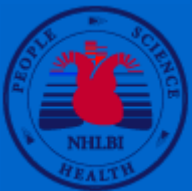


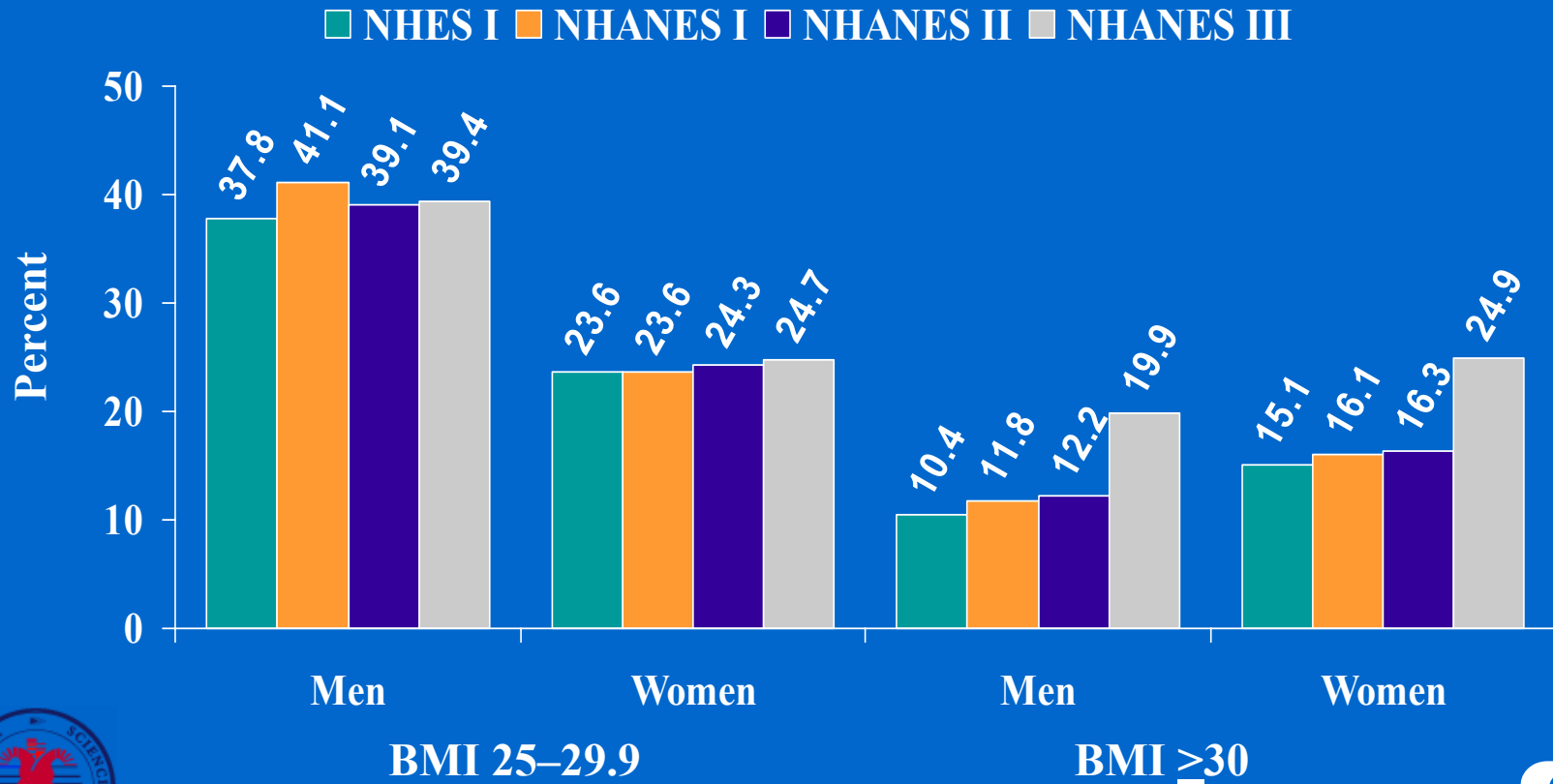
Definitions

Body Mass Index (BMI) describes relative weight for height: $\text{weight (kg)}/\text{height (m}^2\text{)}$

- **Overweight = 25–29.9 BMI**
- **Obesity = ≥ 30 BMI**



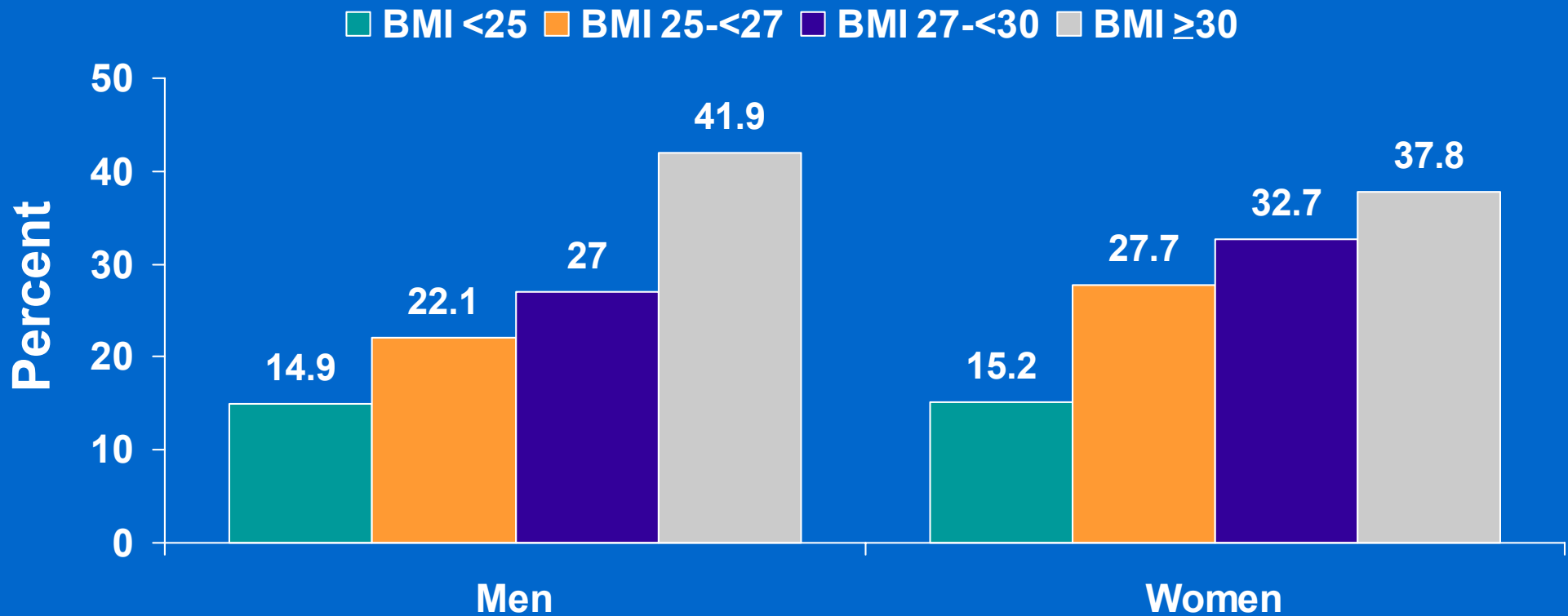
Age-Adjusted Prevalence of Overweight BMI (25–29.9) and Obesity (BMI >30)



CDC/NCHS, United States, 1960-94, ages 20-74 years



NHANES III Prevalence of Hypertension* According to BMI

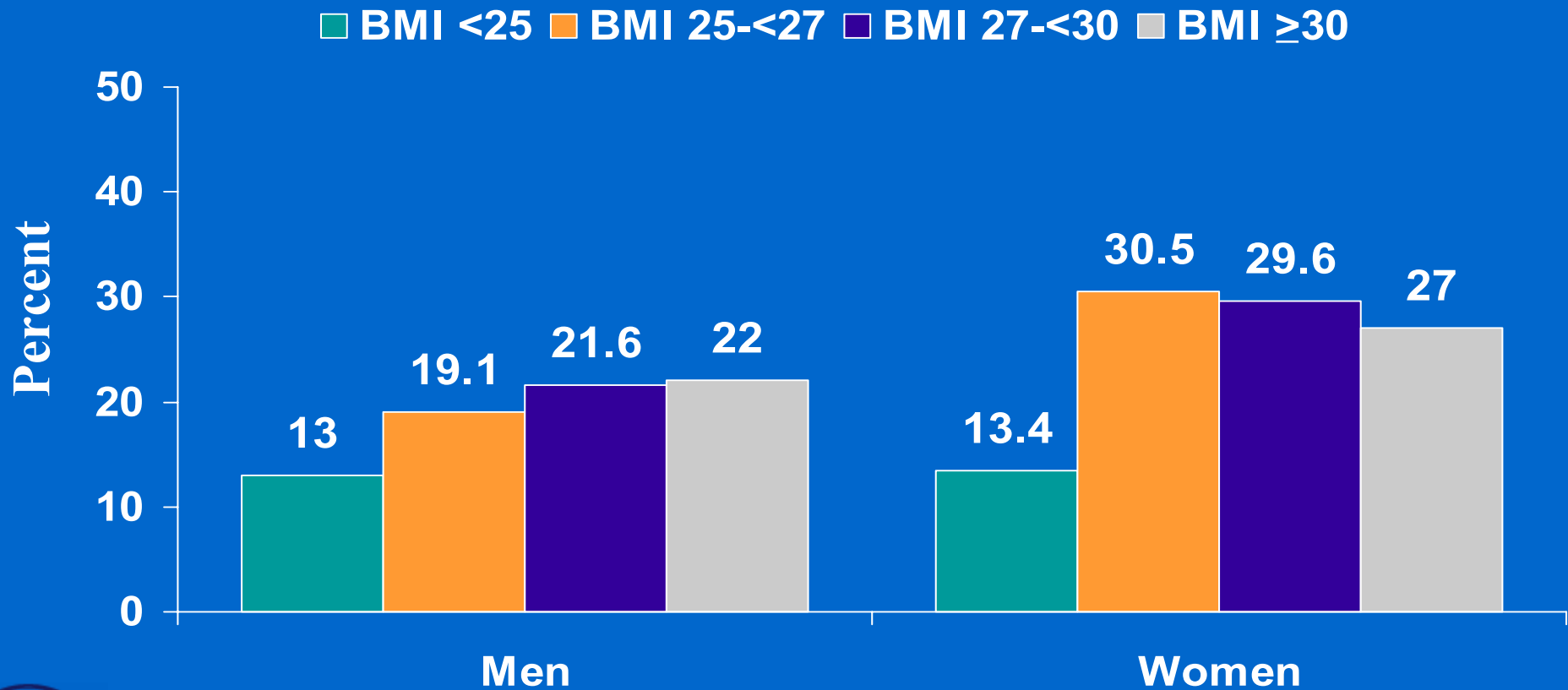


*Defined as mean systolic blood pressure ≥ 140 mm Hg, mean diastolic ≥ 90 mm Hg, or currently taking antihypertensive medication.

Brown C et al. Body Mass Index and the Prevalence of Hypertension and Dyslipidemia. *Obes Res.* 2000; 8:605-619.



NHANES III Prevalence of High Blood Cholesterol* According to BMI

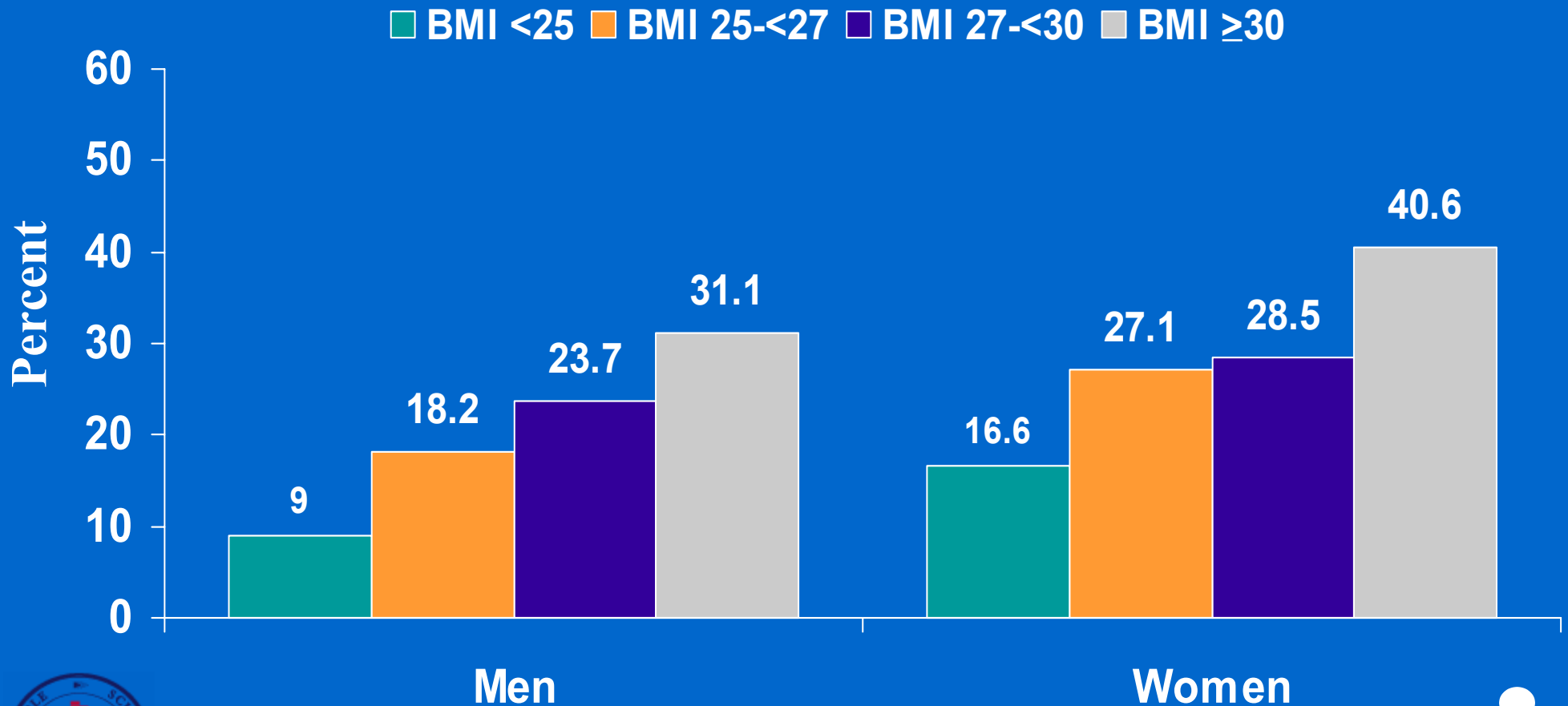


*Defined as ≥ 240 mg/dL.

Brown C et al. Body Mass Index and the Prevalence of Hypertension and Dyslipidemia. *Obes Res.* 2000; 8:605-619.



NHANES III Prevalence of Low HDL-Cholesterol* According to BMI



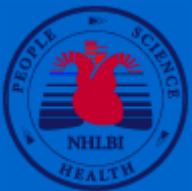
*Defined as <35 mg/dL in men and <45 mg/dL in women.

Brown C et al. Body Mass Index and the Prevalence of Hypertension and Dyslipidemia. *Obes Res.* 2000;8:605-619.



Health Benefits of Weight Loss

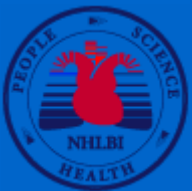
- Decreased cardiovascular risk
- Decreased glucose and insulin levels
- Decreased blood pressure
- Decreased LDL and triglycerides, increased HDL
- Decrease in severity of sleep apnea
- Reduced symptoms of degenerative joint disease
- Improved gynecological conditions



Care of Overweight/Obese Patients

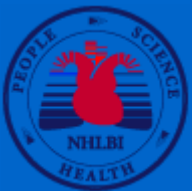
Requires two steps:

- **Assessment**
- **Management**



Assessment of Overweight and Obesity

- Body Mass Index
 - Weight (kg)/height (m²)
 - Weight (lb)/height (in²) x 703
 - Table
- Waist Circumference
 - High risk:
 - Men >102 cm (40 in.)
 - Women >88 cm (35 in.)



Classification of Overweight and Obesity by BMI

	Obesity Class	BMI kg/m²
Underweight		<18.5
Normal		18.5–24.9
Overweight		25–29.9
Obesity	I	30.0–34.9
	II	35.0–39.9
Extreme Obesity	III	≥ 40.0



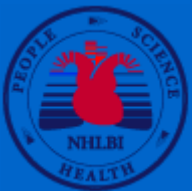
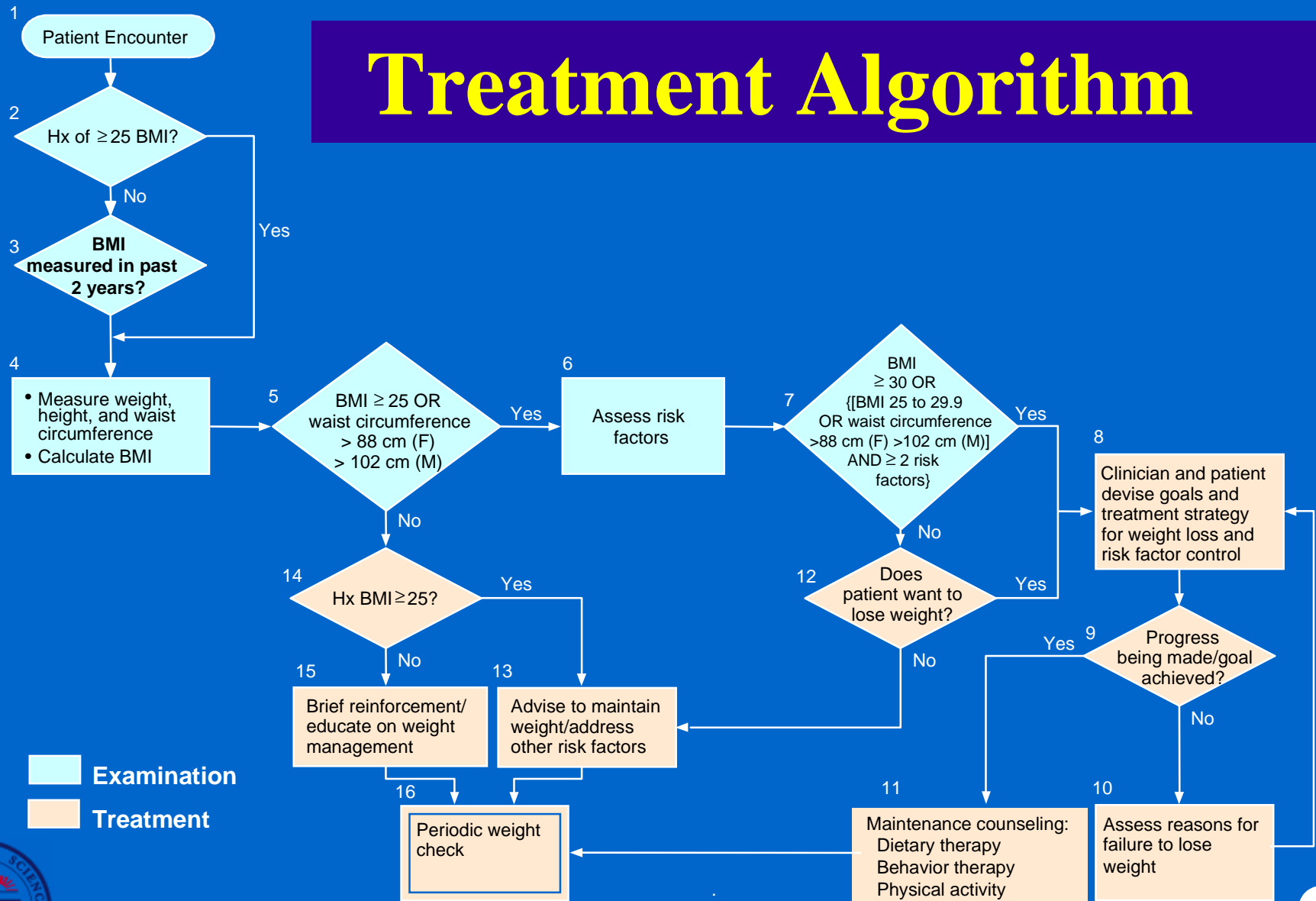
Determine Absolute Risk Status

Evaluate:

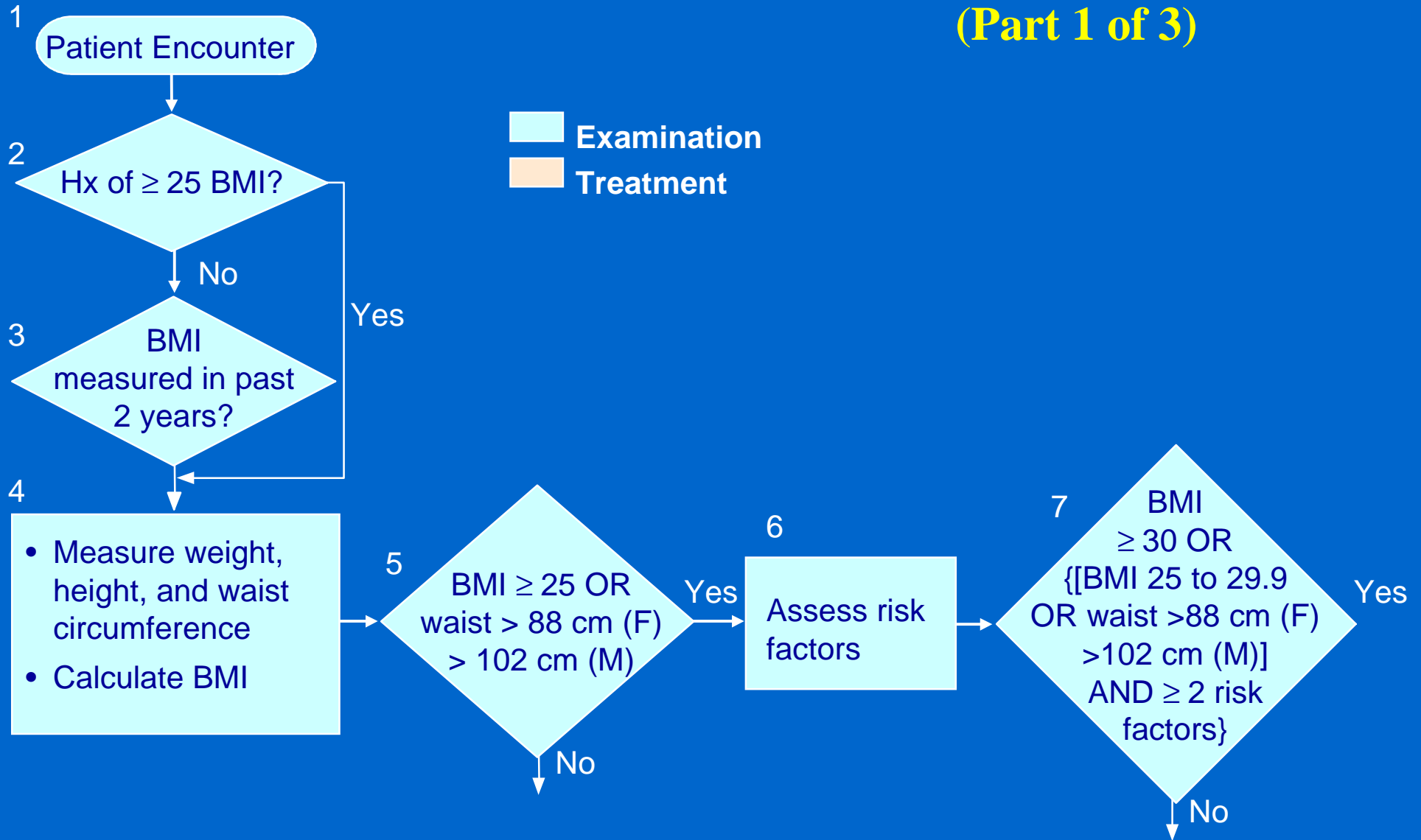
- **Disease conditions** (e.g., CHD, type 2 diabetes, sleep apnea) (+ = very high risk)
- **Other obesity-associated diseases** (e.g., gynecological abnormalities, osteoarthritis)
- **Cardiovascular risk factors:** smoking, hypertension, high LDL, low HDL, IGT, family hx (≥ 3 = high risk)
- **Other risk factors:**
 - Physical inactivity
 - High serum triglycerides (>200 mg/dL)



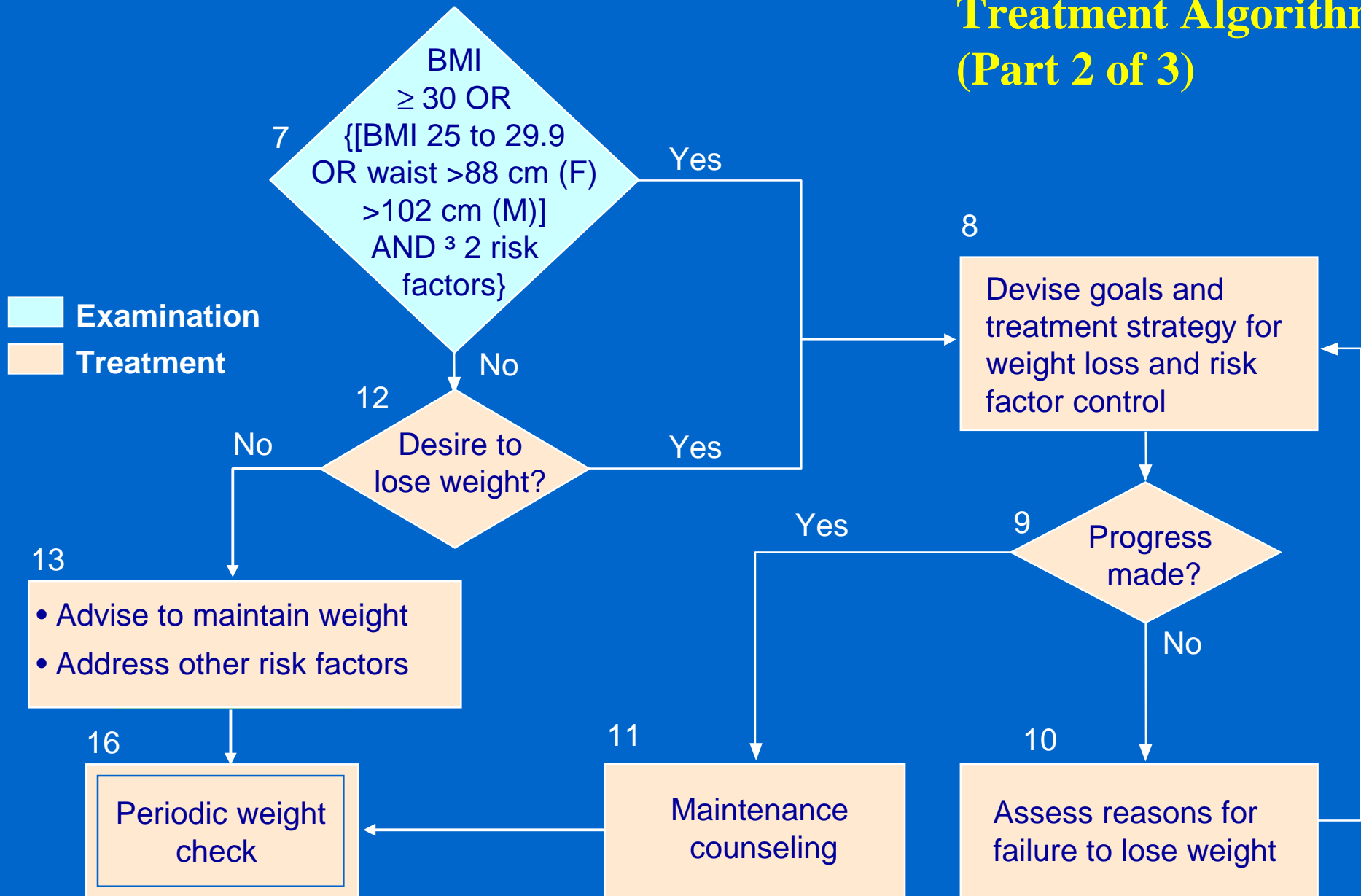
Treatment Algorithm



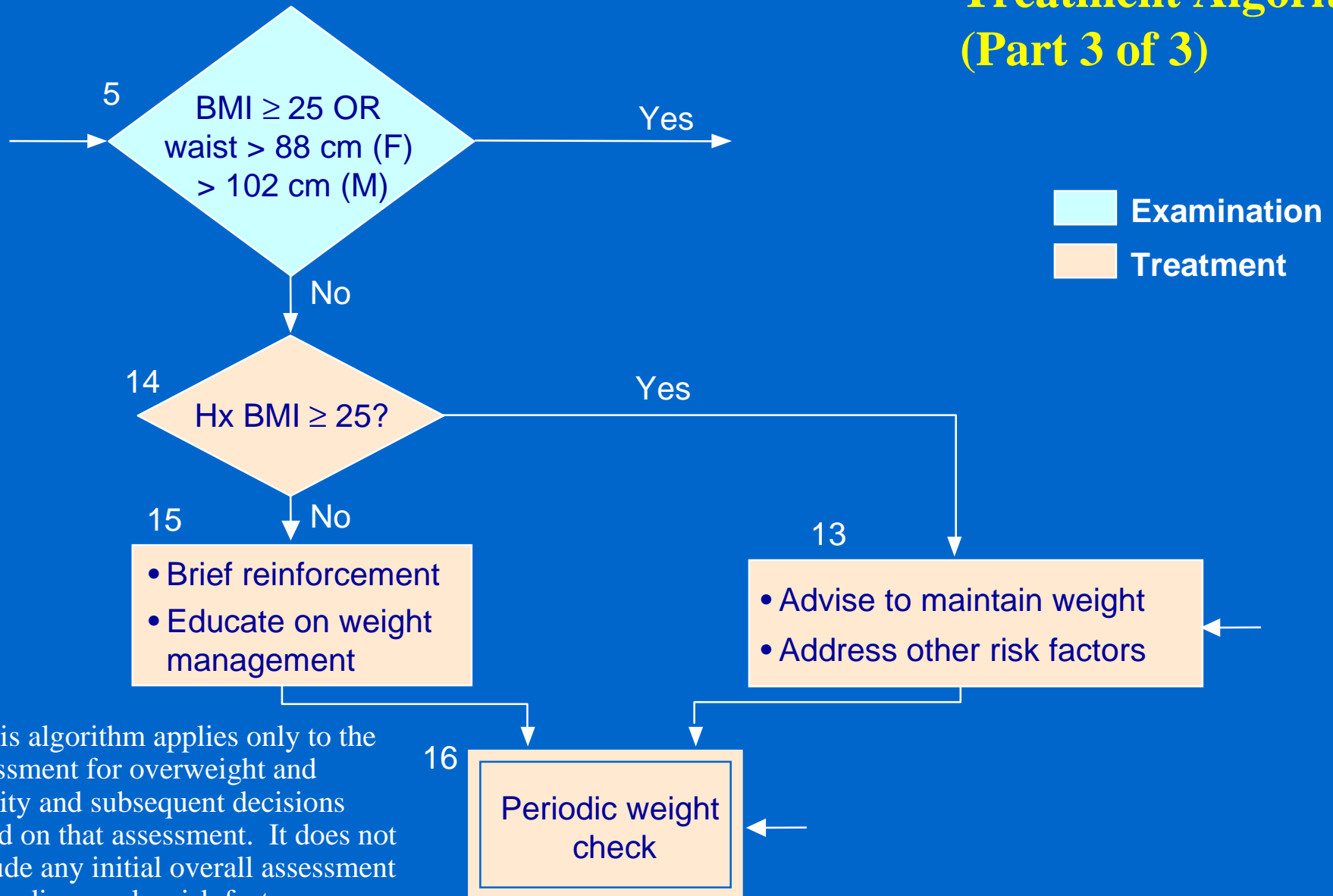
Treatment Algorithm (Part 1 of 3)



Treatment Algorithm (Part 2 of 3)



Treatment Algorithm (Part 3 of 3)



* This algorithm applies only to the assessment for overweight and obesity and subsequent decisions based on that assessment. It does not include any initial overall assessment for cardiovascular risk factors or diseases that are indicated.

Definitions

Body Mass Index (BMI) describes relative weight for height: $\text{weight (kg)}/\text{height (m}^2\text{)}$

- Overweight = 25–29.9 BMI
- Obesity = ≥ 30 BMI

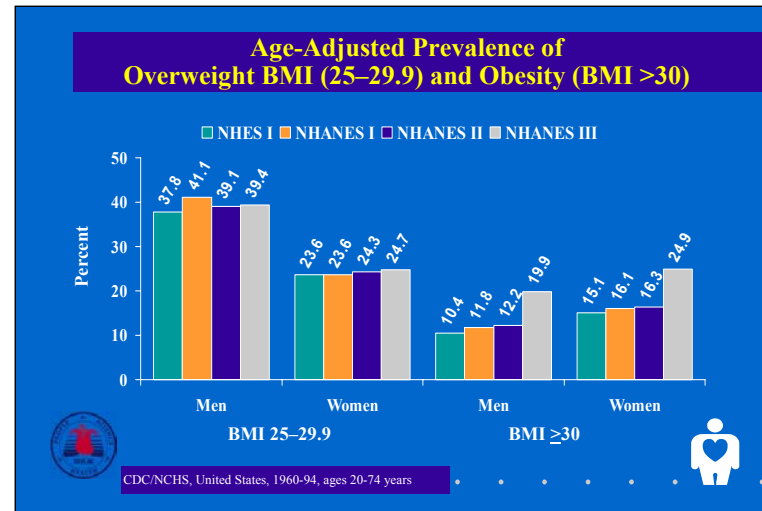


The Expert Panel chose to define overweight and obesity using the measure of the body mass index or BMI.

BMI is a practical indicator of the severity of obesity, and it can also be determined from existing tables.

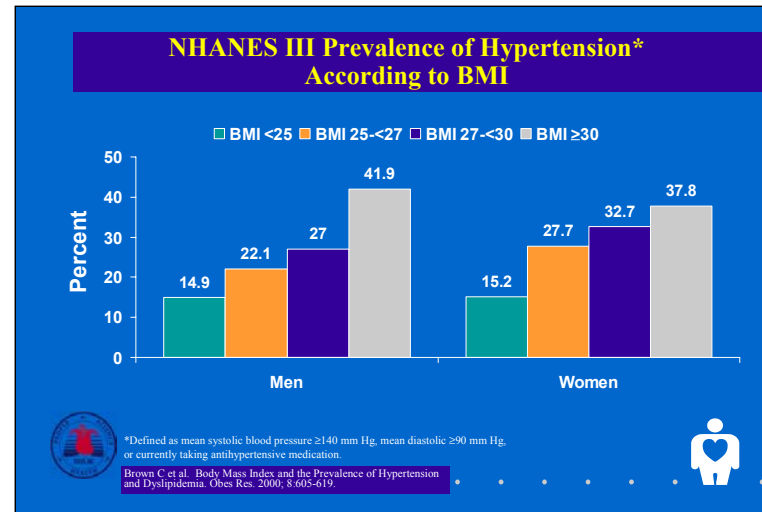
- Overweight is defined by the panel as a body mass index (BMI) of 25 to 29.9 kg/m^2 .
- Obesity is defined as an excess of total body fat that is documented by a BMI of >30 kg/m^2 .
- BMI describes relative weight for height and is calculated as follows:

$\text{BMI} = \text{weight (kg)}/\text{height squared (m}^2\text{)}$. BMI is a direct calculation based on height and weight, regardless of gender.



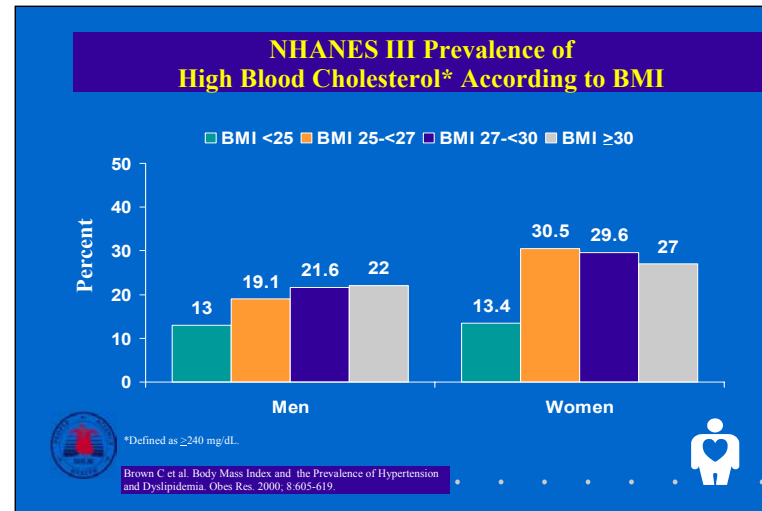
This slide depicts data from several NHANES surveys using the panel’s definition of overweight as a BMI of 25 to 29.9 kg/m² and of obesity as a BMI of greater than or equal to 30 kg/m².

- From 1960 to 1994, the prevalence of overweight increased slightly from 37.8 to 39.4 percent in men and from 23.6 to 24.7 percent in women. In men and women together, overweight increased from 30.5 to 32.0 percent.
- During the same time period, however, the prevalence of obesity increased from 10.4 to 19.9 percent in men and from 15.1 to 24.9 percent in women. In men and women together, obesity increased from 12.8 to 22.5 percent. Most of the increase in obesity occurred in the past decade.



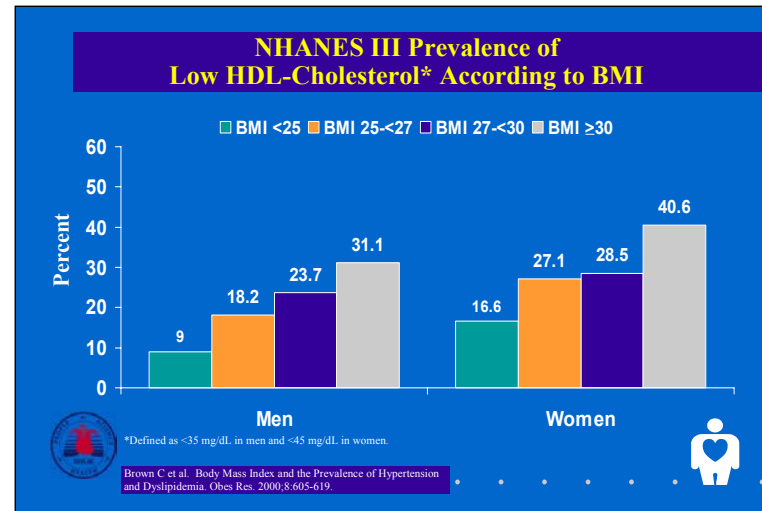
Data from NHANES III show that the prevalence of high blood pressure increases progressively with higher levels of BMI in men and women.

- The prevalence of high blood pressure in adults with BMI >30 is 41.9 percent for men and 37.8 percent for women, respectively, compared with 14.9 percent for men and 15.2 percent for women with BMI ≤ 25 .
- Other studies, such as the large international Intersalt study, carried out in more than 10,000 men and women, also reported a 10 kg (22 lb) higher body weight to be associated with a 3 mm Hg systolic and 2.3 mm Hg diastolic change in blood pressure.
- These differences in blood pressure, as shown in the Intersalt study, translate into a 12 percent increased risk for CHD and 24 percent increased risk for stroke.



The NHANES III data on high blood cholesterol also show that the prevalence of high blood cholesterol increases at higher BMI levels. High blood cholesterol is defined as a cholesterol level of ≥ 240 mg/dL.

- Among men, the prevalence of high blood cholesterol ranged from 13% at the lowest BMI level to 22% at the highest BMI level.
- At each BMI level, the prevalence of high blood cholesterol is greater in women than in men.
- In women, there is a significant increase in the prevalence of high blood cholesterol from BMI level <25 to BMI level 25–26.



- This slide shows that with increasing BMI levels, the prevalence of low HDL increases in both men and women. Low HDL was defined here as <35 mg/dL in men and <45 mg/dL in women.
- The prevalence of low HDL is more prevalent in women than in men at each level of BMI.
- Although low HDL-cholesterol in this study was defined as <35 mg/dL in men and <45 mg/dL in women, the *Third Report of the National Cholesterol Education Program's Expert Panel on the Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* defines low HDL-cholesterol as <40 mg/dL for men and women.

Health Benefits of Weight Loss

- Decreased cardiovascular risk
- Decreased glucose and insulin levels
- Decreased blood pressure
- Decreased LDL and triglycerides, increased HDL
- Decreased severity of sleep apnea
- Reduced symptoms of degenerative joint disease
- Improved gynecological conditions



The recommendation to treat overweight and obesity is based not only on the evidence that shows overweight is associated with increased morbidity and mortality, but also on randomized controlled trials (RCT) evidence that weight loss reduces risk factors for disease. Thus, weight loss may help control diseases worsened by overweight and obesity and may also decrease the likelihood of developing these diseases.

Some benefits associated with weight loss include the following:

- Decreased cardiovascular risk.
- Decreased glucose and insulin levels.
- Decreased blood pressure.
- Decreased LDL-cholesterol and triglycerides and increased HDL-cholesterol.
- Decreased severity of sleep apnea.
- Reduced symptoms of degenerative joint disease.
- Improved gynecological conditions.

Care of Overweight/Obese Patients

Requires two steps:

- Assessment
- Management



As determined by the expert panel, caring for the overweight or obese patient is a two-step process that includes assessment and management:

- **Assessment** requires determining the degree of obesity and a patient's absolute risk status based on other risk factors.
- **Management** includes both weight control or reducing excess body weight and maintaining that weight loss as well as instituting other measures to control associated risk factors.

Obesity is a chronic disease, and both the patient and the practitioner need to understand that successful treatment requires a lifelong effort.

Assessment of Overweight and Obesity

- Body Mass Index
 - Weight (kg)/height (m²)
 - Weight (lb)/height (in²) x 703
 - Table
- Waist Circumference
 - High risk:
 - Men >102 cm (40 in.)
 - Women >88 cm (35 in.)



BMI is the measure of choice as a practical indicator of the severity of obesity. It can be calculated in a variety of ways:

- Weight in kilograms (kg) divided by height in meters squared (m²).
- Using pounds and inches: weight (pounds)/height (inches) 2×703 , (1 lb = 0.4536 kg), (1 in. = 2.54 cm = 0.0254 m). (A patient should be weighed with shoes off and clad only in a light robe or undergarments.)
- From existing tables. BMI is a direct measure based on height and weight, regardless of gender.

The limitations of BMI are that BMI overestimates body fat in persons who are very muscular and can underestimate body fat in persons who have lost muscle mass (e.g., the elderly).

Also, since the presence of excess fat in the abdomen is an independent predictor of risk factors and morbidity, waist circumference should also be measured. A high waist circumference is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension, and cardiovascular disease (CVD) in patients with a BMI in a range between 25 and 34.9 kg/m².

High-risk waist circumference in men is defined as >102 cm (>40 in.) and in women, it is >88 cm (>35 in.).

Classification of Overweight and Obesity by BMI		
	Obesity Class	BMI kg/m ²
Underweight		<18.5
Normal		18.5–24.9
Overweight		25–29.9
Obesity	I	30.0–34.9
	II	35.0–39.9
	III	≥40.0
Extreme Obesity		

The primary classification of overweight and obesity is based on the measurement of BMI. This classification is designed to relate BMI to risk of disease. However, since BMI and disease risk vary among individuals and among different populations, the classification must be viewed as a broad generalization.

- Individuals who are very muscular may have a BMI placing them in an overweight category when they are not overly fat.
- Very short persons (under 5 feet) may have high BMIs that may not reflect overweight or fatness.
- Older persons often have lost muscle mass and have more fat for a given BMI than younger persons, women may have more fat for a given BMI than men, and persons with clinical edema may have less fat for a given BMI .

Since disease risk increases with increasing BMI, there are three classes to define obesity. However, susceptibility to risk factors at a given weight varies among individuals. Some individuals may have multiple risk factors and mild obesity, whereas others may have fewer risk factors with more severe obesity.

Determine Absolute Risk Status

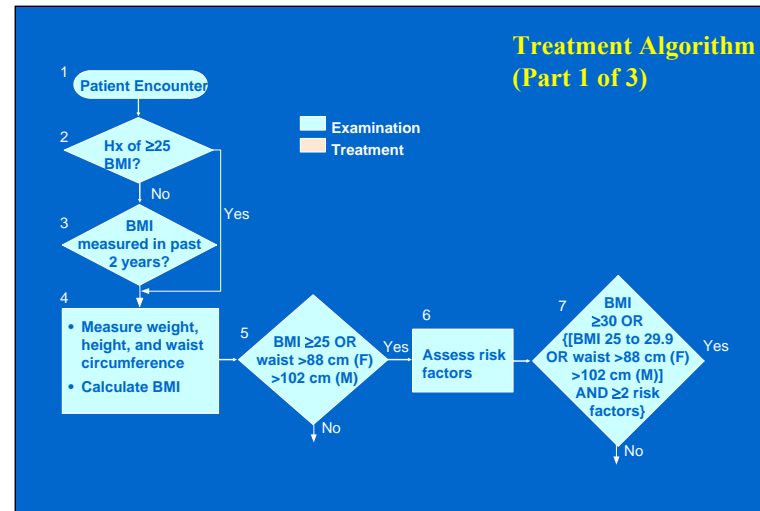
Evaluate:

- **Disease conditions** (e.g., CHD, type 2 diabetes, sleep apnea) (+ = very high risk)
- **Other obesity-associated diseases** (e.g., gynecological abnormalities, osteoarthritis)
- **Cardiovascular risk factors:** smoking, hypertension, high LDL, low HDL, IGT, family hx (≥ 3 = high risk)
- **Other risk factors:**
 - Physical inactivity
 - High serum triglycerides (>200 mg/dL)



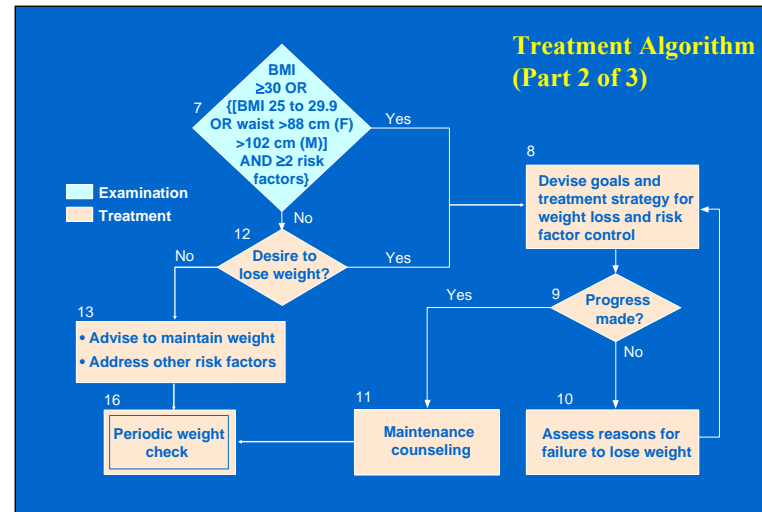
In addition to measuring the patient's BMI and waist circumference, one needs to assess the presence of concomitant CVD risk factors or comorbidities.

- Some obesity-associated diseases (e.g., CHD, type 2 diabetes) and risk factors (e.g., hypertension, high blood cholesterol) place patients in a very high-risk category for subsequent mortality. These diseases require aggressive modification of risk factors in addition to their own clinical management.
- Other obesity-associated diseases are less lethal, but still require appropriate clinical therapy.
- Overweight and obesity also aggravate several cardiovascular risk factors (e.g., triglycerides, physical inactivity). Identifying these risk factors is required as a guide to the intensity of the clinical intervention used to treat the weight problem.



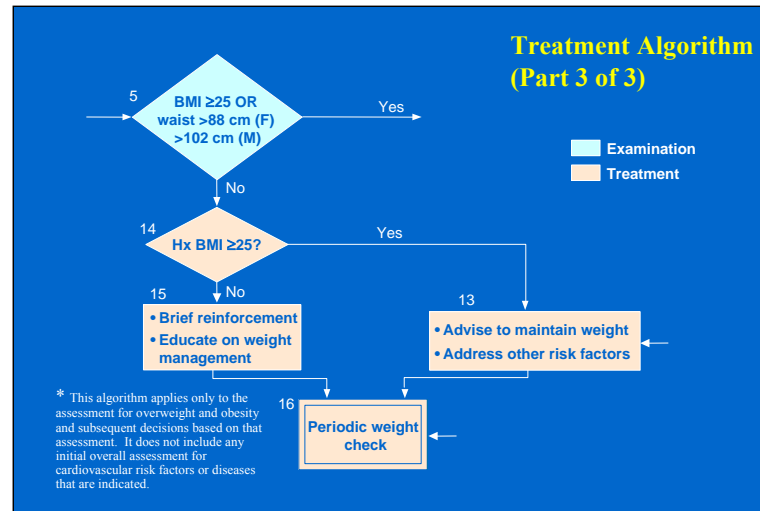
The key features of the algorithm are as follows:

- Patient assessment should include measures of weight and height to determine BMI and waist circumference (Box 4).
- If BMI is ≥ 25 or waist circumference is high (Box 5), then the presence of risk factors (Box 6) should be assessed.
- Patients with BMI ≥ 30 , or BMI 25 to 29.9 or a high waist circumference **AND** two or more risk factors, need to work with their physicians to determine treatment goals and strategies.



If the patient is overweight but does not have two other risk factors, weight loss is not necessarily advised.

- For these patients, it is important to assess their desire to lose weight (Box 12). Weight loss in the clinical setting requires a major investment of time and effort by the health care team as well as expense to the patient. For these reasons, motivation for weight loss should be relatively high before initiating clinical therapy.
- For patients who do not want to lose weight, emphasis should be given to maintaining current weight or not gaining any more weight. However, if the patient has other risk factors, they need to be addressed (Box 13).
- For patients advised to lose weight, their progress needs to be assessed periodically (Box 9). If a patient achieves a 10 percent reduction in body weight in 6 months to 1 year, this can be considered good progress and the patient can enter the weight maintenance phase of counseling (Box 11). If the patient does not lose sufficient weight, assess the reasons for the failure to lose the weight (Box 10). Use these reasons to develop new goals and treatment strategies.



Patients who do not have a high BMI or high waist circumference need to be advised of the importance of staying in this category and should be given reinforcements to help them maintain their current weight and address other risk factors if present (Boxes 13 and 15). Such patients should be screened for weight gain every 2 years (Box 16).