Obesity surgery

Jacek Szopinski MD, PhD

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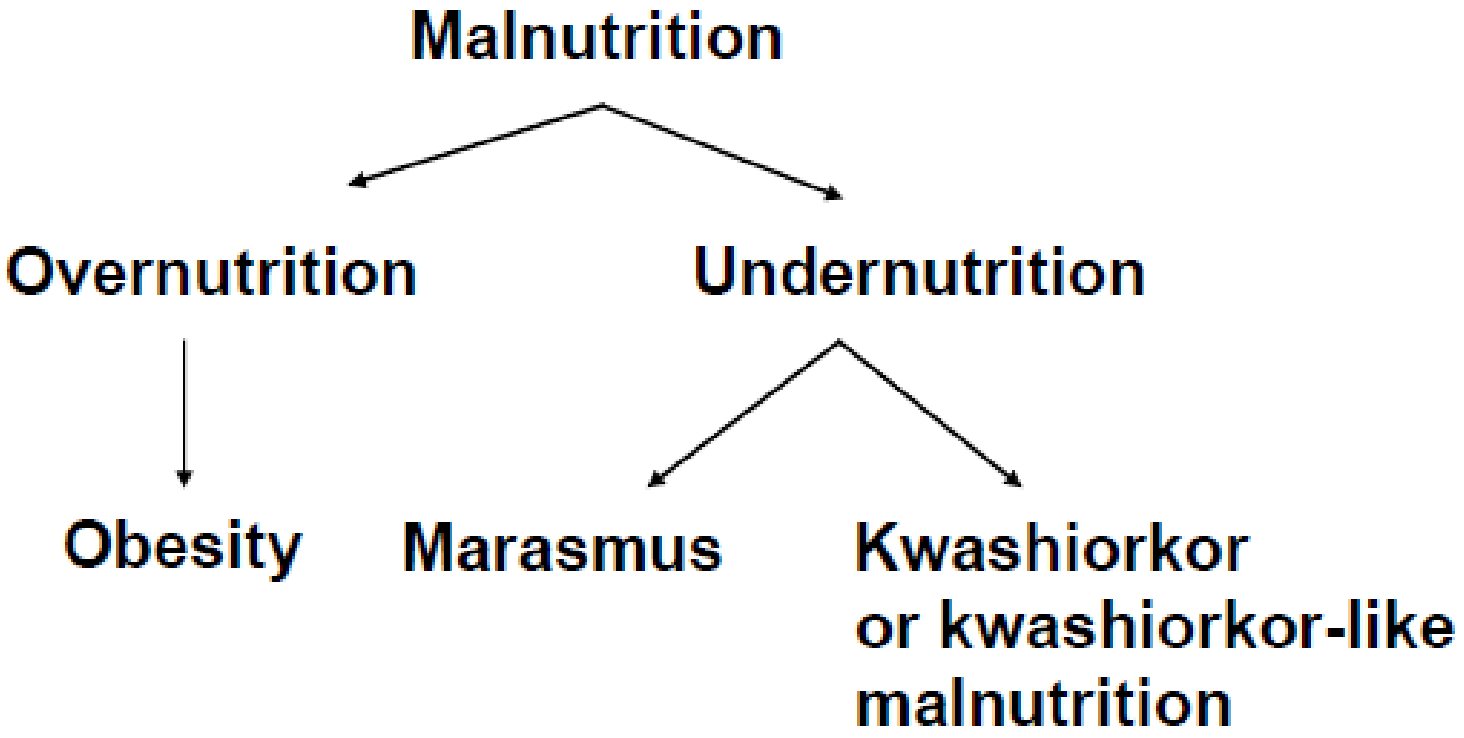
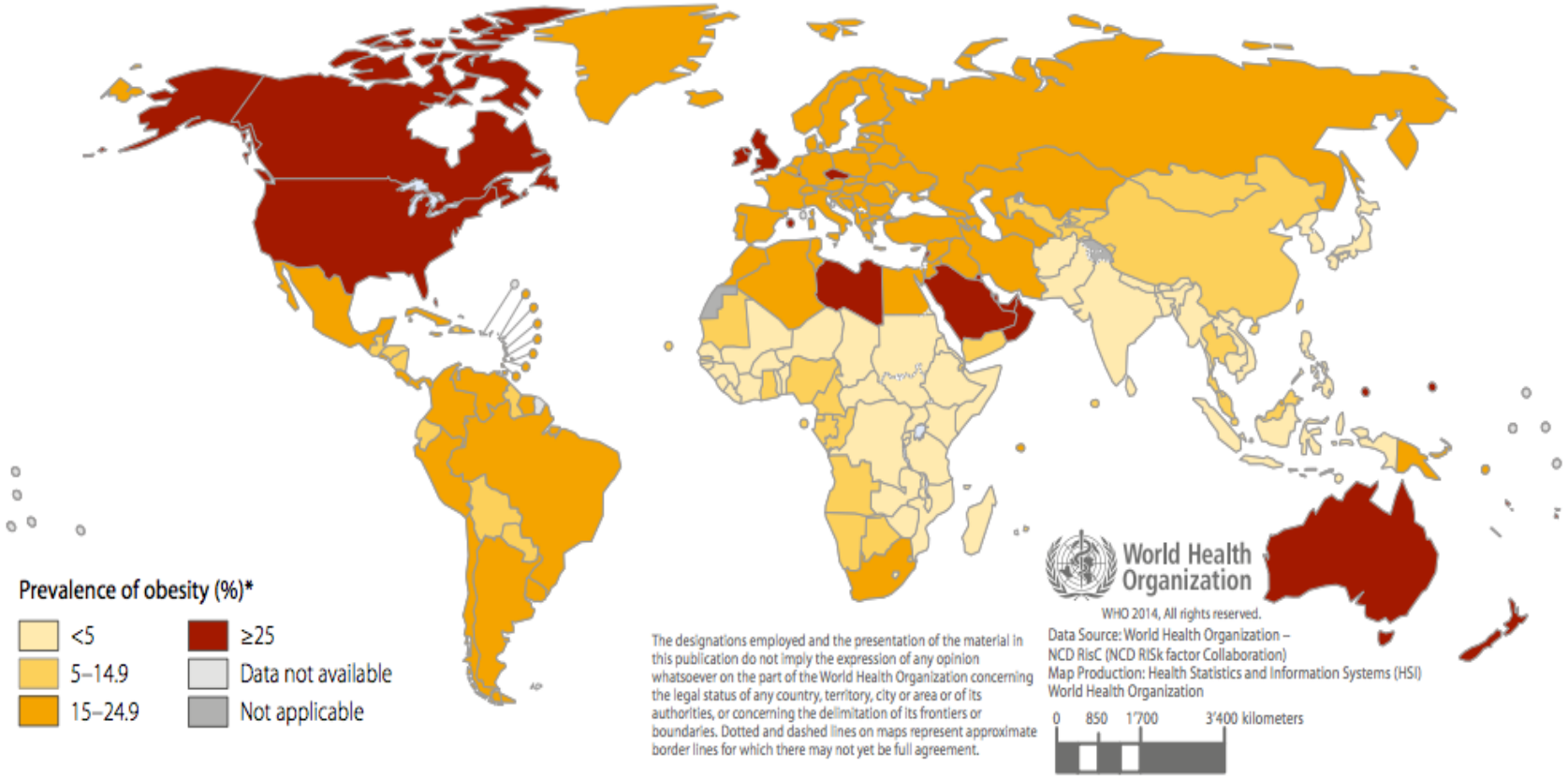
Classification of energy and protein malnutrition



The definition of beauty evolves…

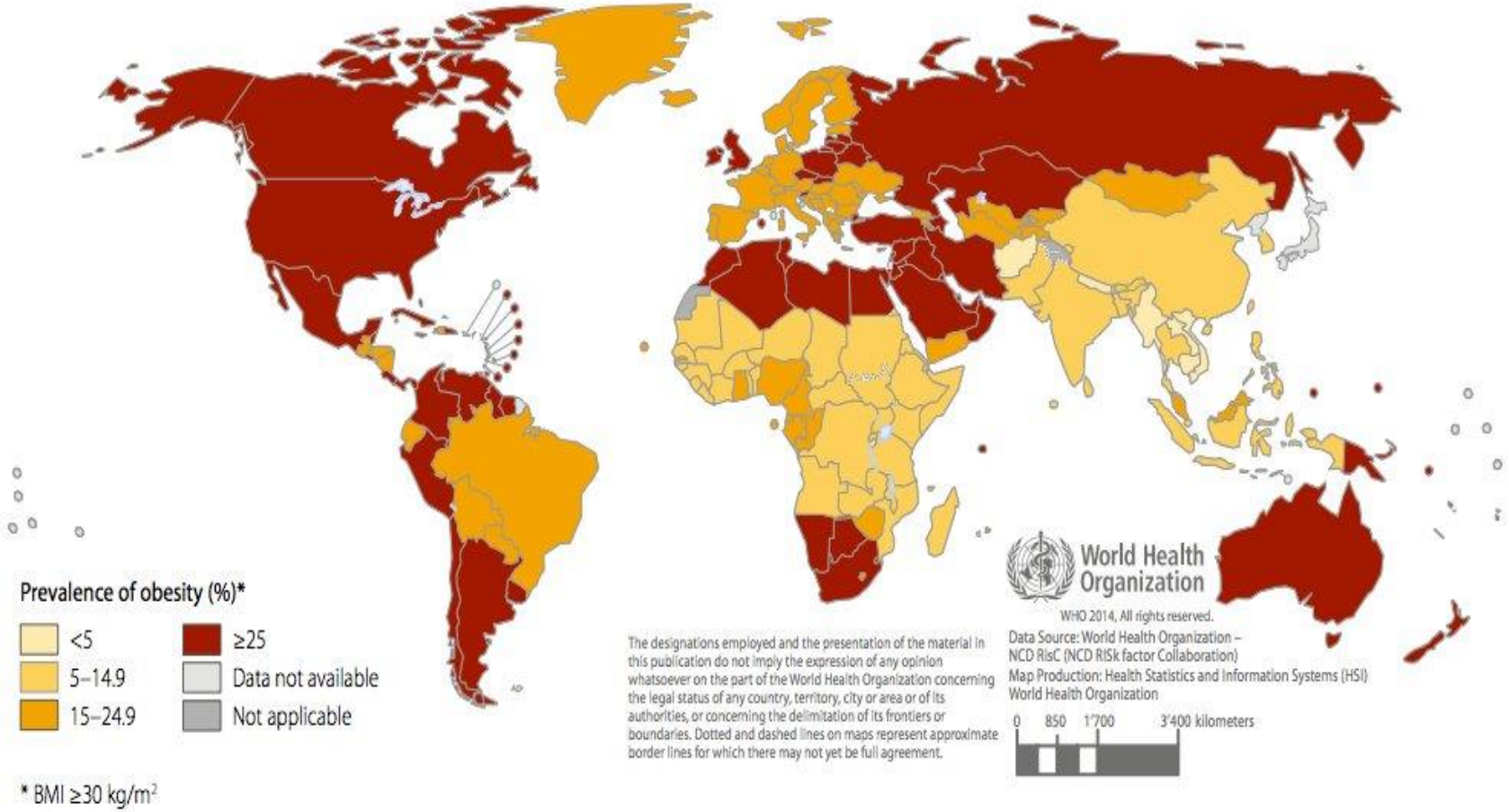
Problem we have to deal with…

Fig. 7.1 Age-standardized prevalence of obesity in men aged 18 years and over (BMI ≥30 kg/m^2), 2014

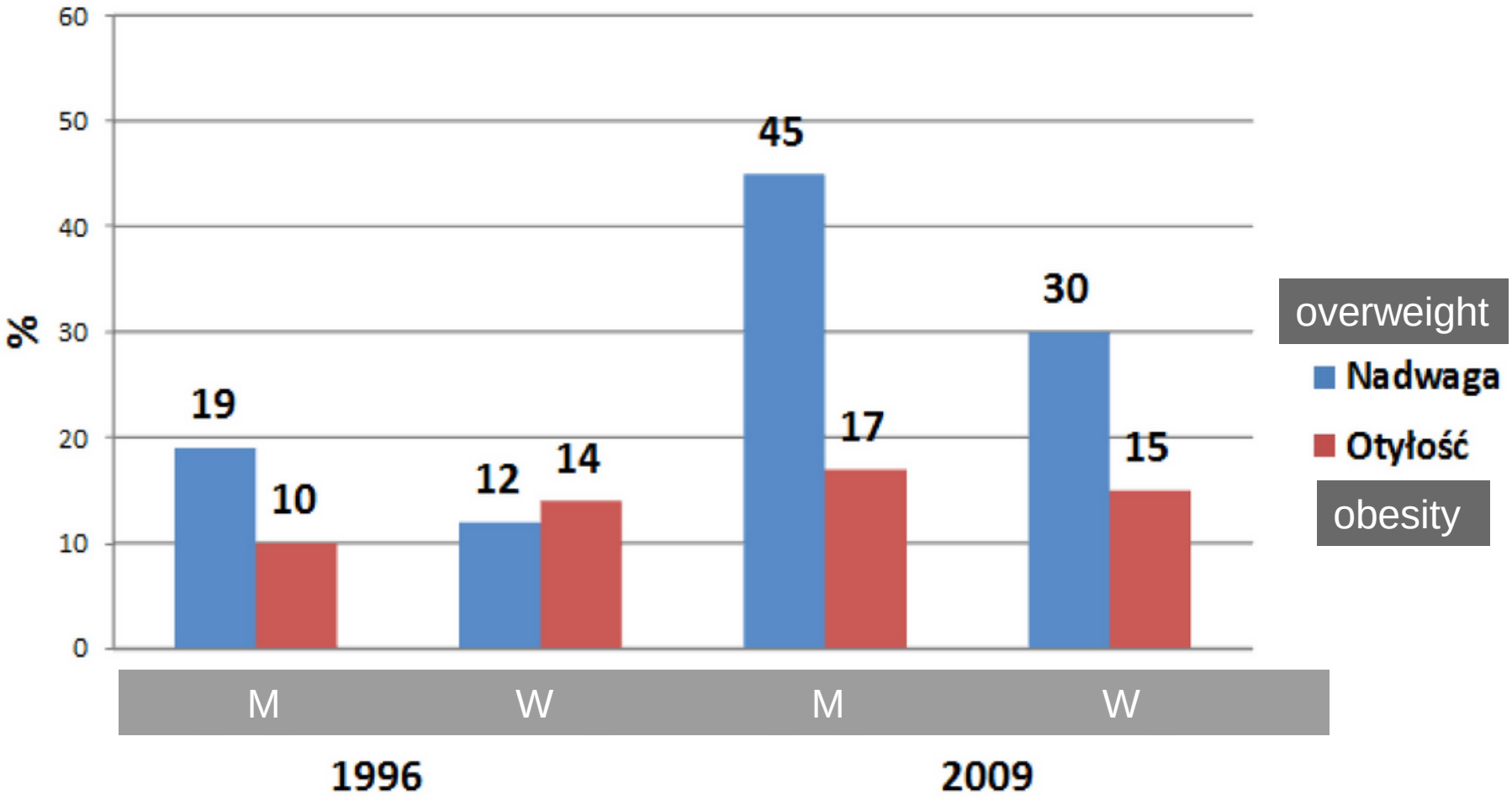


* BMI ≥ 30 kg/m^2

Fig. 7.2 Age-standardized prevalence of obesity in women aged 18 years and over (BMI ≥30 kg/m^2), 2014

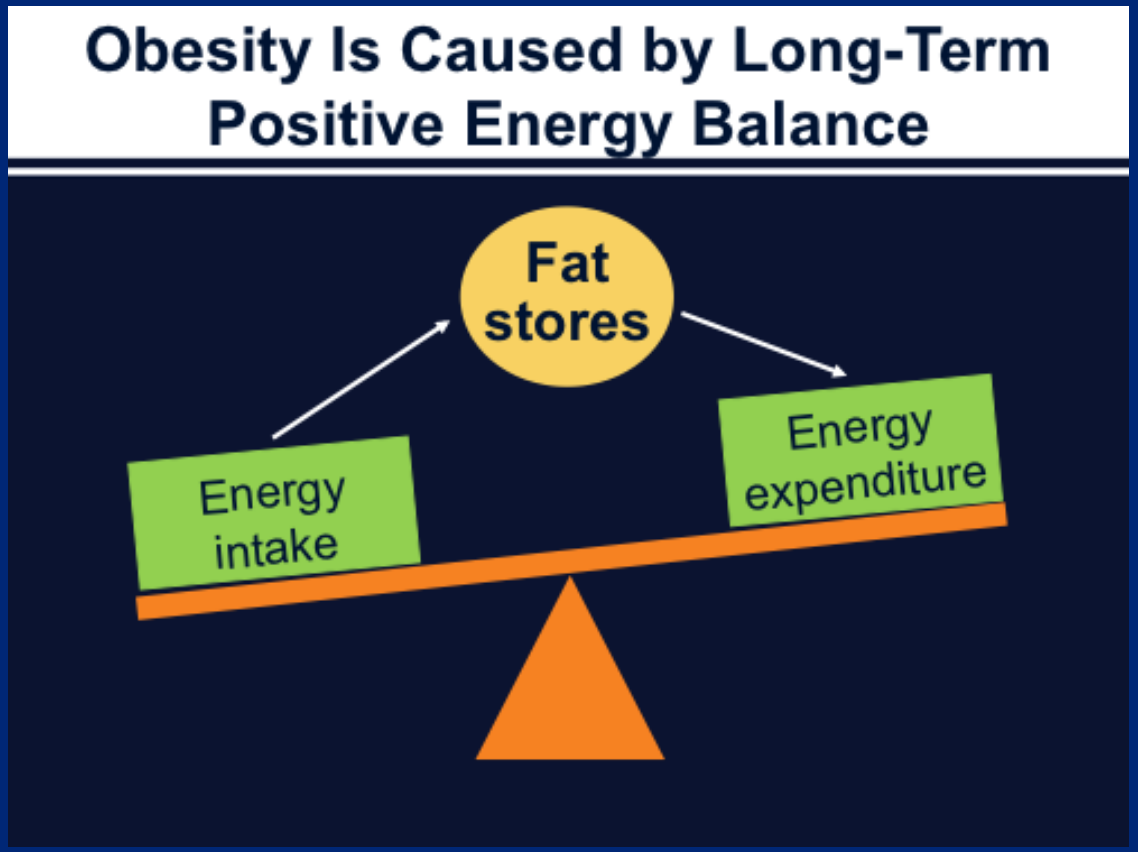


Overweight and obesity in Polish population 1996 and 2009



Causes of obesity ?

- Energy imbalance – too little energy is used comparying to too much food intake
- Weight gain is influenced by:
  - Amount of food
  - Food behaviour
  - Diet

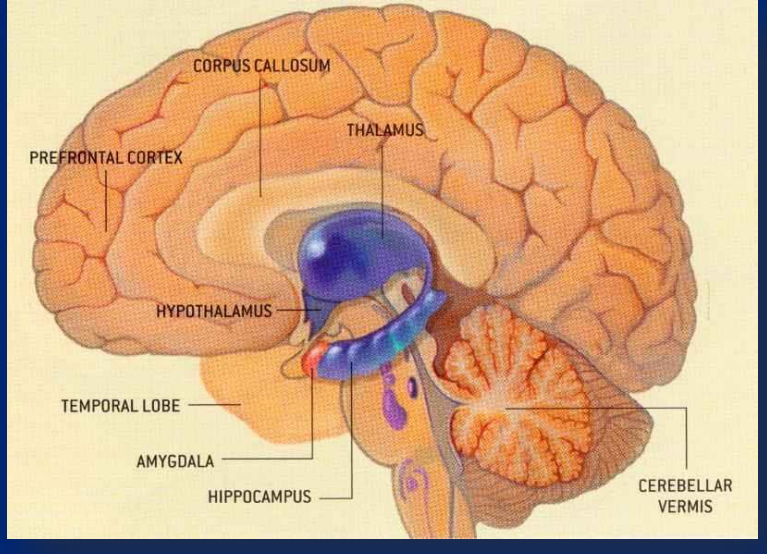


Many co-existing factors:

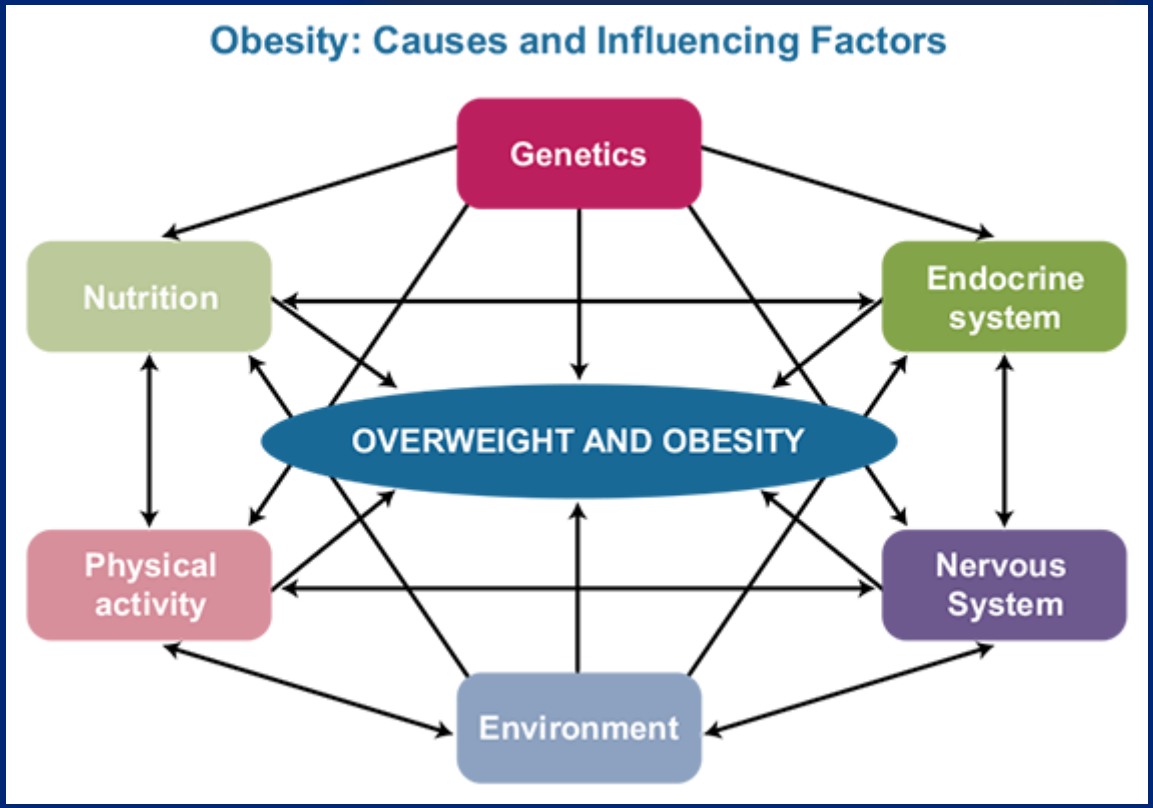
- genetics
- family home habbits
- daily habbits
- usage of energy
- spontaneous activity
- satiety and hunger feeling
- food choice
- stress reaction

Additional factors:

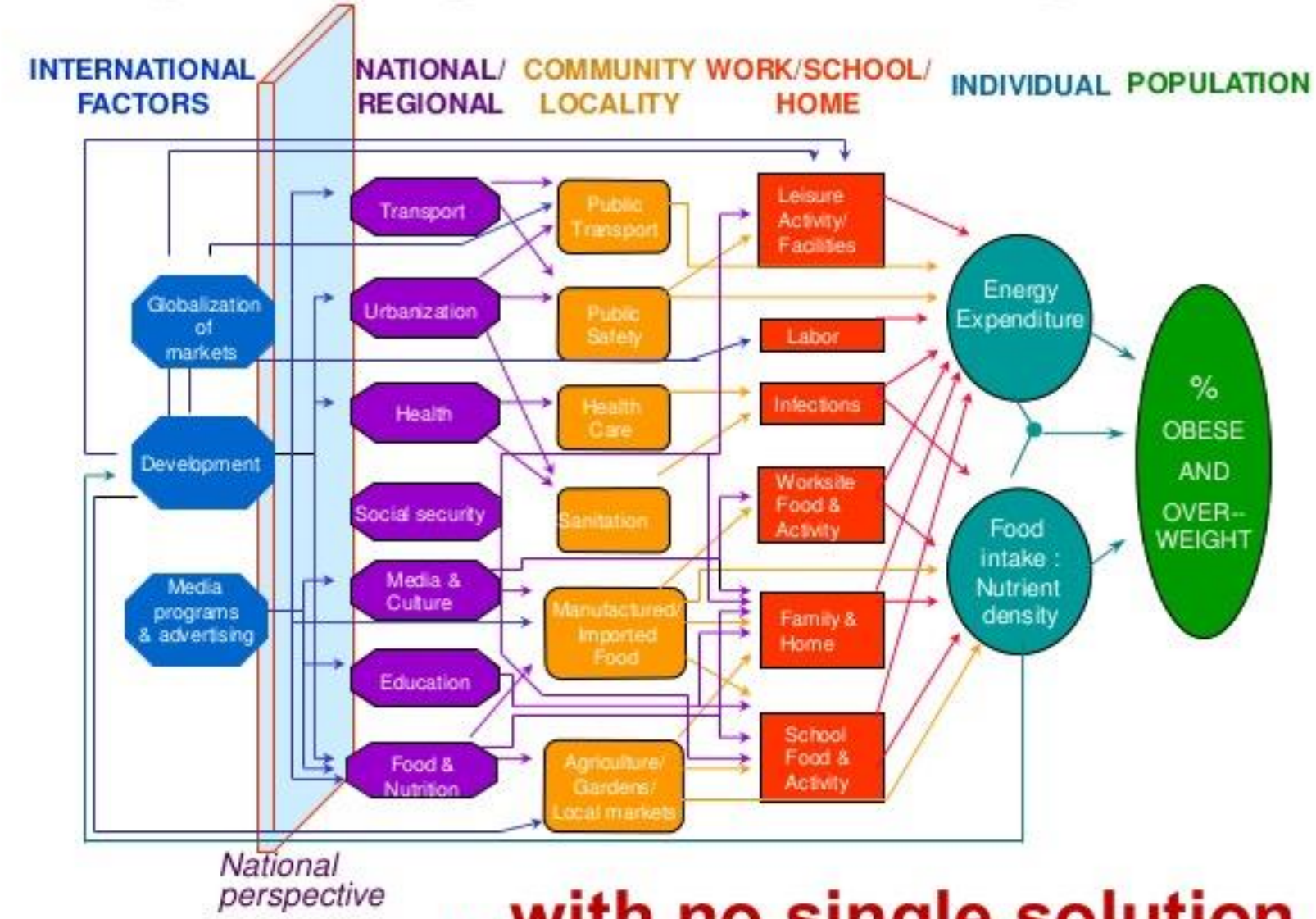
- Food intake control in the brain
- Endocrine disorders



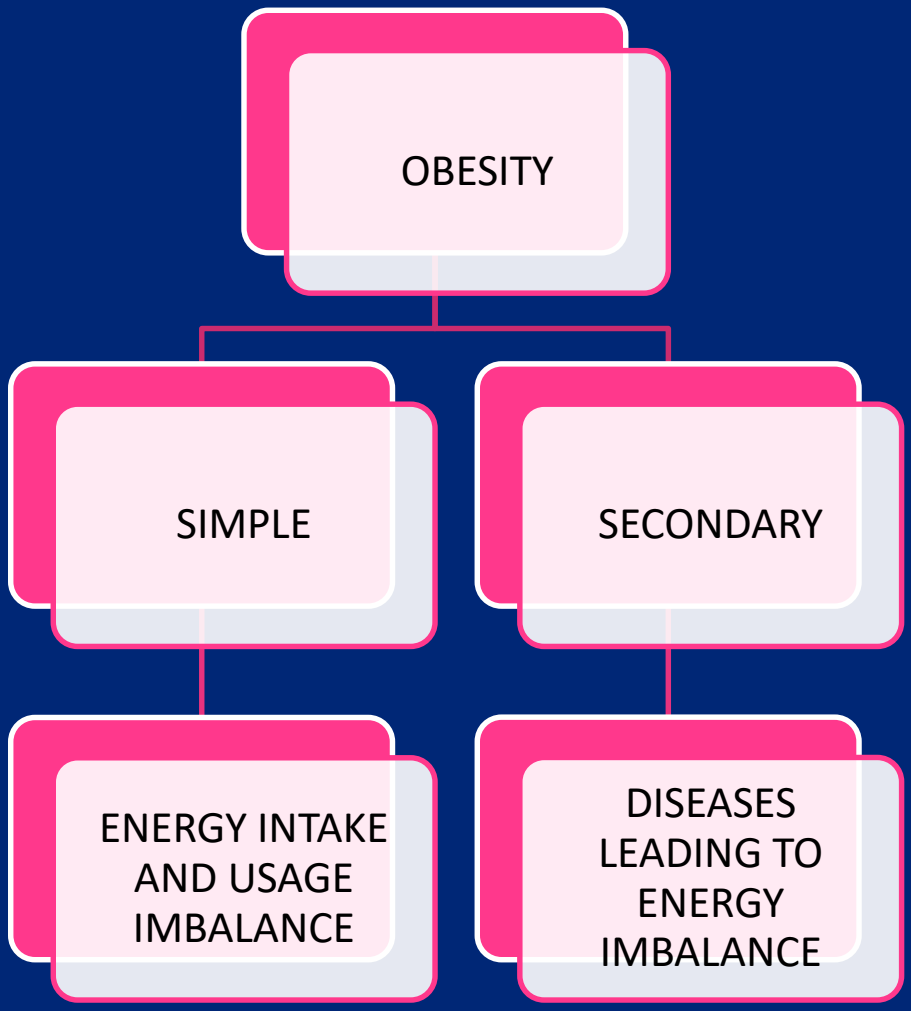
AND
congenital factors
economical factors
sociological factors



Obesity is a complex, multi-factorial problem



…with no single solution



OBESITY – pathological increase of the fat tissue within the body

Body Mass Index

$$BMI = \frac{\text{weight (lb)} * 703}{\text{height}^2\ (\text{in}^2)}$$

OR

$$BMI = \frac{\text{weight (kg)}}{\text{height}^2\ (\text{m}^2)}$$

(metric)

Obesity

According to the CDA guidelines for body weight classification in adults using BMI

Underweight	→ <18.5 (kg/m^2)	→ Increased risk
Normal	→ 18.5 – 24.9 (kg/m^2)	→ Least risk
Overweight	→ 25.0 – 29.9 (kg/m^2)	→ Increased risk
Obese:		
Class I	→ 30.0 – 34.9 (kg/m^2)	→ High risk
Class II	→ 35.0 – 39.9 (kg/m^2)	→ Very high risk
Class III	→ ≥40.0 (kg/m^2)	→ Extremely high risk

BMI: Body mass index; **CDA:** Canadian Diabetes Association

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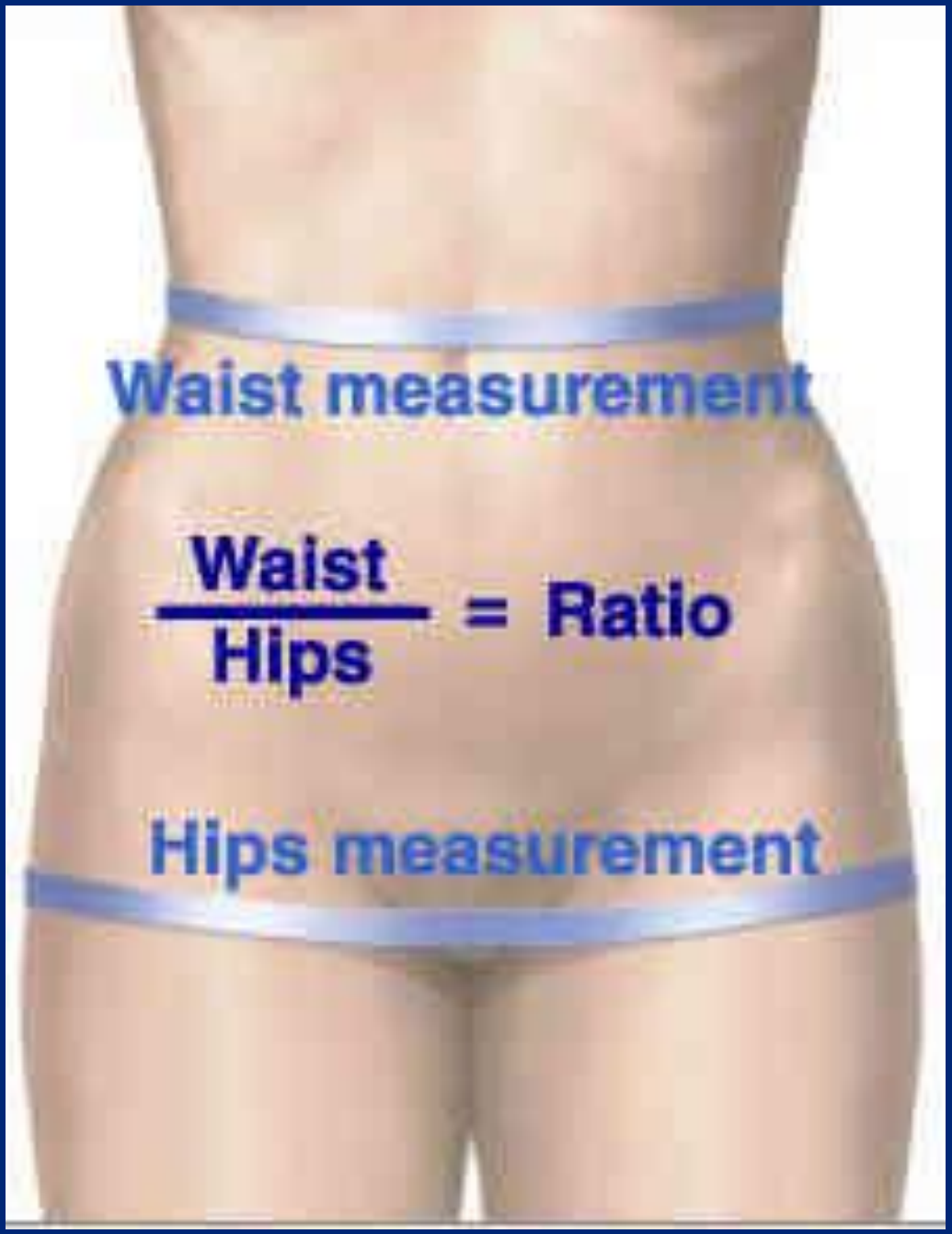

Waist measurement
Waist
Hips
= Ratio
Hips measurement

Waist-Hip Ratio (WHR)

- Waist Hip Ratio (WHR) is another simple measurement that has been used in epidemiological studies in the past but does not provide additional information compared to WC.
- The values that are associated with an increase abdominal fat and increased risk of hypertension, diabetes and ischaemic heart disease are
- · WHR > 0.9 for men
- · WHR > 0.85 for women
- However, waist circumference is the preferred measure of abdominal obesity compared to the WHR

Body shape and BMI

What influences the risk ?

- Time of being obese (> age of the patient) → comorbidities
- Obesity usually + >3 major comorbidities
- Type of obesity → frequency and type of comorbidities

Pear type obesity – fat tissue predominantly in the subcutaneous tissue and peripherally WHR<0,8 K; <1,0 M

Apple type obesity - (visceral obesity) - fat tissue tissue predominantly within the abdominal cavity

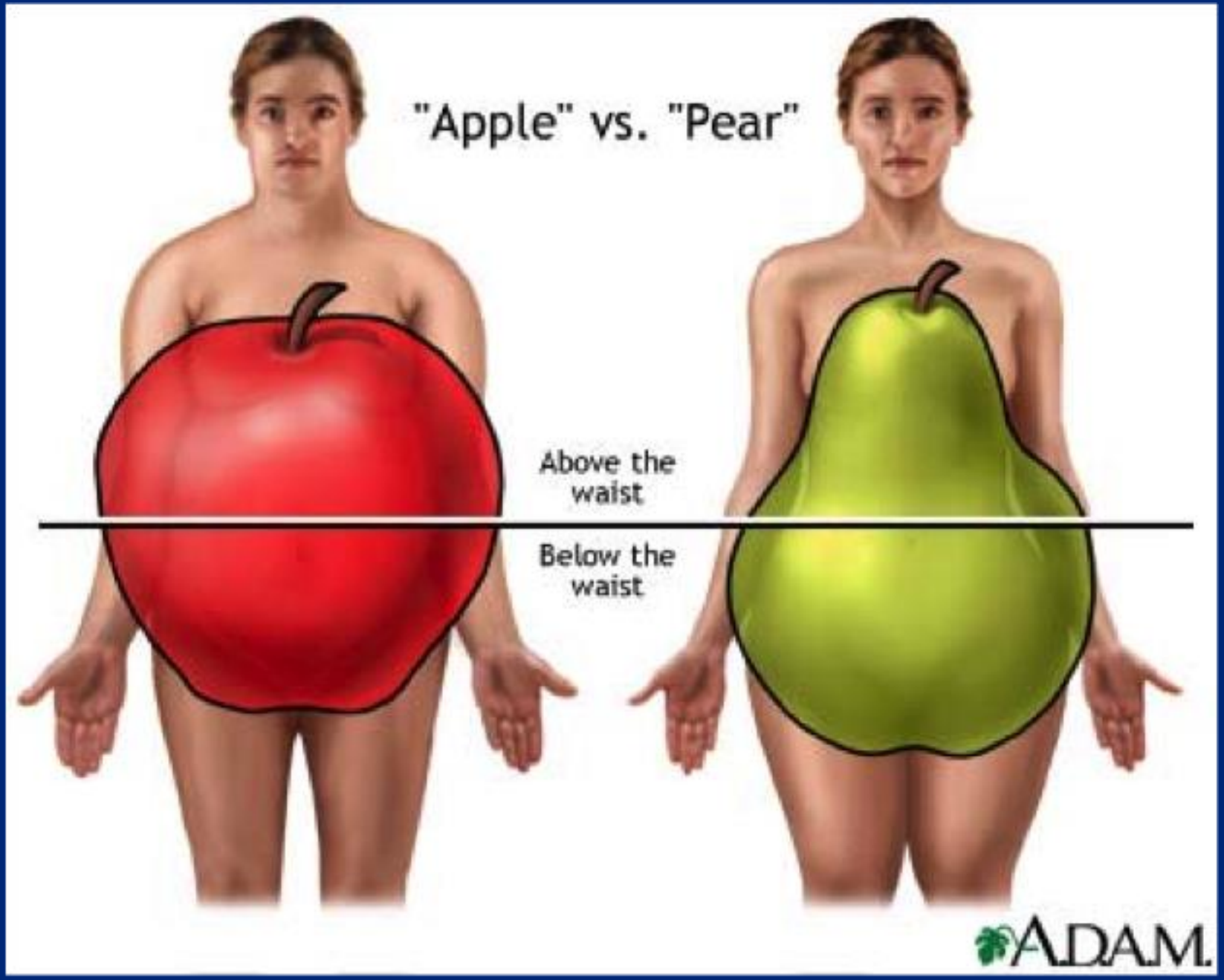
Metabolic disorders

→ BP

→ ischemic heart disease

→ diabetes

→ circulatory system


"Apple" vs. "Pear"
Above the waist
Below the waist
A.D.A.M.

Environmental factors

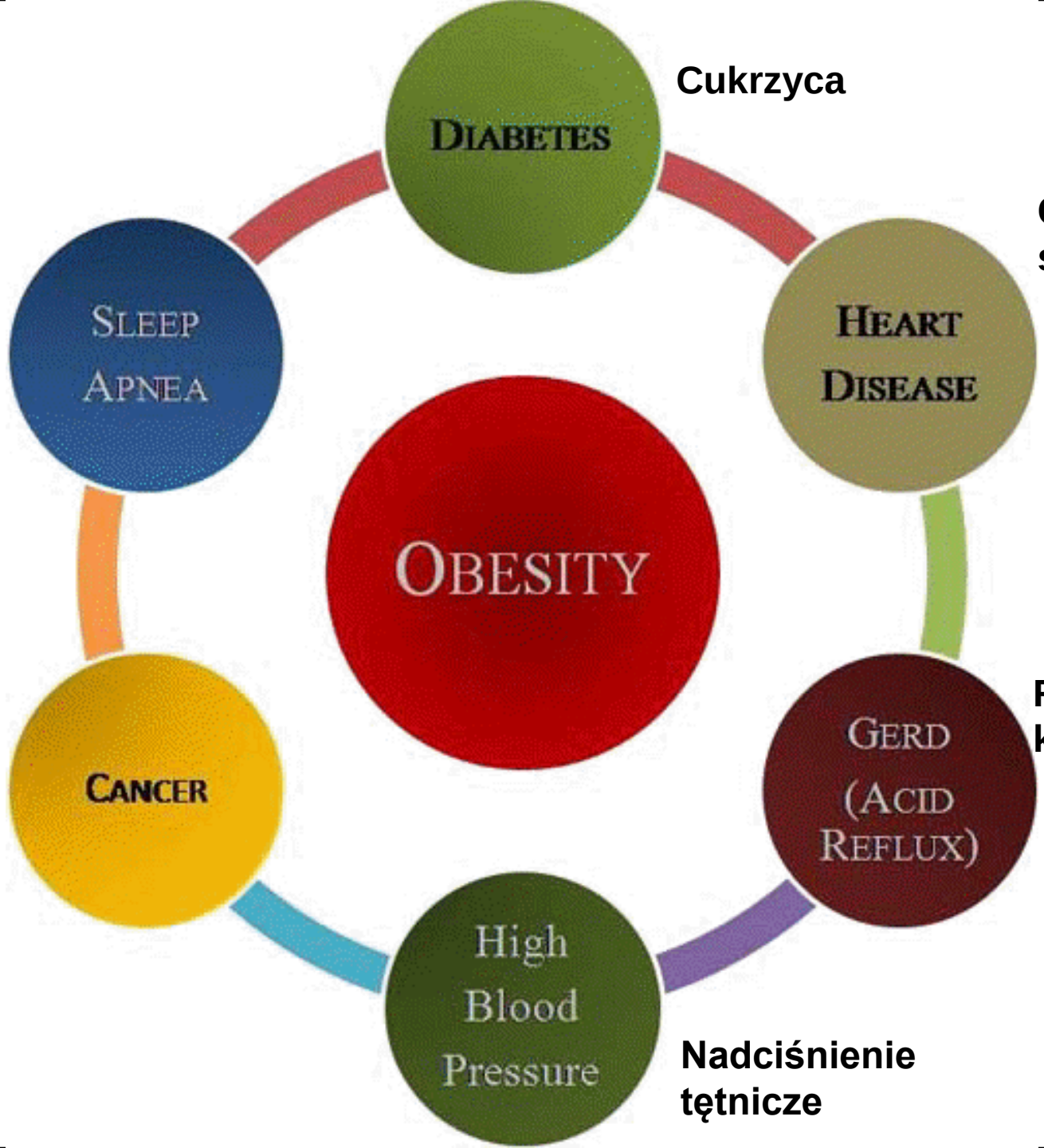
Easy access to high energy density food, food is cheap, high fat content, high carbohydrates

- In the past decades increase in fat content, lower complex carbohydrates, mineras and fiber
- cooking needs much more self-control

Limitted physical activity

almost no excercises

- Lower energy expenditure zany z codzienną aktywnością jest coraz niższy
- excercises done by only every 10th citizen of Poland
- School –children avoid excercises



Cukrzyca

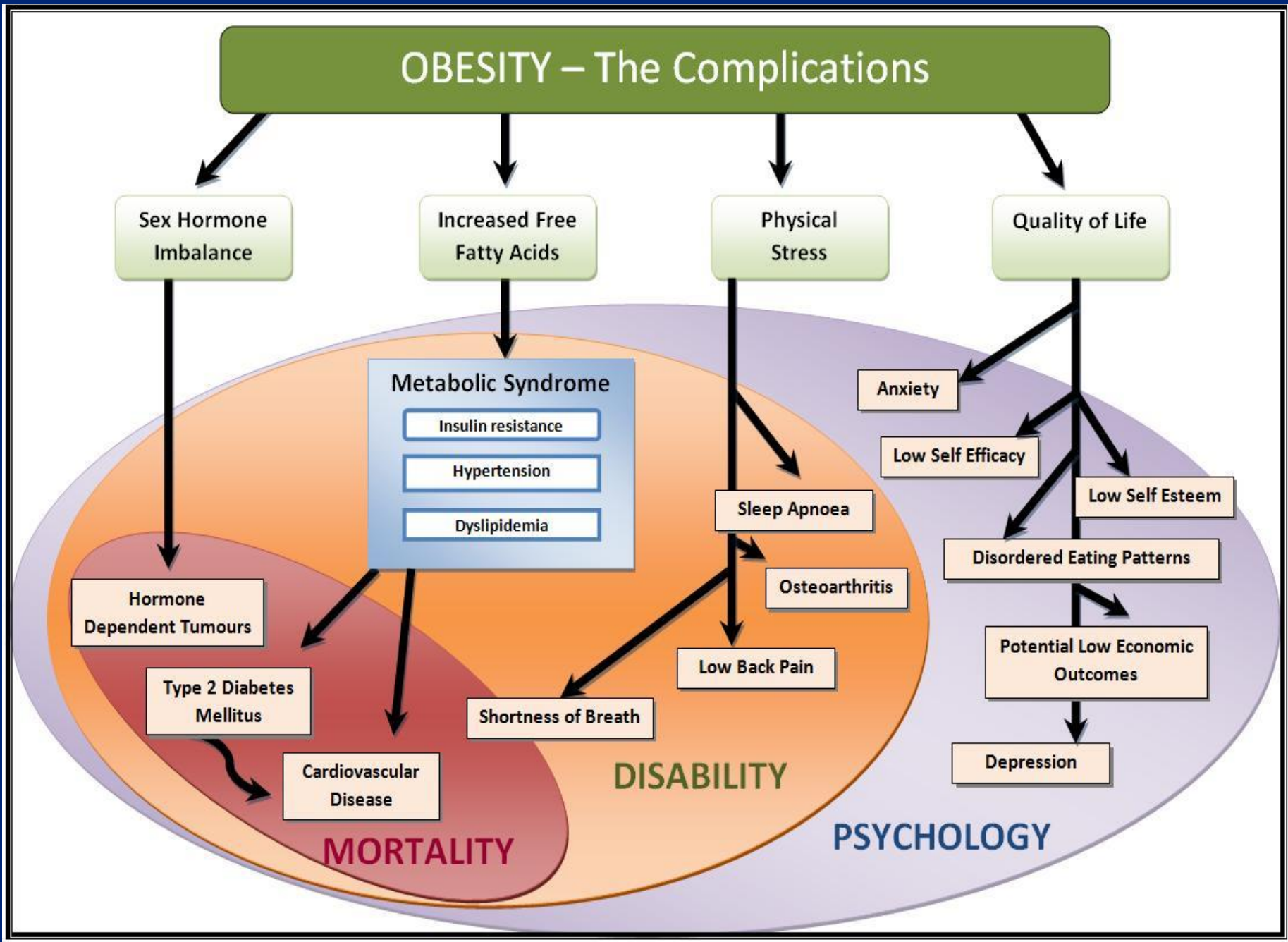
Chore serce

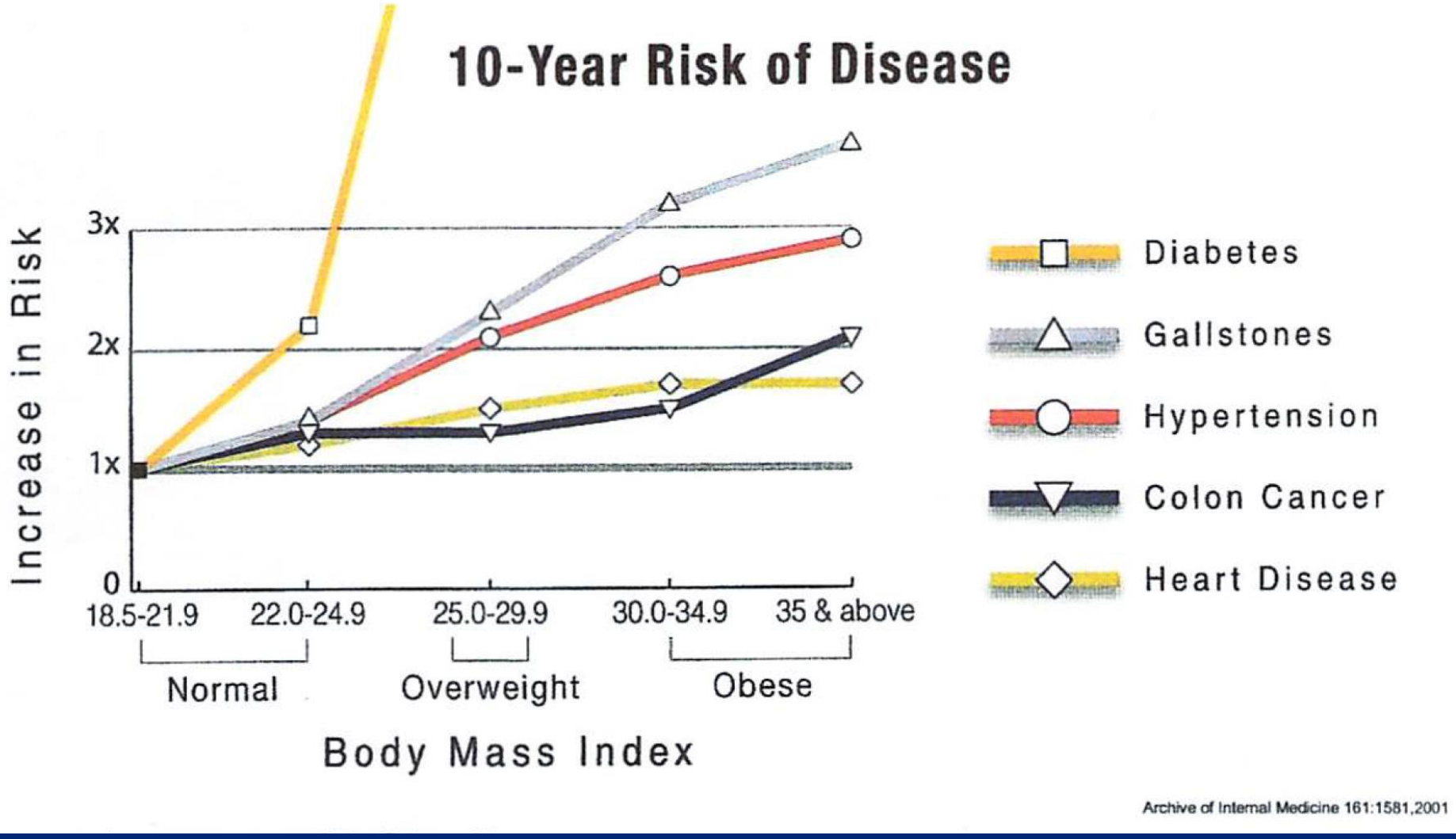
Refluks kwasem

Nadciśnienie tętnicze

Rak

Bezdech senny


OBESITY – The Complications
Sex Hormone Imbalance
Increased Free Fatty Acids
Physical Stress
Quality of Life
Metabolic Syndrome
Insulin resistance
Hypertension
Dyslipidemia
Anxiety
Low Self Efficacy
Low Self Esteem
Sleep Apnoea
Disordered Eating Patterns
Hormone Dependent Tumours
Osteoarthritis
Potential Low Economic Outcomes
Low Back Pain
Type 2 Diabetes Mellitus
Shortness of Breath
Depression
Cardiovascular Disease
DISABILITY
MORTALITY
PSYCHOLOGY



Archive of Internal Medicine 161:1581,2001

Complications of obesity endocrine system

- Glucose intolerance and insulin resistance
- Diabetes type 2 (80% of patients)
- Men with the waist diameter > 102 cm - 4,5 x higher risk of diabetes type 2
-
- Women with the hip diameter > 88 cm s- 3,8 x higher risk of diabetes type 2

Endocrine system

- Polycystic ovary syndrome,
- secondary functional hyperandrogenism
- Involution of tertiary sexual features, hair growth (masculine type)
- Menstruation disorders – even infertility

Vascular system

- Changes in the large and medium size vessels → vessel contraction a endothelial hiperplasia with calcification → arteriosclerosis
- Amount of circulating blood increased → hypertension
- 80% of pts. with abdominal obesity after 50y → hypertension and ischemic heart disease about 40%
- As consequences → stroke or heart infarct
- The heart of the obese is „older” comparyning to the non obese

Changes in lipids

- Higher cholesterole concentration and LDL-cholesterole and triglycerides
- HDL-cholesterole is lowered
- Progress of arteriosclerosis

Respiatory system

Sleep apnoe and asthma

Breathing difficulties ← heart insuffitientia and high position of the diaphragm

Even acute asphyxia and death

GI tract

- GERD (gastro-esophageal reflux disease)
- Adenocarcinoma of the esophagus
- Fatty liver disease (chronic inflammation)
- Gallstones

www.medscape.com

Impact of Metabolic Syndrome in Surgical Patients

Should We Bother?

P. Tzimas; A. Petrou, E. Laou; H. Milionis; D. P. Mikhailidis; G. Papadopoulos

Br J Anaesth. 2015;115(2):194-202.

Clinical measure	Categorical cut-off points
Waist circumference* (European, Caucasian, USA, Canada)	≥102 cm in men ≥88 cm in women
Triglycerides	≥150 mg dl^{-1} (1.7 mmol l^{-1}) or On drug treatment for elevated triglycerides
High-density lipoprotein–cholesterol	<40 mg dl^{-1} (1.0 mmol l^{-1}) in men <50 mg dl^{-1} (1.3 mmol l^{-1}) in women or On drug treatment for low high-density lipoprotein-cholesterol
Blood pressure	≥130 mm Hg systolic blood pressure or ≥85 mm Hg diastolic blood pressure or On antihypertensive drug treatment in a patient with a history of hypertension
Fasting glucose	≥100 mg dl^{-1} (5.6 mmol l^{-1}) or On drug treatment for elevated glucose

Metabolic syndrome has a high prevalence among surgical patients, exceeding 40% in some reports, and may be higher in cardiac surgery patients.

Several, but not all, studies that evaluated the impact of MetS on cardiac and non-cardiac surgery have shown increased mortality among patients with MetS. Most evidence shows that MetS adversely affects perioperative outcomes in both cardiac and non-cardiac surgery. Metabolic syndrome probably contributes to even more perioperative events, with the most common being cardiac, pulmonary, renal, cerebrovascular, thromboembolic, sepsis, and wound infection. Metabolic syndrome has been correlated with a prolonged length of hospital stay after major surgery and a higher need for posthospitalization care, resulting in additional cost. Despite several definitions of MetS currently in use, the recognition of MetS as a group of risk factors for perioperative adverse outcomes urges clinicians to recognize the syndrome, to familiarize themselves with its characteristics, and most importantly, to formulate management strategies that could possibly lead to a reduction of perianaesthetic and perioperative risks. More research in this field is required. Apart from specifically designed studies, the use of registries could prove useful.

Bones

- Aquired deformations of the vertebral column, coxarthrosis, back pain .
- Fractures – more frequent

Kidney

- Diabetes – related glomerulopathy and chronic kidney failure

Varrices of the lower extremitties

- Lipid disorder
- Low physical activity – no effective muscle pump

Skin

- Acanthosis nigricans
- Papilomas
- Ulcerations
- Striae

Cancer

- Endocrine disorders → breast cancer endometrium cancer
- Cancer of the utera, colon cancer, prostate cancer

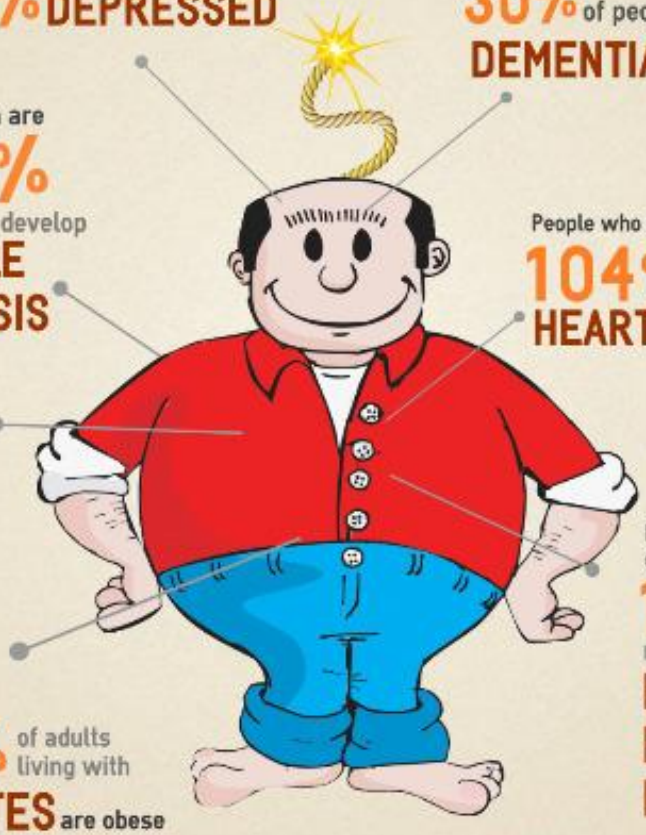
Psycho- sociological disorders

- Depression
- Bulimia, anorexia

Expected life time – shorter !!!

Obesity: a Ticking Time Bomb

Health Consequences of Obesity



People who are obese are...
25% more likely to be DEPRESSED

30% of people suffering DEMENTIA are obese

Obese children are
200%
more likely to develop
MULTIPLE SCLEROSIS

People who are obese are...
104% more likely to have
HEART FAILURE

33%
more likely
to develop
ASTHMA

People who are obese are over
150%
more likely to have
HIGH BLOOD PRESSURE

Over
50% of adults living with
DIABETES are obese

Nearly
10% of all CANCER
is caused by obesity

healtheo360

Letters

Voice of the People

Obesity is not a curable condition

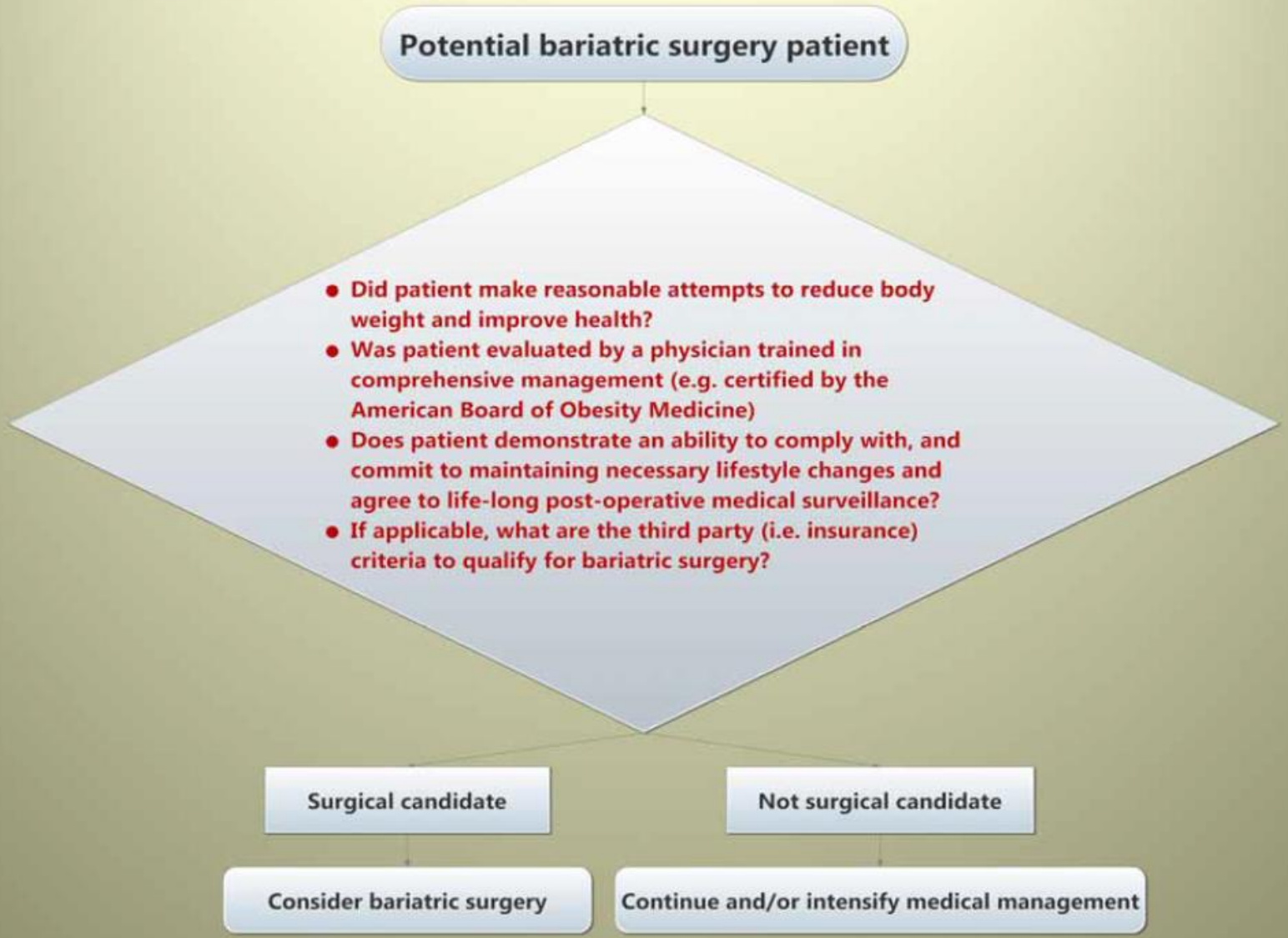
JANUARY 2, 2015, 1:39 PM

This is in response to the Dec. 29 editorial "Obesity as disability." Obesity is not a "curable condition." Class 3 (severe) obesity affects about 6 percent of U.S. adults. Anyone who has severe obesity or works with people who have severe obesity knows that this chronic disease is relentless. Surgical weight loss treatment can produce the most dramatic health benefits for people with severe obesity, but it only makes obesity a manageable, not curable condition. Even after losing a great deal of weight following surgery, many patients will still have a body mass index in the range of obesity, and relapses are common. We have no cures yet for the damage that obesity causes to one's metabolism and nervous system.

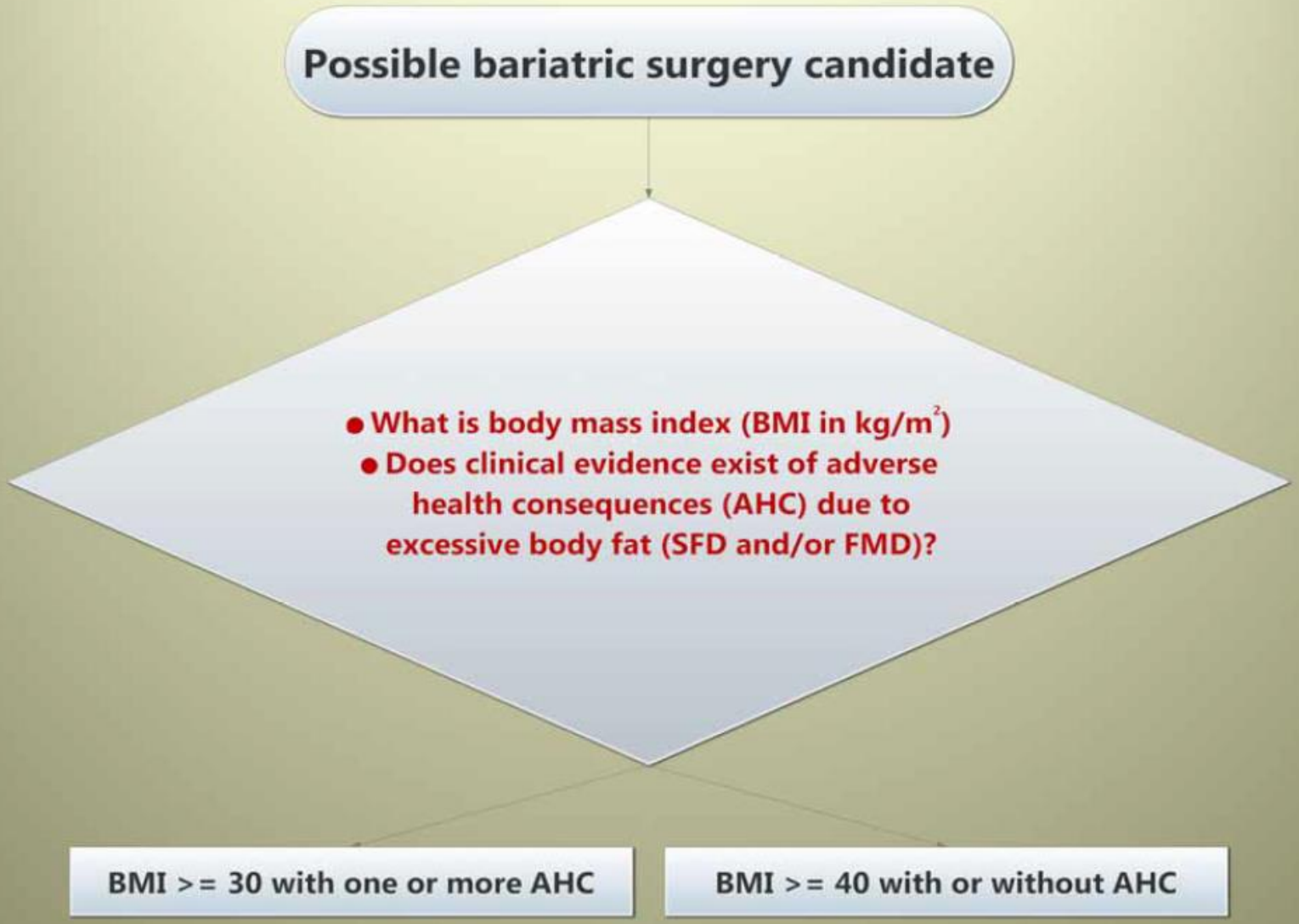
Obesity is more complex than "eating less and exercising more." Diet and exercise regimens are certainly a foundation for any prevention or treatment program. But in study after study, the results are consistent. Just like in diabetes, diet and exercise help manage the condition but do not cure the problem.

Obesity is not "usually the result of individual decisions." Among family studies, approximately 50 percent of the

Treatment


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 third party (i.e. insurance) criteria to qualify for bariatric surgery?
Surgical candidate
Not surgical candidate
Consider bariatric surgery
Continue and/or intensify medical management

Treatment


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 >= 30 with one or more AHC
BMI >= 40 with or without AHC

Indications for surgery

- 1. BMI > 35 + obesity realted commorbidities (i.e. vascular - heart disease, sleep apnea, diabetes type 2)

- 2. BMI > 40, even without commorbidities

Indications for surgery

- Indictions will still exist when the patient is losing weight during preoperative time

- Indications will exist in patients who lost their wight by conservative treatment but are not able to sustain the lower weight in time

European recommendations 2008

- Surgery is the most effective treatment leading to sustained body mass reduction, reduction of comorbidities and improvement of quality of life
- Clinicals trials show that patients with morbid obesity after bariatric surgery will live longer comparying to those with conservative treatment

Indications for surgical treatment of obesity

- Are clearly defined and should be explained to the patient; if they are not – this may be major mistake
- The doctor must explain the indications and contraindications for the surgery and the decision should be undertaken by the patient himself (informed consent)
- We should explain both the risk of surgery and the risk of further live with obesity

Indications for surgery

- age > 18 and < 60
- no efect of controlled diet > 6 mths
- obesity > 5 years
- low risk for the surgical procedure
- no endocrine disease
- mental status ok

NIH Consensus Conference
Ann Intern Med 1991

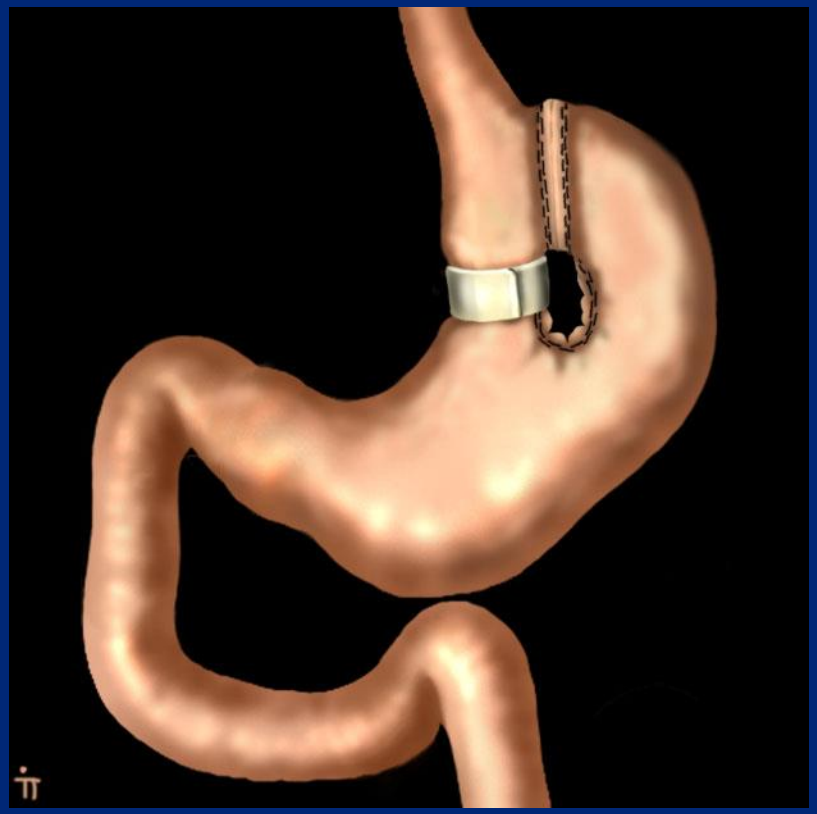
Aims of the baritric surgery

- Efectiveness: weight lose >50% of excess of body weight
- Low perioperative mortality
- Good tolerance
- No late complications (years)

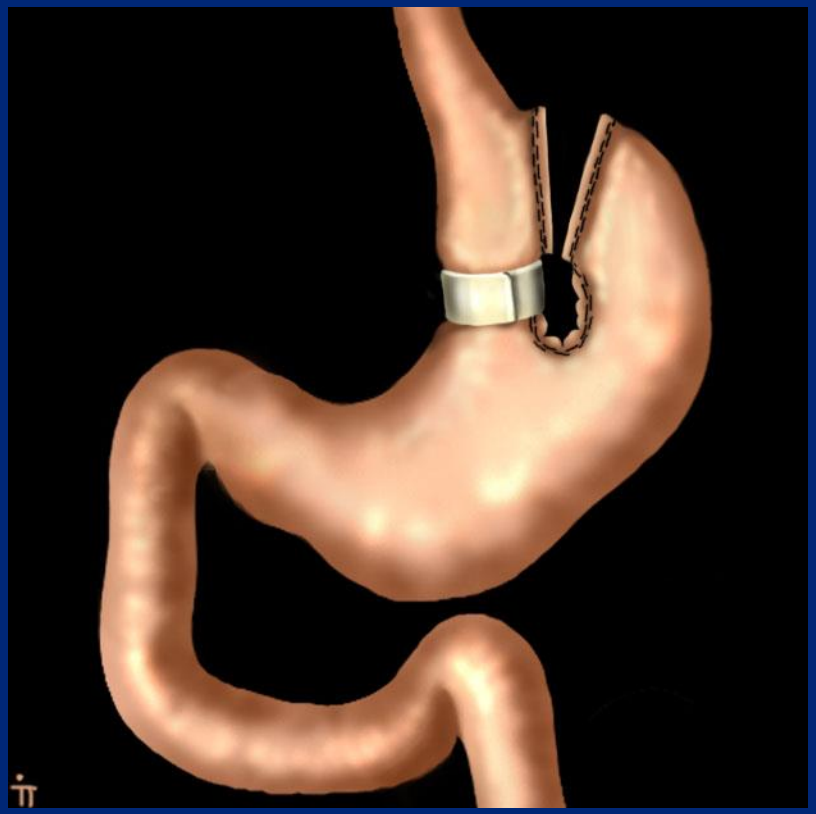
Bariatric procedures

- **Restrictive procedures**
  - **Adjustable gastric banding**
  - **Vertical banded gastroplasty**
  - **Sleeve gastrectomy**
- **Malabsorptive procedures**
  - Biliopancreatic diversion (BPD-DS, dudodenal switch)
- **Mixed procedures**
  - **gastric bypass**

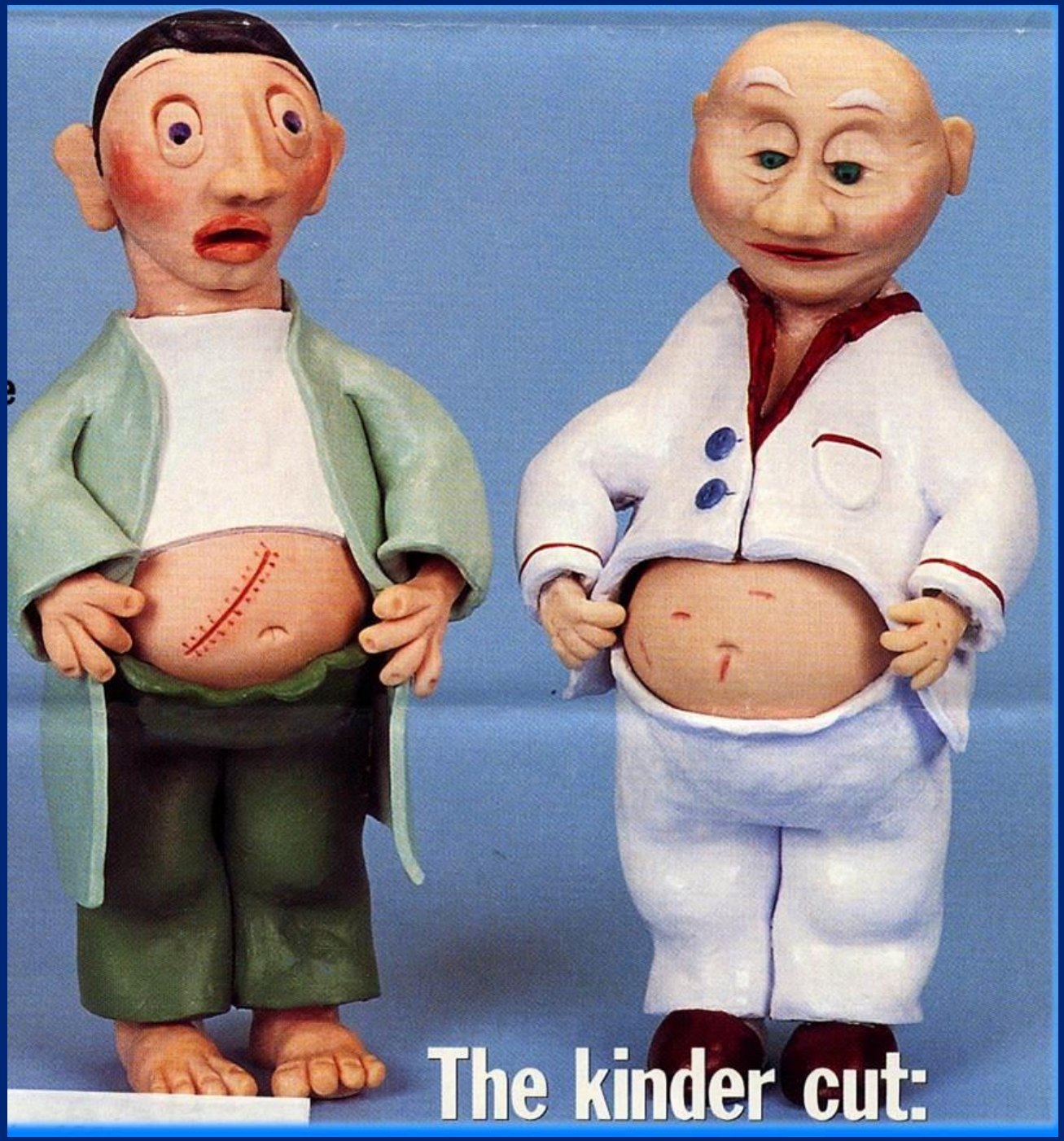
Vertical banded gastroplasty (VBG)



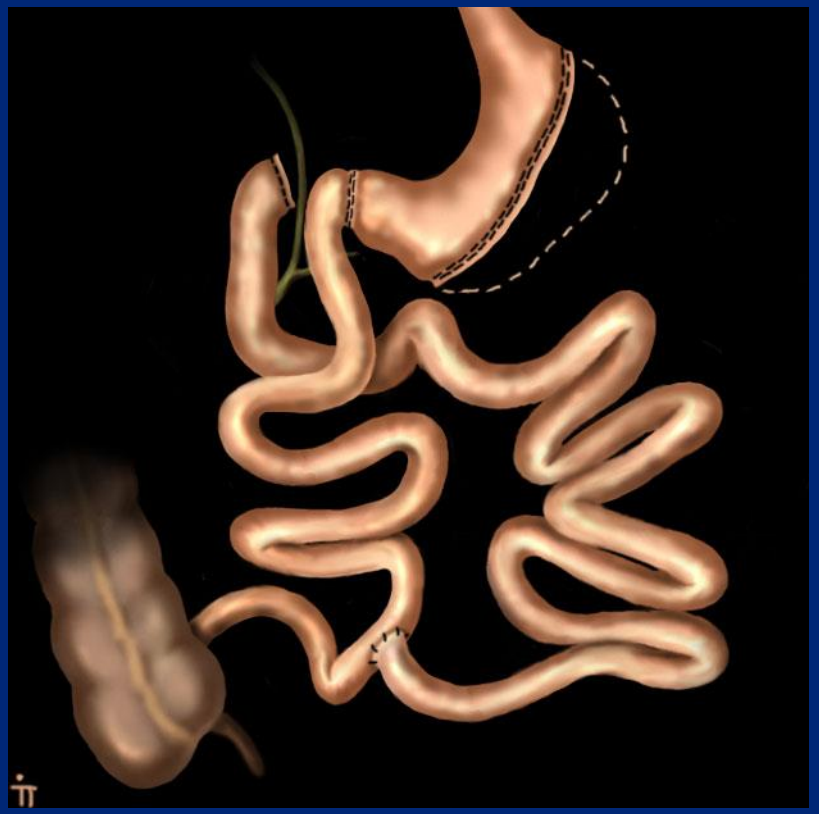
Mason



Mac Lean


The kinder cut:

Biliopancreatic diversion



Scopinaro

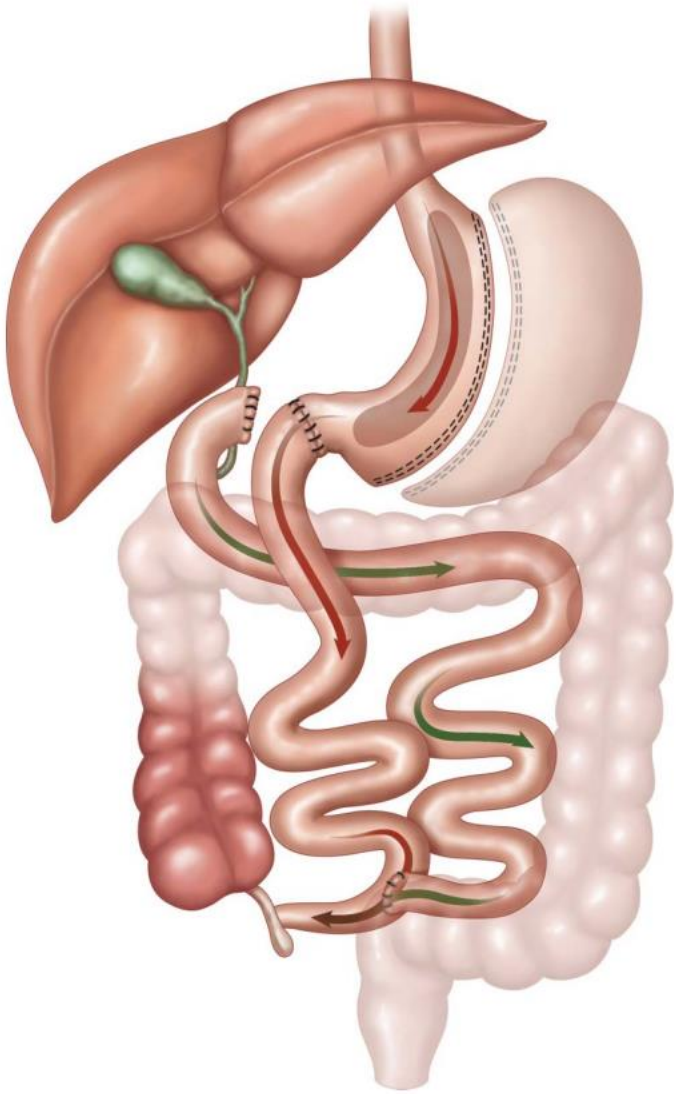


Figure 4 Biliopancreatic Diversion.

Treatment

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

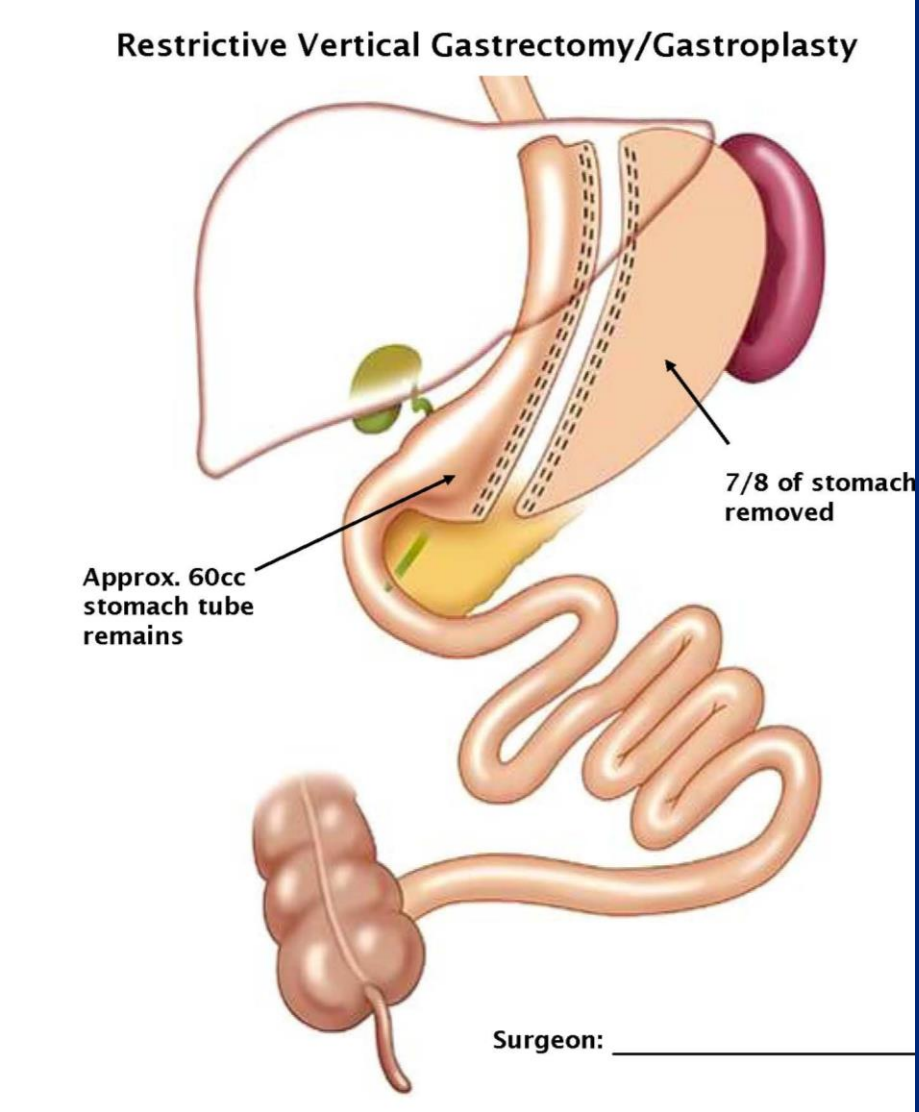
Potential acute complications

- 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

Sleeve gastrectomy



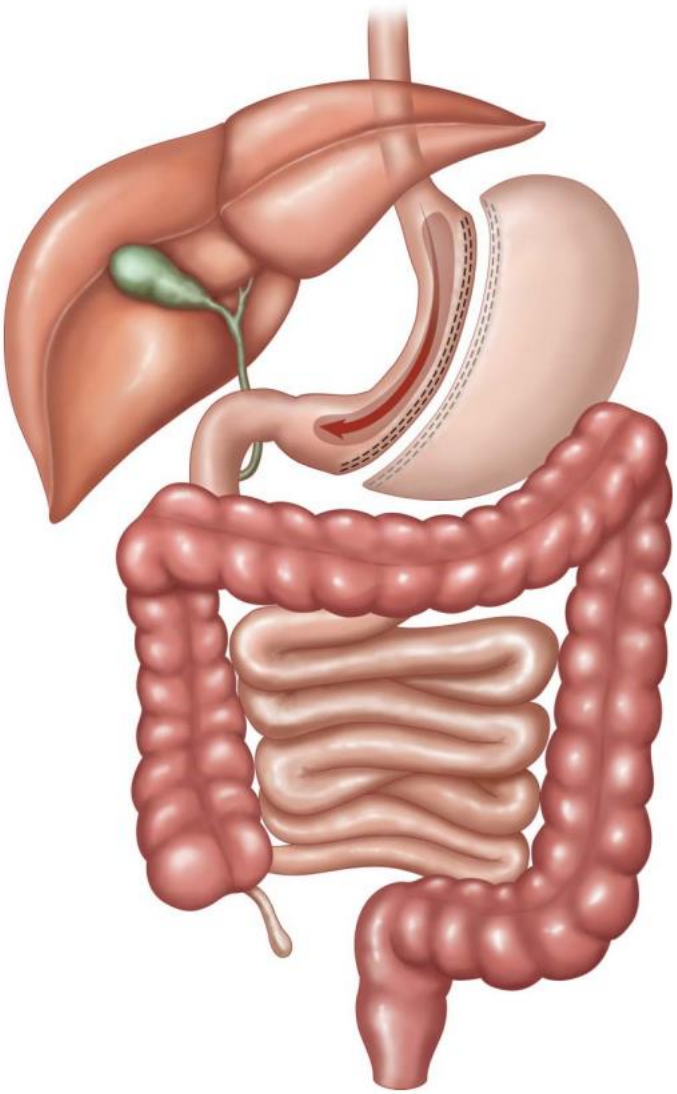
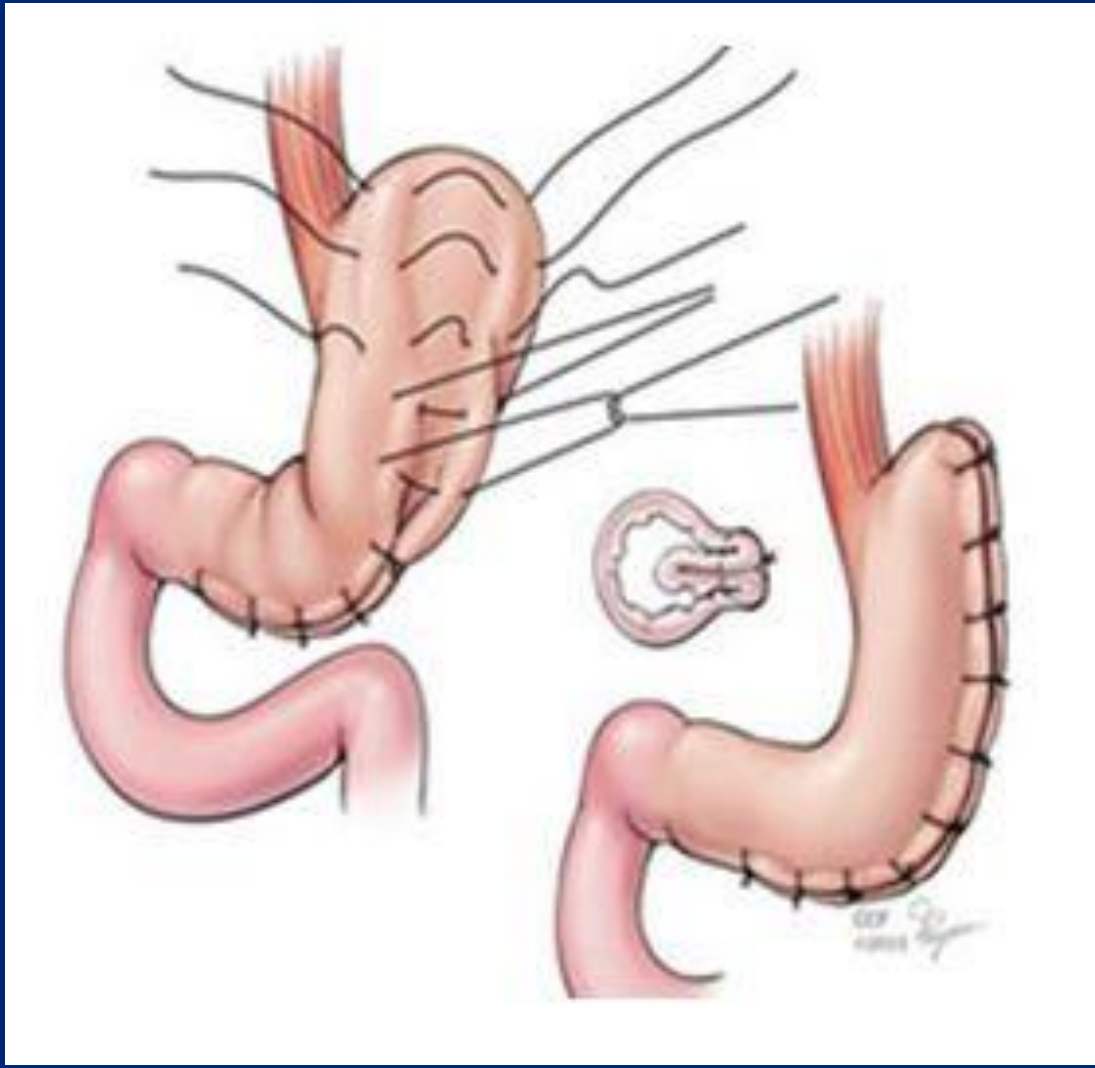


Figure 3 Sleeve Gastrectomy.

Gastric plication



Treatment

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
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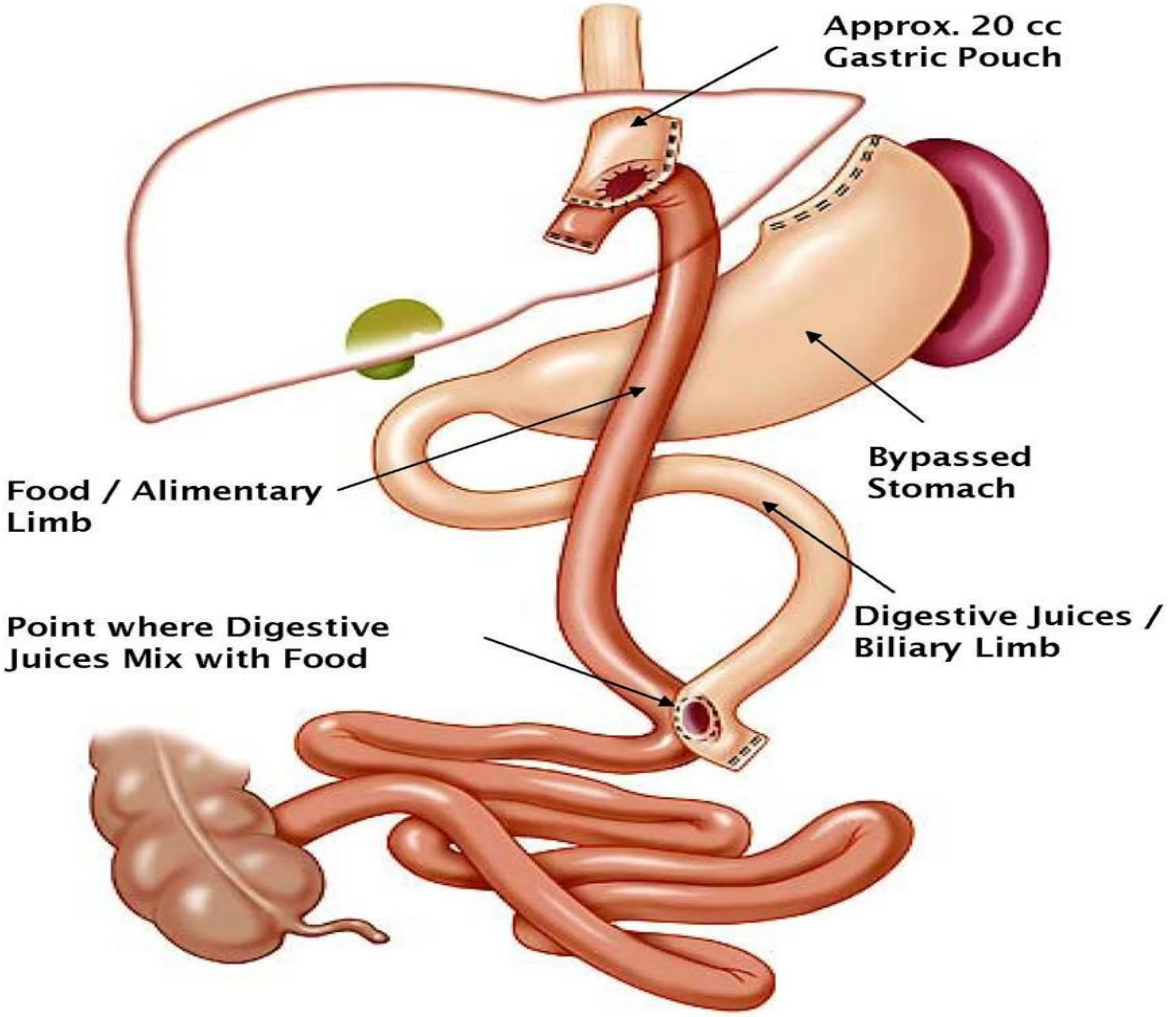
- Protein malnutrition
- Other nutritional and mineral deficiencies (e.g. deficiencies of vitamins A, C, D, E, B, and K, folate, zinc, magnesium,thiamine, etc.)
- Anemia (often related to mineral and nutrition deficiencies)
- Metabolic acidosis
- Bacterial overgrowth
- Kidney stones (oxalosis)
- Neuropathies (resulting from nutritional deficiencies)
- Osteoporosis (often caused by calcium deficiency and chronically elevated parathyroid hormone levels)
- Depression

Roux-en-Y Gastric Bypass

ROUX-EN-Y GASTRIC BYPASS



Surgeon: _____

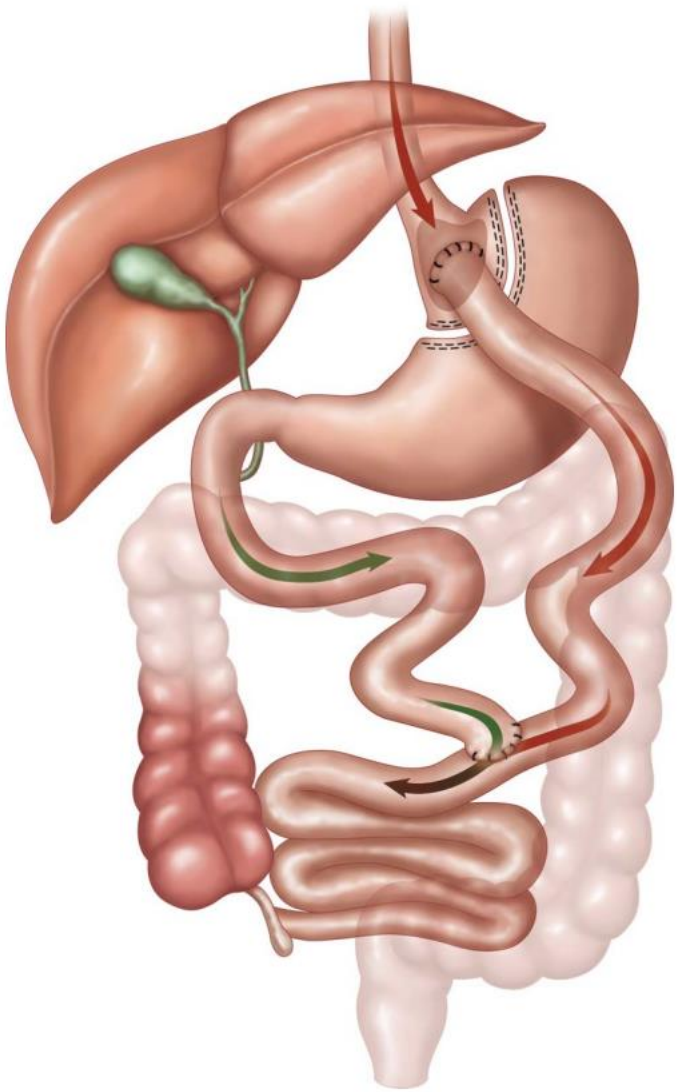
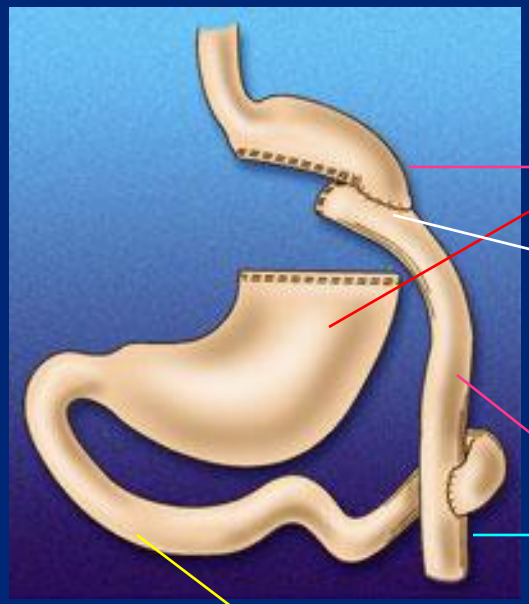


Figure 1 Roux-en-Y gastric bypass.

Gastric Bypass

how it works?



Apetite loss

Ghrelin

?

Restriction

Small pouch (30 cc)

Narrow anastomosis (1.5 cm)

Malabsorbtion

Feeding loop

100 -200 cm

Enzymatic loop

50 - 75 cm

Treatment

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:

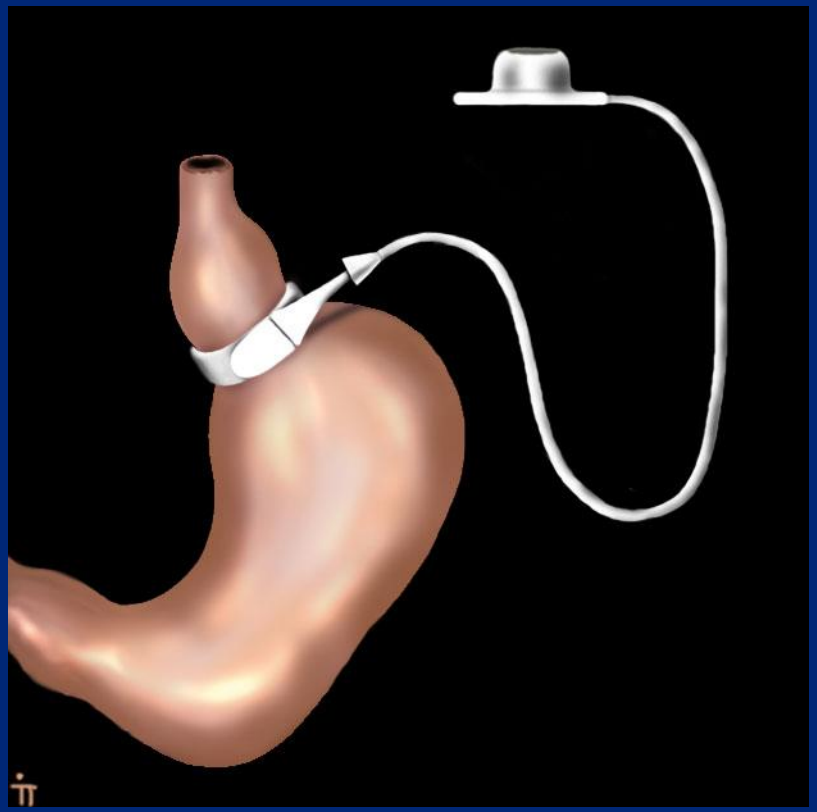
- Band too tight with gastrointestinal obstructive symptoms (e.g. dysphagia)
- Leakage of gastric contents into abdomen
- Hemorrhage
- Gastrointestinal bleeding
- Infection
- Cardiac dysrhythmias
- Atelectasis and pneumonia
- Deep vein thrombosis
- Death

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

Adjustable band

Adjustable gastric banding



Unfilled Band

Filled Band

Laparoscopic Adjustable Gastric Banding 1,014 Consecutive Cases

- Ponce, et al.

- 1014 consecutive cases
- 82% women, mean age 42, BMI 47.7 kg/m2
- **%EBWL → 3 years 62 +/-21 %**
- Slip rate 1.4% (pars flaccida) to 21% (perigastric)
- 2 cases (0.2%) erosion
- 85% follow-up

J Am Coll Surg. Vol 701, No. 4, 2005 p 529-535

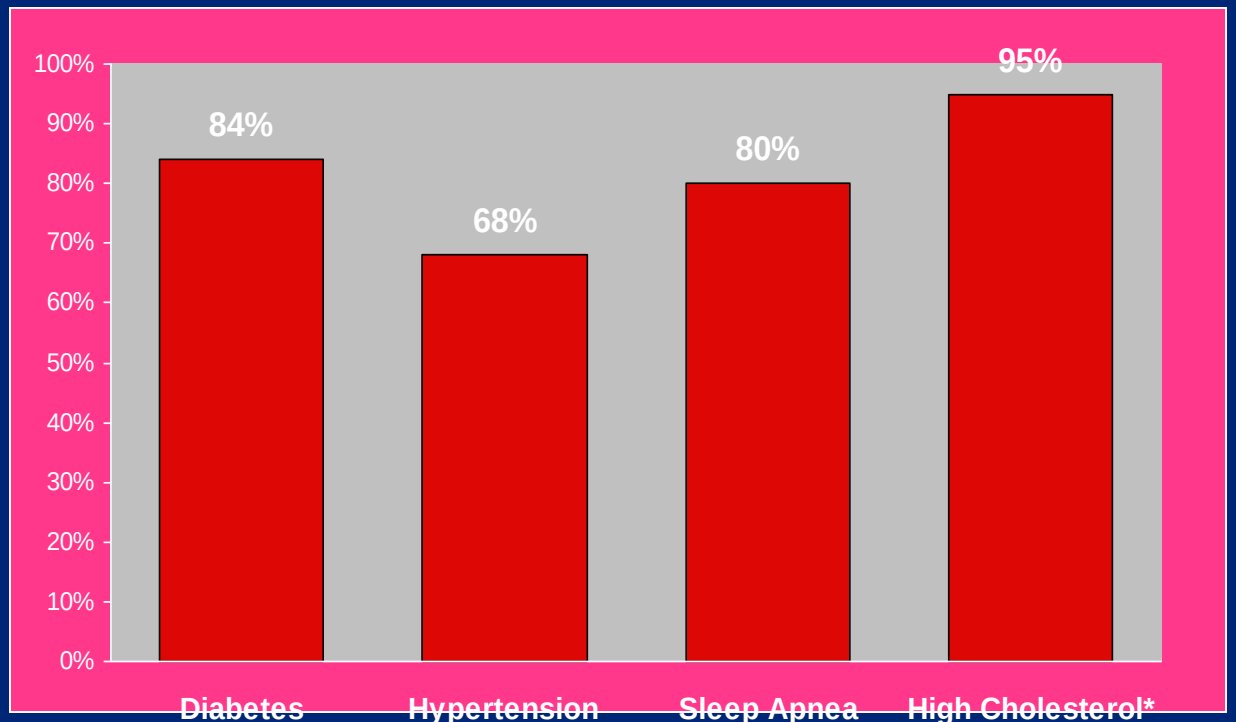
Reduction in Co-morbidities 4 years after Laparoscopic Adjustable Gastric Banding

- Frigg, et al.
- 295 patients mean BMI 45 kg/m2
- EBW 54% at 4 years

	Disappear/Improvement
– BP	58%/42%
– Diabetes	75%/8%
– Dyspnoe	85%/12%

Improvements in Comorbidities From Surgical Weight Loss*

Resolution of Co-morbidities Following Gastric Bypass Surgery



Pories, et al. Ann Surg 1995, Sugerman, et al. Ann Surg 2003, Schauer, et al. Ann Surg 2003, Rasheid, et al. Obes Surg 2003, Deitel, et al. World J Surg 1998, Buchwald, et al JAMA Oct 2004.

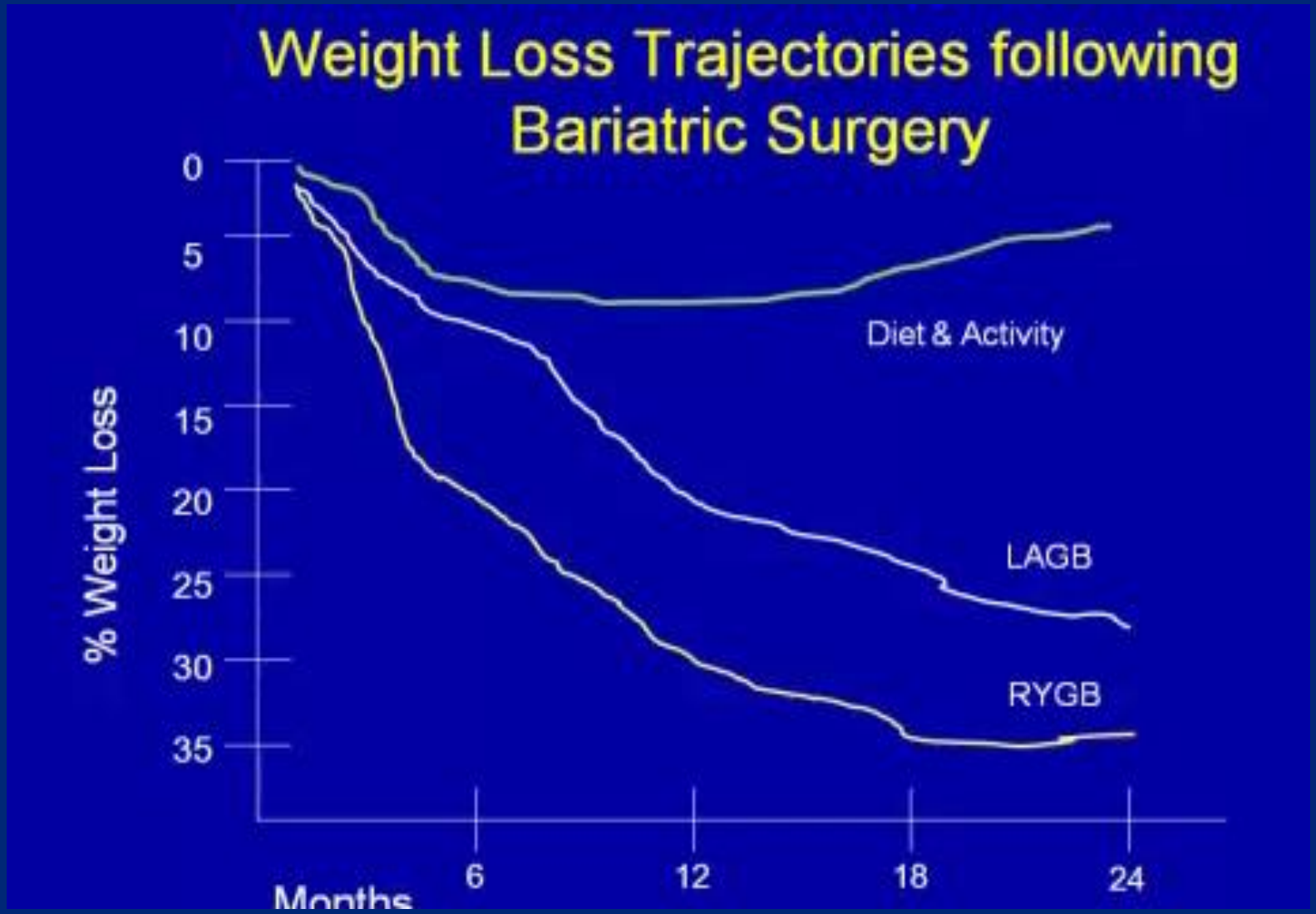
Refers to % resolution and/or improvement

Mortality in Bariatric Surgery

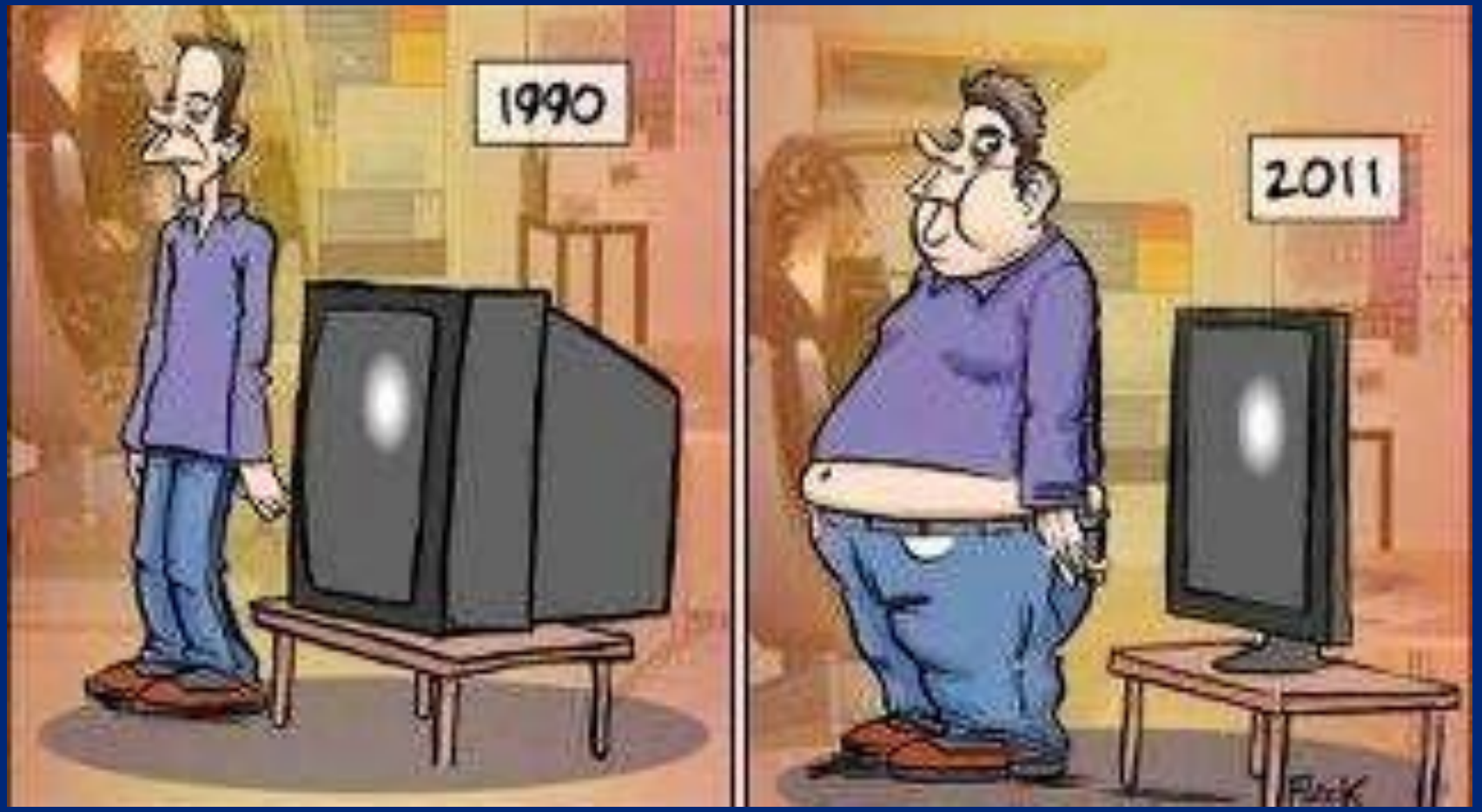
- Meta-analysis of 85,048 patients
- Buchwald H, et al. Surgery 2007: 142: 621-35

Procedure	Death up to 30 POD	Death 30 POD – 2 years
Lap band	0.1%	0%
Lap Gastric bypass	0.2%	0.1%
Open Gastric bypass	0.5%	1.1%

Bariatric Surgery




2000 v. Chr.
EVOLUTION...


1990
2011