disease (adiposopathy)
  - Fat mass disease

- No
  - Metabolically healthy but obese (may help account for obesity paradox)
Obesity as a disease

Within subsets of overweight and obese patients:

- Deranged endocrine and immune responses
  - Sick fat disease (SFD) (Adiposopathy)
    - Elevated blood glucose
    - Elevated blood pressure
    - Dyslipidemia
    - Other metabolic diseases
  - Abnormal and pathologic physical forces
    - Fat mass disease (FMD)
      - Stress on weight bearing joints
      - Immobility
      - Tissue compression (e.g. sleep apnea, gastrointestinal reflux, high blood pressure, etc.)
      - Tissue friction (e.g. intertrigo, etc.)

Reference/s: [4] [5] [6] [7] [8] [9] [10]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Identify health risk and disease in overweight and obese patients

- History
- Physical Exam
- Laboratory

- Sick fat disease (SFD) "Adiposopathy"
- Fat mass disease (FMD)
5 A's of Obesity Management

Ask
- Ask for permission to discuss body weight
- Explore readiness for change

Assess
- Assess body mass index, waist circumference, and obesity stage
- Explore drivers and complications of excess weight

Advise
- Advise the patient about the health risks of obesity, the benefits of modest weight loss, the need for a long-term strategy, and treatment options

Agree
- Agree on realistic weight-loss expectations, targets, behavioral changes, and specific details of the treatment plan

Arrange / Assist
- Assist in identifying and addressing barriers
- Provide resources
- Assist in finding and consulting with appropriate providers
- Arrange regular follow-up
Diagnose fat mass disease (FMD)

Fat Mass Disease

- Cardiovascular
  - Congestive Heart Failure & Cor Pulmonale
  - Varicose Veins
  - Thromboembolic events (e.g. pulmonary embolus, stroke, etc.)
  - Hypertension (e.g. compression of kidney)

- Pulmonary
  - Dyspnea
  - Obstructive Sleep Apnea
  - Hypoventilation Syndrome
  - Pickwickian Syndrome
  - Asthma

- Neurologic
  - Intracranial hypertension (pseudotumor cerebri) i.e. due to increased intra-abdominal pressure, sleep apnea, etc.
  - Stroke (see "cardiovascular")
  - Nerve entrapment (e.g. meralgia paresthetica, carpal tunnel syndrome, etc.)
Diagnose fat mass disease (FMD) - continued -

Fat Mass Disease

Musculoskeletal
- Immobility
- Osteoarthritis (e.g. knees, hips)
- Low back pain

Gastrointestinal
- Gastrointestinal reflux
- Hernias

Integument
- Striae distensae (skin stretch marks)
- Stasis pigmentation
- Venous stasis ulcers
- Cellulitis
- Acanthosis nigricans
- Skin tags
- Intertrigo (i.e. bacterial, fungal skin fold infections)
- Carbuncles

Genitourinary
- Urinary stress incontinence

Reproductive
- Pregnancy complications
Diagnose fat mass disease (FMD) - continued -

Fat Mass Disease

Psycho-social

- Depression
  - Hopelessness
  - Low self esteem
  - Body image dissatisfaction
  - Diminished sex drive
  - Impaired intimacy and sexual relationships

- Decreased work productivity
  - Increased work absenteeism

- Biases
  > Society
  > Family
  > Workplace

- Negative self or external perceptions
  > "Unmotivated"
  > "Weak-willed"
  > "Less intelligent"
  > "Less attractive"
  > "Unsuccessful"
  > "Overindulgent"
  > "Lazy"

Reference/s: [13] [14]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
American Society of Bariatric Physicians (ASBP) Algorithm

Diagnose "sick fat disease" (SFD)

Adiposopathy

Clinical manifestations

- High blood glucose (prediabetes mellitus, type 2 diabetes mellitus)
- High blood pressure
- Metabolic syndrome
- Adiposopathic dyslipidemia
  - Increased triglyceride levels
  - Decreased high density lipoprotein cholesterol levels
  - Increased atherogenic particle number (increased apolipoprotein B)
  - Increased small dense low density lipoprotein particles
  - Increased triglyceride-rich lipoproteins
  - Increased lipoprotein remnant lipoproteins
- Insulin resistance
- Hepatosteatosis (fatty liver)
- Hyperuricemia and gout
- Cholelithiasis
- Nephrolithiasis
- Glomerulopathy
- Pro-thrombotic predisposition
- Neuropsychiatric diseases (such as worsening depression due to adiposopathic immune and endocrine responses)
- Asthma (due to adiposopathic immune and endocrine responses)
- Worsening of other inflammatory diseases (osteoarthritis, atherosclerosis, etc.)

Reference/s: [6] [7] [9] [10] [15]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Diagnose "sick fat disease" (SFD)

Adiposopathy

Clinical manifestations

- Hyperandrogenemia in women
- Polycystic ovarian syndrome
- Menstrual disorders
- Infertility
- Hypoandrogenemia in men

- Cancer - strongest evidence
  - Endometrial cancer
  - Postmenopausal breast cancer
  - Colon cancer
  - Renal cell carcinoma
  - Liver cancer
  - Gallbladder cancer
  - Esophageal cancer
  - Pancreatic cancer
- Cancer - mounting evidence
  - Cervical cancer
  - Ovarian cancer
  - Prostate cancer (prognosis, not necessarily increased risk)
  - Stomach cancer

Reference/s: [6][16][17][18]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Diagnose "sick fat disease" (SFD)

Adiposopathy

**Etiology / Causes**
- Positive caloric balance, especially with high carbohydrate dietary intake
- Sedentary lifestyle with inadequate level of physical activity
- Genetic predisposition
- Environmental contributors to increased body fat
- Extra-genetic contributors to worsening fat function (e.g. certain medications, viral infections, gut microbiota transmission of pro-inflammatory state, etc.)

**Anatomic abnormalities**
- Adipocyte hypertrophy
- Increased visceral, pericardial, perivascular, and other periorgan adiposity
- Growth of adipose tissue beyond vascular supply
- Increased adipose tissue immune cells
- "Ectopic" fat deposition in other body organs (liver, muscle, possibly pancreas, etc.)

**Pathophysiology**
- Impaired adipogenesis
- Adipocyte organelle dysfunction (endoplasmic reticulum, mitochondria, etc.)
- Increased circulating free fatty acids
- Pathogenic adipose tissue endocrine responses
- Pathogenic adipose tissue immune responses
- Pathogenic interactions with other body organs such as fatty liver, vasculopathies (endothelial dysfunction, atherosclerosis, hypercoagulation), etc.
American Society of Bariatric Physicians (ASBP) Algorithm

Reference/s: [21] [22] [23] [24] [25]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
History

Nutrition history

Meals and snacks
- Timing
- Frequency
- Nutritional content
- Preparer of food
- Access to foods
- Location of home food consumption (e.g. eating area, television, computer, etc.)
- Location of away food consumption (e.g. workplace restaurants, fast food, etc.)

Behavior
- Previous nutritional attempts to change body composition, and if unsuccessful or unsustained, what were short and long-term barriers to achieving or maintaining fat weight loss
- Triggers (e.g. hunger, cravings, anxiety, boredom, reward, etc.)
- Nighttime eating
- Binge eating
- Emotional eating
- Family influences
- Community influences
- Readiness for change

Records
- Food and beverage diary, including type & amount (72 hour recall, keep food and beverage record for a week and return for evaluation, etc.)
History

Physical Activity History

- Success and/or failure of previous physical activity / exercise efforts
- Reasons if no longer engaged in a routine physical activity / exercise regimen

- Current mobility and equipment needs
- Current physical activity / exercise status
- Current fitness level or endurance capacity
- Access to locations amenable to increased physical activity / exercise (e.g. gym, workplace exercise facilities, home setting (urban, rural) etc.
- Physical activity / exercise preferences
- Perceived barriers to increased physical activity

- Medical conditions that should be evaluated before prescribing an exercise program
  - Diseases of the heart, lung, musculoskeletal and other body systems
  - Metabolic diseases having potential risks with increased physical activity such as atherosclerotic coronary heart disease (worsening ischemia), diabetes mellitus (hypoglycemia), high blood pressure (increase blood pressure with resistance training), etc.

Reference/s: [29] [30] [31]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Encourage patient to be up-to-date with sentinel and preventive physical exam procedures that the patient and prior clinicians may have avoided, which depending upon gender and age, may include:

- Breast exam (and mammogram as applicable)
- Pelvic exam
- Pap smear
- Testicular exam
- Rectal exam and stool for occult blood (sigmoidoscopy or colonoscopy as applicable)
- Immunizations
Physical Exam

Physical exam

Vital signs
- Height with bare or stocking feet measured with a stadiometer
- Weight using calibrated scale and method consistent from visit to visit (e.g., light indoor clothing or gown, etc.)
- Body mass index (BMI)
- Standing waist circumference using superior iliac crest (optional for BMI > 35 kg/m²)
- Neck circumference
- Blood pressure using appropriate sized cuff
- Pulse

General physical exam
- Physical exam of general body systems
- Special emphasis on physical exam of the lung, heart, musculoskeletal system, and integument
Adiposity-relevant blood testing

- Fasting blood glucose
- Hemoglobin A1c
- Fasting lipid levels
  - Triglycerides
  - Low density lipoprotein (LDL) cholesterol
  - High density lipoprotein (HDL) cholesterol
  - Non-HDL cholesterol
- Liver enzymes and other liver blood tests
  - Aspartate aminotransferase (AST)
  - Alanine aminotransferase (ALT)
  - Alkaline phosphatase
  - Total bilirubin
- Electrolytes (e.g. potassium, sodium, calcium, phosphorous, etc.)
- Renal blood testing (e.g. creatinine, blood urea nitrogen, etc.)
- Uric acid
- Thyroid stimulating hormone (TSH)
- Vitamin D levels

General laboratory testing

- Complete blood count
- Urinalysis
- Urine for microalbumin

Reference/s: [15] [32] [205]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
American Society of Bariatric Physicians (ASBP) Algorithm

Reference/s: [33] [34] [35]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP

**Laboratory**

- Individualized body system testing
- Body composition quantitative testing

**Laboratory**

- Resting electrocardiogram
- Cardiac stress testing
- Echocardiogram
- Sleep studies
- Imaging studies of the liver (e.g. ultrasound)
- Anaerobic threshold/VO2 testing
- Resting Metabolic Rate (RMR)
- Coronary calcium scores

- Dual energy X-ray absorptiometry (DXA)
- Bioelectric impedance analysis
- Near-infrared interactance
- Whole-Body Air-Displacement Plethysmography (BOD POD)
- Quantitative magnetic resonance (QMR)
- Underwater weighing
- Deuterium dilution
- Myotape measurements for wrist and neck size (for potential use in percent body fat equations)
- Myotape measurements for muscle mass
- Caliper percent body fat measurements (e.g. 3-site skinfold calculations)
American Society of Bariatric Physicians (ASBP) Algorithm

**Laboratory**

**Individualized blood testing**

- Overnight dexamethasone suppression test cortisol or 24 hour urine collection for cortisol if endogenous hypercortisolism is suspected
- Estradiol, follicle stimulating hormone, luteinizing hormone, and pregnancy test in women with oligomenorrhea or amenorrhea
- Testosterone and other androgen levels (e.g. dehydroepiandrosterone sulfate/DHEAS) for women with hirsuitism or with polycystic ovarian syndrome
- Testosterone for men with Impotence or physical findings of hypogonadism [and if low to a clinically significant degree, possibly prolactin, follicle stimulating hormone and luteinizing hormone]
- Apolipoprotein B and/or lipoprotein particle number, especially if triglyceride levels are elevated.
- Iron studies (iron, total iron binding capacity, ferritin)
- C-reactive protein

**Emerging science testing**

- Fasting insulin
- Leptin
- Adiponectin
- Leptin to adiponectin ratio
- Free fatty acids
- Immune markers
  > Tumor necrosis factor
  > Interleukin 1 and 6
- Infectious testing
  > Gut microbiota
  > Adenovirus assays
  > Evaluation for other microbes

Reference/s: [16] [36] [37] [38]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Treatment of adult patients with overweight or obesity as a disease

- Nutrition
- Physical activity
- Behavior therapy
- Pharmacotherapy
- Bariatric surgery
Treatment of adult patients with overweight or obesity as a disease

- Treat adipocyte and adipose tissue dysfunction, which treats sick fat disease (SFD or adiposopathy)
- Treat excessive body fat, which treats fat mass disease (FMD)

Treating diseases due to excessive body fat improves patient health, quality of life, body weight and body composition
Treatment

Identify and manage secondary and/or contributing causes of SFD and FMD

Conditions that may promote fat mass gain

- Medical conditions
  - Hypothalamic damage
  - Prader Willi syndrome
  - Immobility
  - Insulinoma
  - Some cases of untreated hypothyroidism
  - Hypercortisolism (Cushing’s disease)
  - Reduced sleep / sleep apnea

- Psychological / behavioral conditions
  - Mental stress
  - Depression
  - Anxiety
  - Post-traumatic stress syndrome
  - Binge eating disorder
  - Night eating disorder

Reference/s: [39] [40] [41] [42]  
Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Identify and manage concomitant pharmacotherapy that might influence body weight

Illustrative examples of pharmacotherapies that may promote fat mass gain

- Steroid hormones (e.g. glucocorticoids, estrogens, progestins, tamoxifen)
- Diabetes therapies (e.g. some insulins, sulfonylureas, thiazolidinediones)
- Some highly active antiretroviral protease inhibitors
- Some B-adrenergic blockers (most commonly described with nonselective B-blockers (e.g. propranolol))
- Some adrenergic blockers
- Some antihistamines (e.g. diphenhydramine)
- Some antidepressants [tricyclic antidepressants, irreversible monoamine oxides (MAO) inhibitors, mirtazapine, and some selective serotonin reuptake inhibitors (e.g. paroxetine, antiserotonin agents (e.g. pizotifen))]
- Some antiseizure drugs (e.g. valproate, gabapentin, and carbamazepine)
- Some psychotropic drugs (e.g. clozapine, olanzapine, risperidone, quetiapine, thioridazine, divalproex, and chlorpromazine and lithium)
- Some chemotherapies

Illustrative examples of pharmacotherapies that may promote fat mass loss

- Anti-diabetes mellitus agents
  - Metformin
  - Glucagon-like peptide-1 (GLP-1) agonists
  - Sodium glucose co-transporter 2 (SGLT2) inhibitors
- Neurologic agents
  - Topiramate
  - Bupropion

Reference/s: [14] [43] [44] [45] [46]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Treatment

Nutritional Therapy

- Energy consumption intended to cause negative caloric balance and fat weight loss
- Low calorie diet is often described as 800 - 1500 kcal / day
- Very low calorie diet is often described as < 800 kcal / day

Restricted dietary carbohydrate  Restricted dietary fat  Very low calorie diets
Carbohydrate-restriction ("low carb diet")

Often defined as approximately 50 - 150 grams of carbohydrate per day, but sometimes less

**Treatment**

- **Weight loss**
  - May produce modestly greater weight loss compared to fat restricted dietary intake for the first 6 months, wherein afterwards, the net weight loss may be similar to other calorie restricted nutritional interventions

- **Metabolic effects**
  - Reduces fasting glucose and insulin levels
  - Reduces triglyceride levels
  - Modestly increases high density lipoprotein cholesterol levels
  - May modestly increase low density lipoprotein cholesterol levels
  - The metabolic effects noted above may occur with or without weight loss
  - May modestly reduce blood pressure
  - In patients with epilepsy, ketogenic diets may reduce seizures
  - Ketogenic diet may possibly improve diabetes mellitus complications (e.g. nephropathy)

- **Risks**
  - May produce carbohydrate cravings within the first few days of implementation, which may be mitigated by artificial sweeteners or adding low glycemic index foods

Reference/s: [15] [32] [51] [52] [53] [54] [55] [56] [57] [58] [59]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Fat restriction ("low fat diet")

Often defined as approximately 20 - 35% of total calories from fat

- Weight loss
  - After 6 months, fat restrictive low calorie nutritional intervention generally produces the same amount of weight loss compared to "low carb diet"

- Metabolic effects
  - May reduce fasting glucose and insulin levels
  - Modestly decreases low density and high density lipoprotein cholesterol levels
  - May modestly reduce blood pressure

- Risks
  - Hunger control may be more difficult than with carbohydrate restrictive nutritional intervention
  - If fat restriction results in a substantial increase in carbohydrate consumption, and if weight loss is not achieved, then an increase in carbohydrate dietary intake may contribute to hyperglycemia, hyperinsulinemia, hypertriglyceridemia, and reduced levels of high density lipoprotein cholesterol

Reference/s: [15] [60] [61]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
**Treatment**

**Very low calorie diets**

Often defined as 400 - 800 kcal/day, commonly implemented by use of commercially prepared formulas

- **Weight loss**
  - Produces more rapid weight loss than standard carbohydrate and/or fat restricted dietary intake

- **Metabolic effects**
  - Reduces fasting glucose and insulin levels
  - Reduces triglyceride levels
  - May modestly increase high density lipoprotein cholesterol levels
  - May modestly decrease low density lipoprotein cholesterol
  - Reduces blood pressure

- **Risks**
  - Fatigue, nausea, constipation, diarrhea, hair loss, and brittle nails
  - Cold intolerance
  - Dysmenorrhea
  - Gallstones
  - Kidney stones
  - Gout
  - Insufficient mineral intake may predispose to:
    - Palpitations and cardiac dysrhythmias
    - Muscle cramps
    - Possible increased risk of osteoporosis
    - Tooth decay

Reference/s: [62] [63]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Treatment

Physical activity

Adiposopathy (sick fat disease)
- Assist with weight maintenance
- Assist with weight loss
- Improve body composition
- Possibly improve adipocyte function ("train" fat cells)
  - Improve insulin sensitivity
  - Increase mitochondrial biogenesis
  - Increase browning of fat cells

Non-adipose health parameters
- Improve metabolic health
- Improve musculoskeletal health
- Improve cardiovascular health
- Improve pulmonary health
- Improve mental health
- Improve sexual health

Reference/s: [64] [65] [66]
Physical activity

Medical evaluation to ensure safety before beginning new exercise program

- Assess current physical activity level
- Assess readiness
- Agree upon patient expectations & goals with written "contract"
- Assess potential need for medical testing / evaluation (cardiac stress testing, pulmonary function tests, musculoskeletal assessment etc.)
- Assess mobility, fitness, and potential equipment needs or modifications
- Potential adjustment of medications
  - Before start of physical activity plan
  - During implementation of physical activity plan
- Exercise Prescription (FITTE)
  - Frequency
  - Intensity
  - Time spent
  - Type
  - Enjoyment level
- Optimal default
- Back-up plan

Reference/s: [67] [206]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Physical activity

Assess Mobility

Unable to walk
- Seated exercise program
- Arm exercises (e.g., arm cycling)
- Swimming/aquatic exercises (e.g., shallow or deep water exercises)
- Gravity-mediated physical activity
- Consider physical therapy evaluation
  > Recommend rehabilitation & physical therapy guided activity program
  > Set physical activity goals
  > Assess special equipment needs

Limited mobility, able to walk
- Walking
- Swimming/aquatic exercises (e.g., shallow or deep water exercises)
- Gravity-mediated physical activity
- Assess for special equipment needs

No substantial limitations in mobility
- Exercise/Physical activity prescription plan driven by patient, and guided by clinician
- Assess for special equipment needs
Treatment

Physical activity

Priority is to increase energy expenditure

Dynamic (aerobic) training

- Some physical activity is better than none
- At least 150 (2.5 hours) per week of moderate physical activity or at least 75 minutes (1.25 hours) per week of vigorous intensity aerobic exercise = most health benefits, promote modest weight loss, & prevent weight gain
- > 300 minutes (5 hours)/week of moderate physical activity or 150 (2.5 hours)/week of vigorous intensity aerobic exercise = promote more robust weight loss & prevent weight regain after weight loss

Resistive (anaerobic) strength training

- Percent body fat better assessment of body composition than BMI
- Utilize appropriate weight lifting technique
- Emphasize "core" muscle exercises
- Short term sore muscles may be expected
- Sore joints suggests poor technique, with possible need for medical evaluation and physical activity modification
- Prioritize muscle mass metrics (e.g. myotape measurements) versus amount of weight lifted

Reference/s: [70] [207]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
**Physical activity**

- **Leisure time physical activity**
  - Engage in competitive sport activities involving substantial physical activity, especially if willing to do so on a routine basis.
  - Engage in non-competitive sports such as running, hiking, cycling, cross-fit training, etc.
  - Outdoor warm weather physical activity in sunlight may facilitate negative caloric balance and have other health benefits, but need to avoid excessive sun exposure.
  - Engage in physical activity sport-alternatives, such as dancing.

- **Transportational / occupational non-exercise activity thermogenesis (NEAT)**
  - Walk short distances instead of automated transportation.
  - Take stairs instead of elevator.
  - Carry overnight travel bags instead of using rollers.
  - Active work environment (standing desks; walking desks).

Priority is to increase energy expenditure.

Reference/s: [71] [72]
Physical activity

Physical activity accounting records

- Daily activity logs
- Pedometer / accelerometer logs
- Dynamic training metrics (miles run, laps swam, etc.)
- Resistance training metrics (muscle circumference measurements, reps, sets, etc.)
- Percent body fat measurements

Reference/s: [73] [74]
Behavior Therapy

Frequent encounters with medical professional or other resources free from provider bias

- Physician
- Dietitian
- Nurse educator
- Physical activity professional (trainer, physiologist, etc.)
- Mental health professional
- Web-based programs
- Mobile access (text messages, applications, etc.)
- Multidisciplinary approach
  > Clinicians with professional expertise
  > Patient with self expertise

Education

- Medical health
- Mental health
- Nutrition
- Physical activity
- Establish healthy sleep habits
- Establish healthy eating habits (e.g. reduce speed of eating, drink water between meals, choose and have available healthy snacks, etc.)

Reference/s: [75] [76] [77]  
Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Behavior Therapy (continued)

Stimulus control
- Avoid eating for reasons other than hunger
- Avoid frequent snacking
- Avoid binge eating
- Utilize portion control
- Environmental removal of foods identified as especially tempting for the individual patient

Cognitive restructuring
- Address matters of body image
- Identify and establish a plan to counteract unhelpful or dysfunctional thinking leading to unhealthy behaviors and actions
- Emphasize rationale of aggressive, yet realistic weight loss expectations through an emphasis of weight loss as a matter of medical and mental health
- Encourage patient
  > Acknowledge he/she is capable of positive thoughts and behaviors
  > Replace unhelpful thoughts and behaviors with more productive ones
  > Practice behavior therapy skills between clinician encounters

Reference/s: [76] [78]

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Behavior Therapy (continued)

- Goal setting
  - Patients are given step-by-step instructions to accomplish goals (e.g. nutrition and physical activity prescriptions)

- Self monitoring
  - Daily or weekly body weights
  - Other routine self anthropometric measurements (calipers for percent body fat, tape measure for waist circumference, myotape for muscle mass, etc.)
  - Food diaries (including online services or mobile applications)
  - Physical activity logs
  - Pedometer / accelerometer measures
Behavior Therapy (continued)

Behavioral contracting
- Tokens of reward
- Financial incentives

Problem solving, social support and other reinforcement contingencies
- Stress management
- Establish alternative back-up procedures to engage during times that challenge adherence to agreed upon plans (e.g. stressful periods, life-changes, etc.)
- Healthcare team support
- Mental health professional
- Other group or social support
- Commercial weight loss/maintenance programs
- Encourage interactions with others that may provide positive recognitions for successes
Weight Management Pharmacotherapy

Adjunct to nutritional, physical activity, and behavioral therapies

Objectives:
- Treat disease
  - Adiposopathy or sick fat disease (SFD)
  - Fat mass disease (FMD)
- Facilitate management of eating behavior
- Slow progression of weight gain / regain
- Improve the health, quality of life, and body weight of the obese and/or overweight patient

Reference/s: [32] [82]
Pathologic metabolic and/or fat mass consequences of increased body fat

- 5 - 10 % weight loss may improve adipocyte and adipose tissue metabolic and immune function
  - 5 - 10 % weight loss may improve metabolic disease

- 5 - 10 % weight loss may improve abnormal and pathologic physical and mechanical forces
  - 5 - 10 % weight loss may improve fat mass diseases

Reference/s: [83] [84]
Treatment

Pharmacotherapy

Examples of weight management agents approved 1999 or before
- Phentermine
- Diethylpropion
- Phendimetrazine
- Benzphetamine
- Orlistat

Examples of weight management agents approved 2012 and beyond
- Lorcaserin
- Phentermine HCl / topiramate extended-release
**Pharmacotherapy**

**Sympathomimetic amines**
- **Examples:** Phentermine, diethylpropion, phendimetrazine, benzphetamine
- **Increases satiety**
- **Drug Enforcement Agency Schedule weight management agents**
  - DEA IV for phentermine and diethylpropion
  - DEA III for phendimetrazine and benzphetamine
- **Potential adverse experiences include**
  - palpitation, tachycardia, increased blood pressure, overstimulation, tremor, dizziness, insomnia, dysphoria, headache, dryness of mouth, dysgeusia, diarrhea, constipation
- **Pregnancy category X**

**Gastrointestinal lipase inhibitors**
- **Example:** Orlistat
- **Impairs gastrointestinal energy absorption**
- **Potential adverse experiences include**
  - oily discharge from the rectum, flatus with discharge, increased defecation, fecal incontinence, may increase risk of cholelithiasis, may increase risk of urinary oxalate, rare postmarketing reports of severe liver injury, may decrease fat-soluble vitamin absorption (e.g. vitamins A, D, E, K, and beta carotene)
- **Pregnancy category X**
Treatment

Weight Management Pharmacotherapy

Currently Approved Pharmacotherapy Principles

Approved weight management pharmacotherapy indications:
- Obese patients (e.g. BMI >= 30kg/m2)*
- Overweight patients (e.g. BMI >= 27 kg/m2) with presence of adiposity complication (e.g. type 2 diabetes mellitus, hypertension, dyslipidemia)*

If no clinical improvement after 12 weeks with one weight management pharmacotherapy, then consider alternative weight management pharmacotherapy, or increasing weight management pharmacotherapy dose (if applicable).

* While BMI (body mass index) is the only measure listed in the prescribing information for weight management pharmacotherapy, BMI may have limitations; in some circumstances, obesity and overweight are more accurately assessed by other measures

Reference/s: [85] [207]  
Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
**Treatment**

**Lorcaserin**

- **Indications & use**
  - Serotonin (5-hydroxytryptamine) 2c receptor agonist weight management agent
  - Drug Enforcement Agency Schedule IV drug
  - Dose = 10 mg twice a day

- **Potential drug interactions**
  - The safety of lorcaserin coadministration with other serotonergic or antidopaminergic agents is not yet established, which includes selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors, monoamine oxidase inhibitors, triptans, bupropion, dextromethorphan, St. John’s Wort

- **Pharmacokinetics**
  - Lorcaserin is metabolized in the liver with metabolites excreted in the urine.

Reference/s: [88] [89] [208]  

**Copyright © 2013 ASBP:** May not be reproduced or altered in any form without written permission from ASBP
**Lorcaserin**

**Potential Adverse experiences**
- Headache
- Dizziness
- Fatigue
- Nausea
- Dry mouth
- Constipation
- Cough
- Reduced heart rate
- Hyperprolactinemia

**Contraindications**
- If signs or symptoms of valvular heart disease develop, then discontinuation of lorcaserin should be considered during evaluation for valvulopathy.
- Use with caution with use of hazardous machinery because of the potential for cognitive impairment with disturbances in attention or memory.
- Use with caution among patients with psychiatric disorders, including euphoria and dissociation.
- Use with caution among patients with psychiatric disorders and predisposed to depression who should be monitored for depression or suicidal thoughts, with discontinuation of lorcaserin if symptoms develop.
- Weight-loss lorcaserin may produce hypoglycemia in patients treated for diabetes mellitus.
- Use with caution in men with history of priapism or predisposition to priapism.
- Contraindicated during pregnancy or nursing mothers (Pregnancy category X).

Reference/s: [88] [89] [208]  

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Phentermine HCl / topiramate extended-release

Completion of Risk Evaluation and Mitigation Strategy (REMS) program to inform prescribers and women patients about the increased risk of congenital malformations (especially orofacial clefts) in infants exposed to phentermine HCl / topiramate ER during the first trimester of pregnancy

Indications & use

- Drug Enforcement Agency Scheduled IV
- Phentermine is a shorter acting sympathomimetic amine approved as monotherapy as a weight management drug
- Topiramate is a longer-acting neurostabilizer approved as monotherapy for seizure disorders and migraine headache prevention
- Doses = Once daily in the morning with or without food
  - Starting dose = 3.75-mg/23-mg (phentermine 3.75 mg/topiramate 23 mg extended-release); then after 14 days intervals, and as clinically indicated, escalate doses to:
    - Recommended dose = 7.5 mg/46 mg
    - Titration dose = 11.25 mg/69 mg
    - Top dose = 15 mg/92 mg

Potential drug interactions

- PHEN/TPM ER may alter the exposure to oral contraceptives, causing irregular menstrual bleeding, but not an increased risk of pregnancy.
- Oral contraceptives should not be discontinued if spotting occurs.
- PHEN/TPM ER may potentiate central nervous system depressants such as alcohol; thus, patients should avoid concomitant alcohol
- PHEN/TPM ER may potentiate hypokalemia of non-potassium sparing diuretics

Pharmacokinetics

- Phentermine is metabolized by the liver, with most excreted by the kidney.
- Topiramate is excreted mainly by the kidney

Reference/s: [90] [91] [209]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Phentermine HCl / topiramate extended-release

Completion of Risk Evaluation and Mitigation Strategy (REMS) program to inform prescribers and women patients about the increased risk of congenital malformations (especially orofacial clefts) in infants exposed to phentermine HCl / topiramate ER during the first trimester of pregnancy.

Potential Adverse experiences

In clinical trials, adverse reactions occurring greater than or equal to 5% include:
- Paresthesia
- Dizziness
- Dysgeusia (taste distortion/perversion)
- Insomnia
- Constipation
- Dry mouth

Laboratory abnormalities may include:
- Metabolic acidosis
- Elevated creatinine
- Lowering of glucose levels

Contraindications

PHEN/TPM ER is contraindicated:
- Glaucoma
- Hyperthyroidism
- During or within 14 days of taking monoamine oxidase inhibitors
- Women of reproductive potential should have negative pregnancy test before treatment and monthly thereafter, and use effective contraception while on PHEN/TPM ER
- Pregnancy or nursing (Pregnancy category X)

PHEN/TPM ER should be discontinued in patients with:
- Unacceptable increases in adrenergic responses, such as increase in heart rate especially those with cardiac and/or cerebrovascular disease
- Suicidal behavior and ideation
- Acute myopia and secondary angle closure glaucoma
- Unacceptable mood and sleep disorders
- Cognitive impairment
- Pregnancy or nursing

Reference/s: [90] [91] [209]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
44 year old woman with overweight / obesity:
- Prediabetes mellitus
- Prehypertension
- Mild dyslipidemia
- Discomfort to weight bearing joints
- Mild snoring
- Low self esteem due to increased body weight

Optimal treatment strategy: Decide to engage in early, pro-active interventions intended to prevent onset of sick fat disease (diabetes mellitus, dyslipidemia, hypertension) and prevent fat mass disease.

- Optimize nutritional therapy and physical activity
- Initiate behavioral therapy
- Consider weight management pharmacotherapy
- Consider bariatric surgery

- Prevent onset of metabolic disease:
  > Diabetes mellitus
  > Dyslipidemia
  > Hypertension
- Prevent fat mass diseases:
  > Osteoarthritis
  > Sleep apnea
  > Depression
Delayed Treatment

44 year old woman with overweight / obesity:
- Prediabetes mellitus
- Prehypertension
- Mild dyslipidemia
- Pain to weight bearing joints
- Mild snoring
- Low self esteem due to increased body weight

Suboptimal treatment strategy: Wait for the onset of diabetes mellitus, dyslipidemia, hypertension, osteoarthritis, sleep apnea, and depression

Once adverse health consequences are blatantly apparent:
- Optimize nutritional therapy and physical activity
- Initiate behavioral therapy
- Consider weight management pharmacotherapy
- Consider bariatric surgery

Follow:
- Diabetes mellitus evaluation and treatment guidelines such as the American Diabetes Association Clinical Practice Recommendations
- Lipid evaluation and treatment guidelines such as the National Cholesterol Education Program, Adult Treatment Panel, or the American Diabetes Association / American College of Cardiology Consensus Report
- Blood pressure guidelines such as the Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
- Follow other disease-specific guidelines

Reference/s: [210] [211] [212]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Delayed Treatment

44 year old woman with overweight / obesity:
- Prediabetes mellitus
- Prehypertension
- Mild dyslipidemia
- Pain to weight bearing joints
- Mild snoring
- Low self esteem due to increased body weight

If the decision was made to wait for the onset of diabetes mellitus, dyslipidemia, hypertension, osteoarthritis, sleep apnea, and depression (continued):

- Utilize diabetes mellitus therapies most likely to improve adipose tissue function
- In patients with fat mass disease, utilize diabetes mellitus therapies having neutral or body weight loss effects, such as metformin, glucagon-like peptide-1 (GLP-1) agonists, sodium glucose cotransporter-2 (SGLT2) inhibitors, etc.
- Utilize lipid therapies most likely to reduce atherosclerotic coronary heart disease risk and least likely to increase body weight
- Utilize blood pressure therapy most likely to reduce cardiovascular disease risk, which may also provide other health benefits (e.g. diuretics, angiotensin converting enzyme inhibitors, etc.)
- Utilize non-steroidal anti-inflammatory agents to treat osteoarthritis
- Treat sleep apnea
- Utilize anti-depressant medications least likely to promote further weight gain
- Administer additional pharmaceuticals and/or treatment modalities as indicated

Reference/s:  [10] [15] [43] [92]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
**Potential bariatric surgery patient**

- Did patient make reasonable attempts to reduce body weight and improve health?
- Was patient evaluated by a physician trained in comprehensive management (e.g. certified by the American Board of Obesity Medicine)
- Does patient demonstrate an ability to comply with, and commit to maintaining necessary lifestyle changes and agree to life-long post-operative medical surveillance?
- If applicable, what are the applicable third party (i.e. insurance) criteria to qualify for bariatric surgery?

**If applicable:**
- Surgical candidate
  - Consider bariatric surgery
- Not surgical candidate
  - Continue and/or intensify medical management

Reference/s: [93] [94]  
Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Possible bariatric surgery candidate

- What is body mass index (BMI in kg/m²)?
- Does clinical evidence exist of adverse health consequences (AHC) due to excessive body fat (SFD and/or FMD)?

BMI \geq 30 with one or more AHC
BMI \geq 40 with or without AHC
Treatment

Bariatric surgery pre-op evaluation

- Medical evaluation by physician specializing in the care in overweight and/or obese patients
- Surgical consultation by bariatric surgery specialist
- Cardiology, Pulmonary, Gastroenterology, other specialty consultation as indicated
- Mental health professional
- Nutritional support (such as through a dietitian)
- Educational support (such as through pre-operative seminar)
Laparoscopic adjustable gastric banding

A surgical procedure where an adjustable band is placed around the upper stomach creating a small pouch. The band diameter is adjustable through introduction of saline via a subcutaneous port that can be accessed from the upper abdomen.

**General**
- Outpatient procedure
- Recovery usually one week
- Contraindications
  - Poor surgical candidate
  - Severe psychiatric disorder
  - Intolerance to general anesthesia
  - Pregnancy
  - Drug or alcohol addiction
  - Untreated esophagitis

**Potential acute complications:**
- Band too tight with gastrointestinal obstructive symptoms (e.g., dysphagia)
- Leakage of gastric contents into abdomen
- Hemorrhage
- Gastrointestinal bleeding
- Infection
- Cardiac dysrhythmias
- Atelectasis and pneumonia
- Deep vein thrombosis
- Death

**Potential chronic complications**
- Weight regain or no weight loss
- Band slippage, erosion, ulceration, port infection, disconnection and displacement
- Esophageal dilation
- Rare nutrient deficiencies if persistent vomiting or marked and sustained decrease in nutritional intake
- Depression

Reference/s: [8] [95] [96]  

Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Sleeve gastrectomy

A surgical procedure wherein the stomach is reduced to about 25% of its original size by the surgical removal of a large portion of the stomach along the greater curvature resulting in a narrower sleeve or tube like structure.

General
- Hospital stay 1 - 2 days
- Recovery 1 - 2 weeks
- Contraindications
  - Poor surgical candidate
  - Severe psychiatric disorder
  - Intolerance to general anesthesia
  - Pregnancy
  - Drug or alcohol addiction
  - Untreated or severe esophagitis
  - Barrett’s esophagus
  - Severe gastroparesis
  - Achalasia
  - Previous gastrectomy
  - Previous gastric bypass
- Sometimes used as a staged approach to gastric by-pass

Potential acute complications
- Gastrointestinal obstruction
- Hemorrhage
- Gastrointestinal bleeding
- Anastomotic staple line leaks
- Infection
- Cardiac dysrhythmias
- Atelectasis and pneumonia
- Deep vein thrombosis
- Pulmonary emboli
- Rhabdomyolysis
- Dehydration
- Death

Potential chronic complications
- Weight regain or lack of long-term weight loss
- Marginal ulcers
- Esophageal dilation
- Dumping syndrome with reactive hypoglycemia
- Small bowel obstruction caused by internal hernias or adhesions
- Luminal stenoses (stomal narrowing)
- Anastomotic staple line leak
- Fistula formation
- Gallstones
- Calcium deficiency
- Secondary hyperparathyroidism
- Iron deficiency
- Protein malnutrition
- Other nutritional and mineral deficiencies (e.g. deficiencies of vitamins A, C, D, E, B, and K, folate, zinc, magnesium, thiamine, etc.)
- Anemia (often related to mineral and nutrition deficiencies)
- Metabolic acidosis
- Bacterial overgrowth
- Kidney stones (oxalosis)
- Neuropathies (resulting from nutritional deficiencies)
- Osteoporosis (often caused by calcium deficiency and chronically elevated parathyroid hormone levels)
- Depression

Reference/s: [8] [95] [96]
Gastric bypass

A surgical procedure wherein the stomach is divided into a large residual section and a smaller section (pouch) that is attached to a limb of the small intestine at variable distances from the first part of the small intestine, largely bypassing the stomach and part of the duodenum.

General

- Hospitalization 2 - 4 days
- Recovery 2 - 4 weeks
- Contraindications
  - Poor surgical candidate
  - Severe psychiatric disorder
  - Intolerance to general anesthesia
  - Pregnancy
  - Drug or alcohol addiction
  - Untreated esophagitis
  - Unwillingness or an inability for appropriate long-term follow-up

Potential acute complications:

- Gastrointestinal obstruction
- Hemorrhage
- Gastrointestinal bleeding
- Anastomotic leaks
- Infection
- Cardiac dysrhythmias
- Atelectasis and pneumonia
- Deep vein thrombosis
- Pulmonary emboli
- Rhabdomyolysis
- Dehydration
- Death

Potential chronic complications:

- Weight regain
- Marginal ulcers
- Esophageal dilation
- Dumping syndrome with reactive hypoglycemia
- Small bowel obstruction caused by internal hernias or adhesions
- Anastomotic stenoses (stomal narrowing)
- Gallstones
- Calcium deficiency
- Secondary hyperparathyroidism
- Iron deficiency
- Protein malnutrition
- Other nutritional and mineral deficiencies (e.g., deficiencies of vitamins A, C, D, E, B, and K, folate, zinc, magnesium, thiamine, etc.)
- Anemia (often related to mineral and nutrition deficiencies)
- Metabolic acidosis
- Bacterial overgrowth
- Kidney stones (oxalosis)
- Neuropathies (resulting from nutritional deficiencies)
- Osteoporosis (often caused by calcium deficiency and chronically elevated parathyroid hormone levels)
- Depression

Reference/s: [8] [95] [96] [97]  Copyright © 2013 ASBP: May not be reproduced or altered in any form without written permission from ASBP
Obesity may be assessed using several criteria: presence of adiposity-related disease, fat percent, waist circumference or body mass index. Thresholds vary based on ethnicity.

**Criteria**

- **Edmonton Obesity Staging System**
- **Fat Percent**
- **Waist Circumference**
- **Body Mass Index**

**Stage 0, 1, 2, 3, 4**

- **No Obesity**
  - BMI 18.5 – 24.9
  - male < 25%
  - female < 32%

- **Overweight**
  - BMI 25.0-29.9
  - male < 40 in
  - female < 35 in

- **Obesity**
  - BMI > 30.0
  - male > 25%
  - female > 32%
  - male > 40 in
  - female > 35 in

**Consider**

- If treatment ineffective
- Referral to an Obesity Medicine Specialist

**Prevention**
Edmonton Obesity Staging System

**STAGE 0**: No apparent risk factors (e.g., blood pressure, serum lipid and fasting glucose levels within normal range), physical symptoms, psychopathology, functional limitations and/or impairment of well-being related to obesity

**STAGE 1**: Presence of obesity-related subclinical risk factors (e.g., borderline hypertension, impaired fasting glucose levels, elevated levels of liver enzymes), mild physical symptoms (e.g. dyspnea on moderate exertion, occasional aches and pains, fatigue), mild psychopathology, mild functional limitations and/or mild impairment of well-being

**STAGE 2**: Presence of established obesity-related chronic disease (e.g., hypertension, type 2 diabetes, sleep apnea, osteoarthritis), moderate limitations in activities of daily living and/or well-being

**STAGE 3**: Established end-organ damage such as myocardial infarction, heart failure, stroke, significant psychopathology, significant functional limitations and/or impairment of well-being

**STAGE 4**: Severe (potentially end-stage) disabilities from obesity-related chronic diseases, severe disabling psychopathology, severe functional limitations and/or severe impairment of well-being


**Fat Percent**

Body Fat Percent can be calculated using bioimpedance, near infrared reactance, DEXA scan or whole-body-air-displacement plethysmography.

**Waist Circumference**

Waist circumference can be measured by tape measure around the abdomen at the level of the anterior superior iliac crests, parallel to the floor. Tape should be snug against skin without compressing.

**Body Mass Index**

Body Mass Index = (weight in kg) / (height in m)^2 OR

703 x (weight in pounds) / (height in inches)^2

*Obesity Medicine Specialists, certified by the American Board of Obesity Medicine, dedicate a portion or all of their practice to the treatment of obesity. They perform a medical evaluation (history, physical, laboratory, body composition) and provide medical supervision for lifestyle change (nutrition, activity, behavior change), medications, or very low calorie diets. Obesity is a chronic medical disease, and may require lifelong treatment.*
### ASBP Obesity Algorithm: Executive Summary

**Obesity Medicine Specialist Evaluation may include:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>Weight history, past medical history, family history, social history, screening for weight promoting medications, food intake, activity, review of systems</td>
</tr>
<tr>
<td>Physical Examination</td>
<td>Height, weight, blood pressure, body composition analysis, waist measurement, complete physical examination</td>
</tr>
<tr>
<td>Laboratory Tests</td>
<td>Complete blood count, electrolytes, liver function, kidney function, fasting lipid profile, thyroid tests, hemoglobin A1c, uric acid, vitamin D</td>
</tr>
<tr>
<td>Diagnostic Testing</td>
<td>EKG, Echocardiogram, exercise stress test, sleep study, barium swallow or esophagoduodenoscopy</td>
</tr>
</tbody>
</table>

**Individualized Treatment Plan may include:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet</td>
<td>Caloric restriction, carbohydrate restriction, food journaling Very Low Calorie Diet (VLCD) programs</td>
</tr>
<tr>
<td>Activity</td>
<td>Give exercise prescription, use pedometers, limit TV and computer time, goal of 150 minutes/week of moderate intensity physical activity</td>
</tr>
<tr>
<td>Counseling</td>
<td>Eliminate provider bias/stigma, identify self-sabotage, develop strong support, stress management, sleep optimization, other psychological support</td>
</tr>
<tr>
<td>Pharmacotherapy</td>
<td>Use medications as part of a comprehensive program</td>
</tr>
</tbody>
</table>

If ineffective, consider referral to a Metabolic and Bariatric Surgeon.
Optimal pre- and post-operative bariatric surgery care includes an Obesity Medicine Specialist.
Current Treatment Options for Obesity

**Lifestyle**: Includes nutrition, exercise, behavioral programs

**Lifestyle + Medication**: May include Lifestyle, VLCDs w supplements, and weight loss medications

**Surgery**: (in order of lowest risk/cost and potency): Gastric Banding < Gastric Sleeve < Gastric Bypass (Roux-en-Y)

* Potency includes many factors such as the amount, rate and sustainability of weight loss, and long-term resolution of adiposopathy and fat mass disease. Potency varies greatly for each individual: long-term adherence to a lifestyle program can be as potent as gastric bypass surgery.
References

Internet Website References:


References

Internet Website References (continued):

       Information on Pre-Participation Physical Examinations

       Activity Guidelines for Americans  (Accessed August 20, 2013)


[210]  http://care.diabetesjournals.org/content/36/Supplement_1 American Diabetes Association Clinical Practice Guidelines 2013
       (Accessed July 28, 2013)

[211]  http://www.nhlbi.nih.gov/about/ncep/ National Heart and Lung Blood Institute, National Cholesterol Education Program
       (Accessed July 28, 2013)

       National Committee (JNC) (Accessed July 28, 2013)
References

Journal References:

References

Journal References (continued):


Copyright © 2013 ASBP: May not be reproduced in any form without written permission from ASBP
References

Journal References (continued):

References

Journal References (continued):


References

Journal References (continued):

References

Journal References (continued):

References

Journal References (continued):


Copyright © 2013 ASBP: May not be reproduced in any form without written permission from ASBP
References

Journal References (continued):

82. Bray GA: Why do we need drugs to treat the patient with obesity? Obesity (Silver Spring) 2013 21:893-899.

Copyright © 2013 ASBP: May not be reproduced in any form without written permission from ASBP
References

Journal References (continued):

Disclosures

Co-chairs: Jennifer Seger MD and Deborah Bade Horn DO report no disclosures.

Co-authors: Eric C. Westman MD reports advisor and speaker for Vivus; Richard Lindquist MD reports no disclosures; Wendy Scinta MD reports consultant for Optifast, committee member of OPMC (Office of Professional Misconduct) and expert witness for Bariatric Case Reviews, Medical Director of 3# Health, speaker for Vivus; Larry Richardson MD reports no disclosures; Craig Primack MD reports speaker for Nestle, Vivus and Eisai, and consultant for Vivus; David Bryman DO reports no disclosures; William McCarthy MD reports no disclosures; Ed Hendricks MD reports speaker for Eurodrug Laboratories and Akrimax Pharm, consultant for Citius Pharm and Rodman & Renshaw LLC, and member of GLG Healthcare & Biomedical Council; Brian Sabowitz MD reports speaker for Eisai Pharmaceuticals; Stacy Schmidt PhD reports no disclosures; Harold Bays MD reports having his research site receive research grants from Acurian, Alere, Amarin, Amgen, Ardea, Arena, Boehringer-Ingelheim, Cargill, California Raisin Board, Elcelyx, Eli Lilly, Esperion, Essentialis, Forest, Gilead, Given, GlaxoSmithKline, High Point, Hoffman-La Roche, Home Access, Johnson & Johnson, Merck, Micropharma, Necktar, Novartis, Novo Nordisk, Omthera, Orexigen, Pfizer, Pozen, Regeneron, Takeda, TransTech, Trygg, TWI Bio, Vivus, WPU, and Xoma; and has served as a consultant and/or speaker for Amgen, Amarin, Bristol-Myers Squibb, Catabasis, Daiichi-Sankyo, Eisai, Merck, Novo Nordisk, Vivus, and WPU.
Citation: