باسمه تعالی

Recent Developments in Overweight and Obesity and Their Relevance to Prevention & Control of NCDs

تازه های اضافه وزن و چاقی در بیماری های غیر واگیر

مهر ۱۴۰۴

تنظیم: بهبود تغذیه شبکه بهداشت کوهپایه

تعریف و ارزیابی اضافه وزن و چاقی

- چاقی ⟸ وجود بافت چربی اضافه در بدن
- حالتی که درصد چربی بدن از مقادیری که سلامت در نظر گرفته شود فراتر می رود.

Body Fat Percentage Categories		
	Males % Fat	**Females % Fat**
Essential Fat	2-5%	10-13%
Average	18-24%	25-31%
Obese	25% and >	32% and >
Fitness	14-17%	21-24%
Athletes	6-13%	14-20%

تعریف و ارزیابی اضافه وزن و چاقی

Calculating BMI and Using BMI to Classify Adults

Formulas for calculating body mass index or BMI are as follows:

$$\text{BMI} = \text{weight in kilograms} \div (\text{height in meters})^2$$

To convert weight in pounds to weight in kilograms:

$$\text{pounds} \div 2.2 = \text{kilograms}$$

To convert height in inches to height in meters:

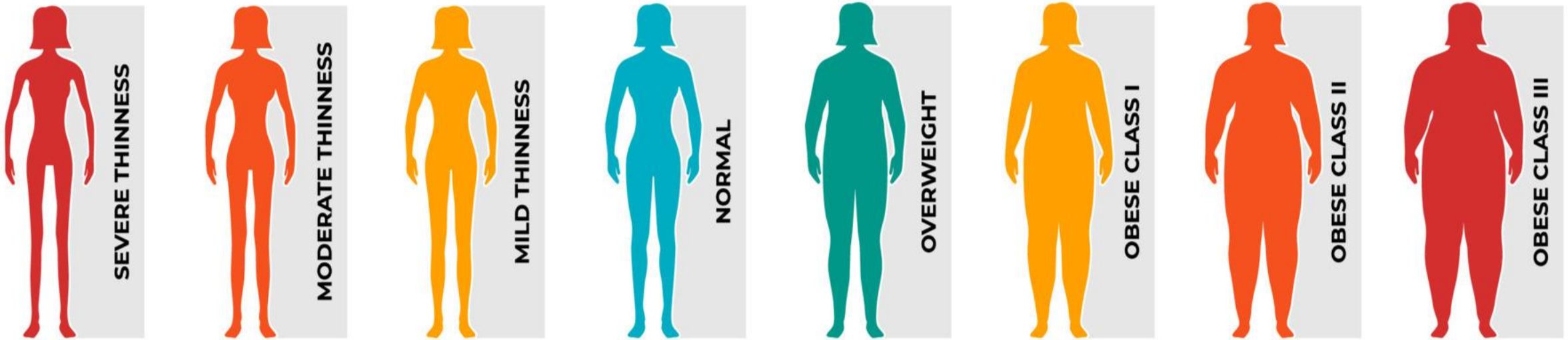
$$\text{inches} \times 0.0254 = \text{meters}$$

For those who have difficulty using the SI units of measurement, the following formula can also be used to calculate BMI using weight in pounds and height in inches:

$$\text{BMI} = (\text{weight in pounds} \times 703) \div (\text{height in inches})^2$$

- بسیاری از متخصصین تغذیه یا بالینی زمان و یا تجهیزات مورد نیاز جهت ارزیابی ترکیب بدن را در دسترس ندارند.
- BMI به عنوان راهکار بالینی روتین جهت ارزیابی وزن بکار می رود.

BODY MASS INDEX (kg/m²)



ارزیابی اضافه وزن و چاقی در کودکان و نوجوانان

Classification of Pediatric Obesity in Children and Adolescents > Age 2	
Overweight	BMI ≥ 85th Percentile but < 95th percentile
Obese	BMI ≥ 95th percentile
Extreme obesity	≥120% 95th percentile or ≥35 kg/m2

Z-score	Growth indicators			
	Length/height-for-age	Weight-for-age	Weight-for-length/height	BMI-for-age
Above 3	*See note 1*	*See note 2*	*Obese*	*Obese*
Above 2			*Overweight*	*Overweight*
Above 1			*Possible risk of overweight (See note 3)*	*Possible risk of overweight (See note 3)*
0 (median)				
Below –1				
Below –2	*Stunted (See note 4)*	*Underweight*	*Wasted*	*Wasted*
Below –3	*Severely stunted (See note 4)*	*Severely underweight (See note 5)*	*Severely wasted*	*Severely wasted*

تعریف و ارزیابی اضافه وزن و چاقی

قضاوت بالینی در تفسیر BMI

- توده عضلانی بالا ⟵ BMI میزان چربی بدن را overestimate می کند
- وجود ادم ⟵ overestimation
- تحلیل عضلانی ⟵ underestimation
- استئوپورز ⟵ underestimation
- افراد با ماسکولاریته بالا در حالی که وزن بالایی دارند، دارای درصد چربی بدن پایین می باشند.

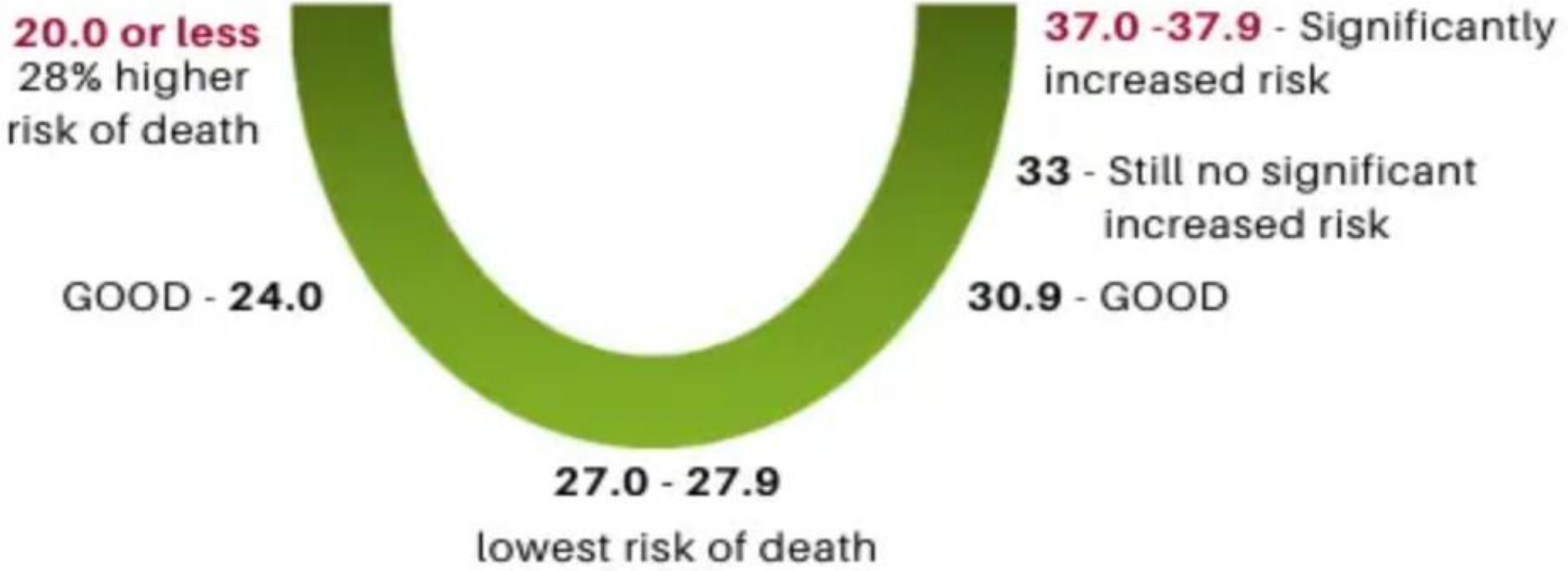
تعریف و ارزیابی اضافه وزن و چاقی

قضاوت بالینی در تفسیر BMI

- در سالمندان وجود توده عضلانی بالاتر با وضعیت بهتر سلامت همراه می باشد.
- این ارتباط در سالمندان در مقایسه با افراد جوانتر قوی تر است.
- وجود وزن بالاتر در این گروه از افراد نشان دهنده وجود توده عضلانی مناسب می باشد.

BMI & Risk of Death in Adults Age 65 and Over

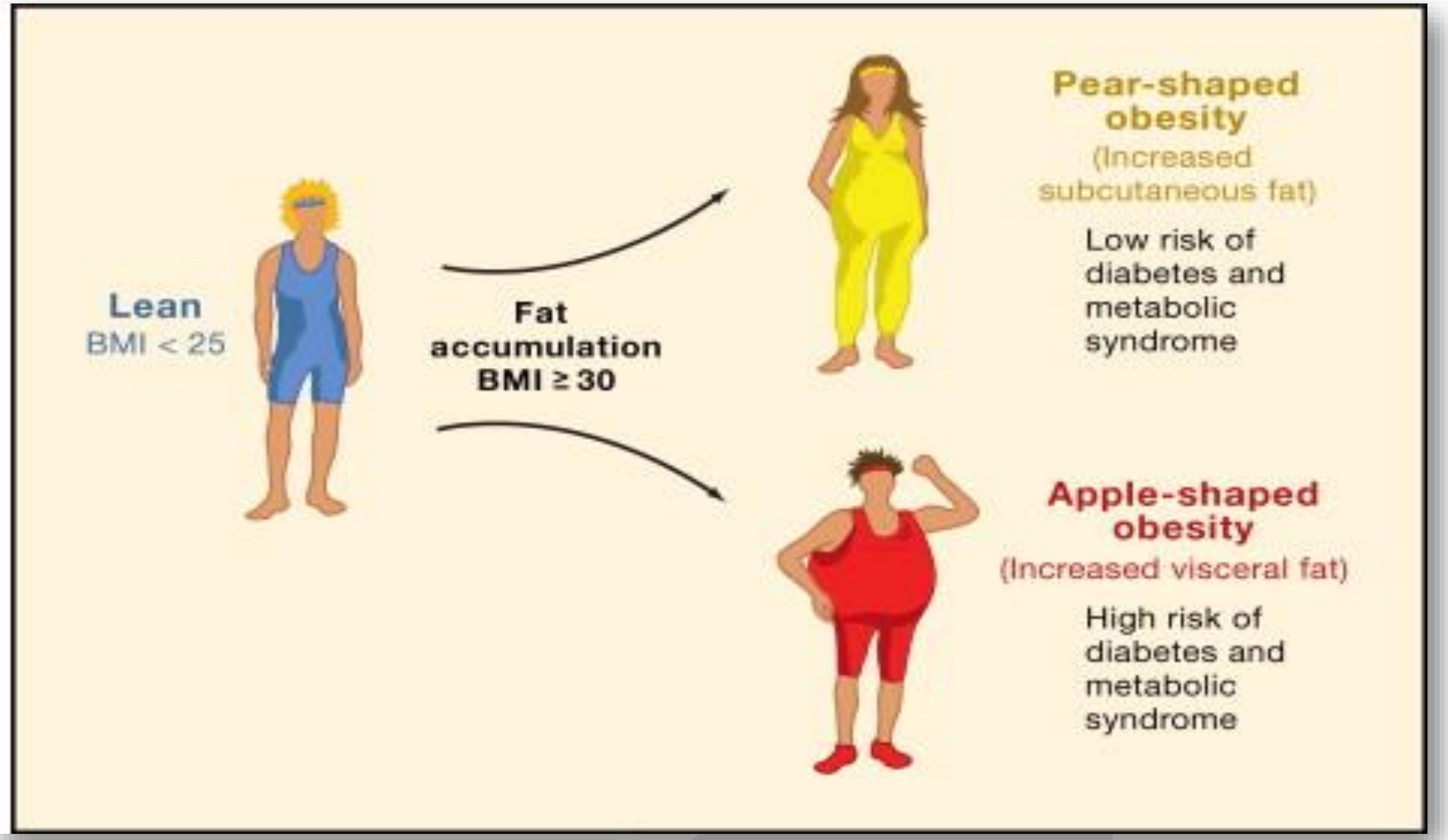
Winter, et al. BMI and All-Cause Mortality in Older Adults: A Meta-Analysis. 2014.



توزیع بافت چربی در بدن

- توجه به محل و نحوه توزیع بافت چربی در بدن به هنگام ارزیابی عوارض چاقی و اضافه وزن اهمیت دارد.
- دور کمر ⟵ معیار ضروری در تعیین عوارض چاقی
- **توزیع چربی بدن از نظر بالینی:**

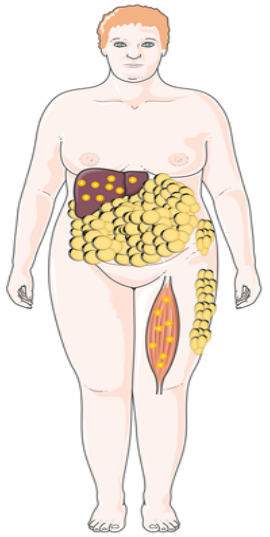
1) توزیع چربی شکمی یا مرکزی (چربی احشایی)
2) توزیع چربی در قسمت پایینی بدن (لگن و ران پا)


Lean
BMI < 25
Fat accumulation
BMI ≥ 30
Pear-shaped obesity
(Increased subcutaneous fat)
Low risk of diabetes and metabolic syndrome
Apple-shaped obesity
(Increased visceral fat)
High risk of diabetes and metabolic syndrome

توزیع بافت چربی در بدن

Table 12.3 High-Risk Waist Circumference in Adult Males and Females

Caucasian, African American, Hispanic, and Native American	
Males	>40 in (>102 cm)
Females	>35 in (>88 cm)
Asian	
Males	≥35.4 in (≥90 cm)
Females	≥31.5 in (≥80 cm)

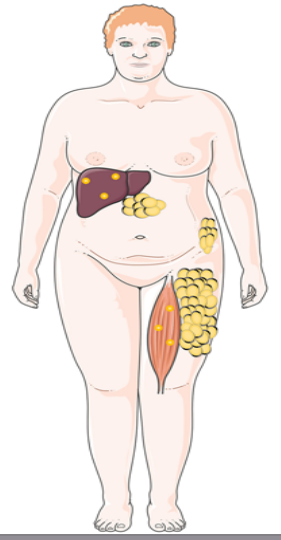


Metabolically Unhealthy Obesity

Features:
↑ Adiposity
↑ Inflammatory status
↓ Adipose tissue function
↑ Insulin resistance

Adipose distribution:
↓Subcutaneous fat
↑ Visceral fat

↓ Lipid storage capacity
↑ Hepatic fat
↑ Skeletal muscle fat

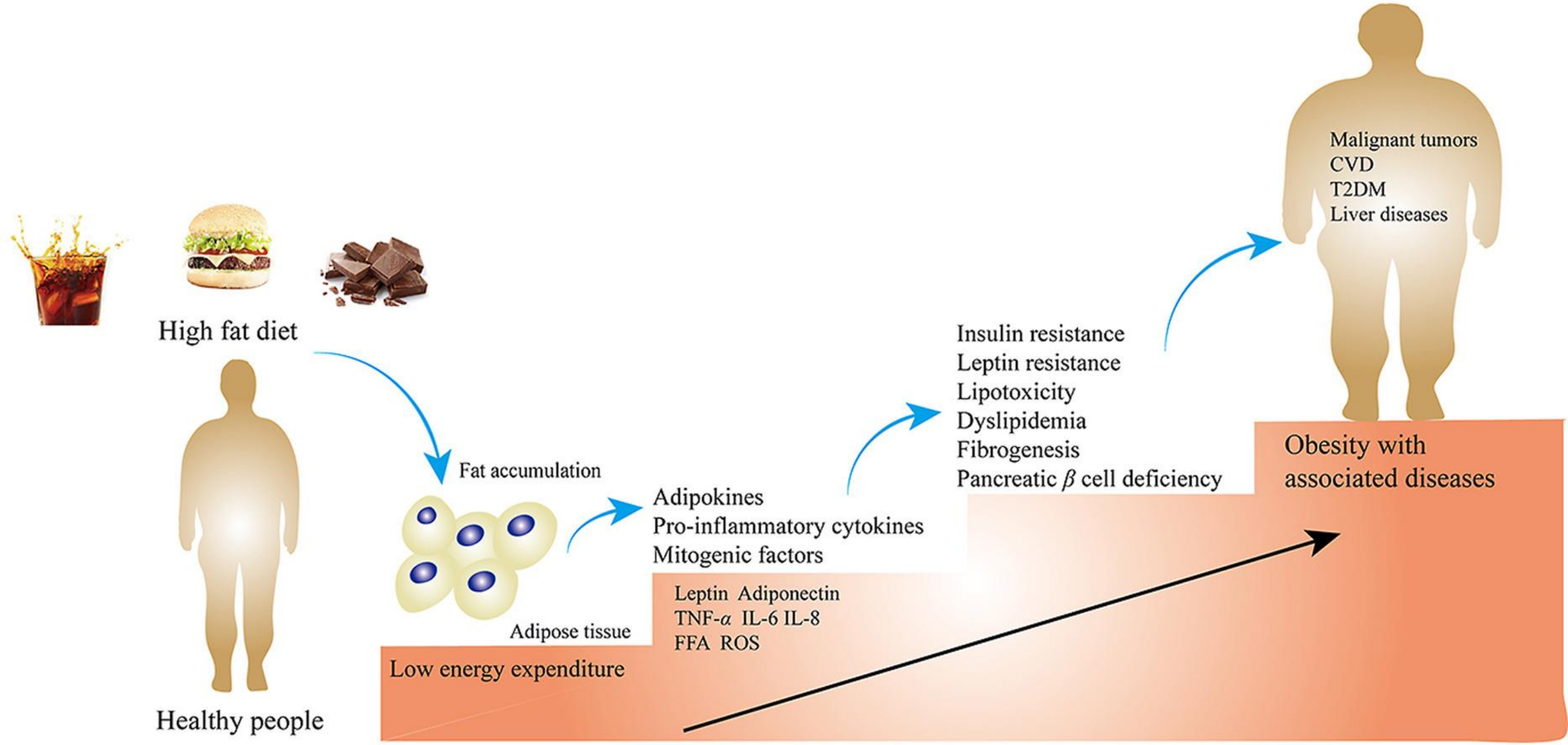


Metabolically Healthy Obesity

Features:
↑ Adiposity
↔ Inflammatory status
↔ Adipose tissue function
↑ Insulin sensitivity

Adipose distribution:
↑ Subcutaneous fat
↓ Visceral fat

↔ Lipid storage capacity


High fat diet
Healthy people
Fat accumulation
Adipose tissue
Low energy expenditure
Adipokines
Pro-inflammatory cytokines
Mitogenic factors
Leptin Adiponectin
TNF-α IL-6 IL-8
FFA ROS
Insulin resistance
Leptin resistance
Lipotoxicity
Dyslipidemia
Fibrogenesis
Pancreatic β cell deficiency
Malignant tumors
CVD
T2DM
Liver diseases
Obesity with
associated diseases


medicine
vaccine
disease
doctor
health
epidemiology
medical
infection
infectious

شیوع اضافه وزن و چاقی

- شیوع اضافه وزن در سال ۲۰۱۶ ۳۹/۸ درصد در بزرگسالان و ۱۸/۵ درصد در سنین زیر ۱۸ سال
- شیوع چاقی در سال ۲۰۱۶ ۱۳ درصد جمعیت جهان (۱۱ درصد در مردان و ۱۵ درصد در زنان)
- ۳ برابر شدن شیوع چاقی در بازه زمانی سال های ۱۹۷۵ تا ۲۰۱۶
- افزایش شیوع اضافه وزن و چاقی در کودکان و نوجوانان (۵ تا ۱۹ سال) از ۴٪ در سال ۱۹۷۵ تا ۱۸٪ در سال ۲۰۱۶
- میزان افزایش شیوع در دخترها و پسرها تقریبا به یک میزان بوده است.

Table 1.2: Global obesity trends for children, adolescents and adults by gender 2020–2035

Children and adolescents (aged 5–19 years)*

	Boys 2020	Boys 2025	Boys 2030	Boys 2035
Number with obesity (millions)	103	140	175	208
Proportion of all boys	10%	14%	17%	20%
	Girls 2020	**Girls 2025**	**Girls 2030**	**Girls 2035**
Number with obesity (millions)	72	101	135	175
Proportion of all girls	8%	10%	14%	18%

** For children and adolescents, obesity is defined using the WHO classification of +2SD above median growth reference.*

Adults (aged 20 years and over)

	Men 2020	Men 2025	Men 2030	Men 2035
Number with obesity (millions)	347	439	553	690
Proportion of all men	14%	16%	19%	23%
	Women 2020	**Women 2025**	**Women 2030**	**Women 2035**
Number with obesity (millions)	466	568	693	842
Proportion of all women	18%	21%	24%	27%

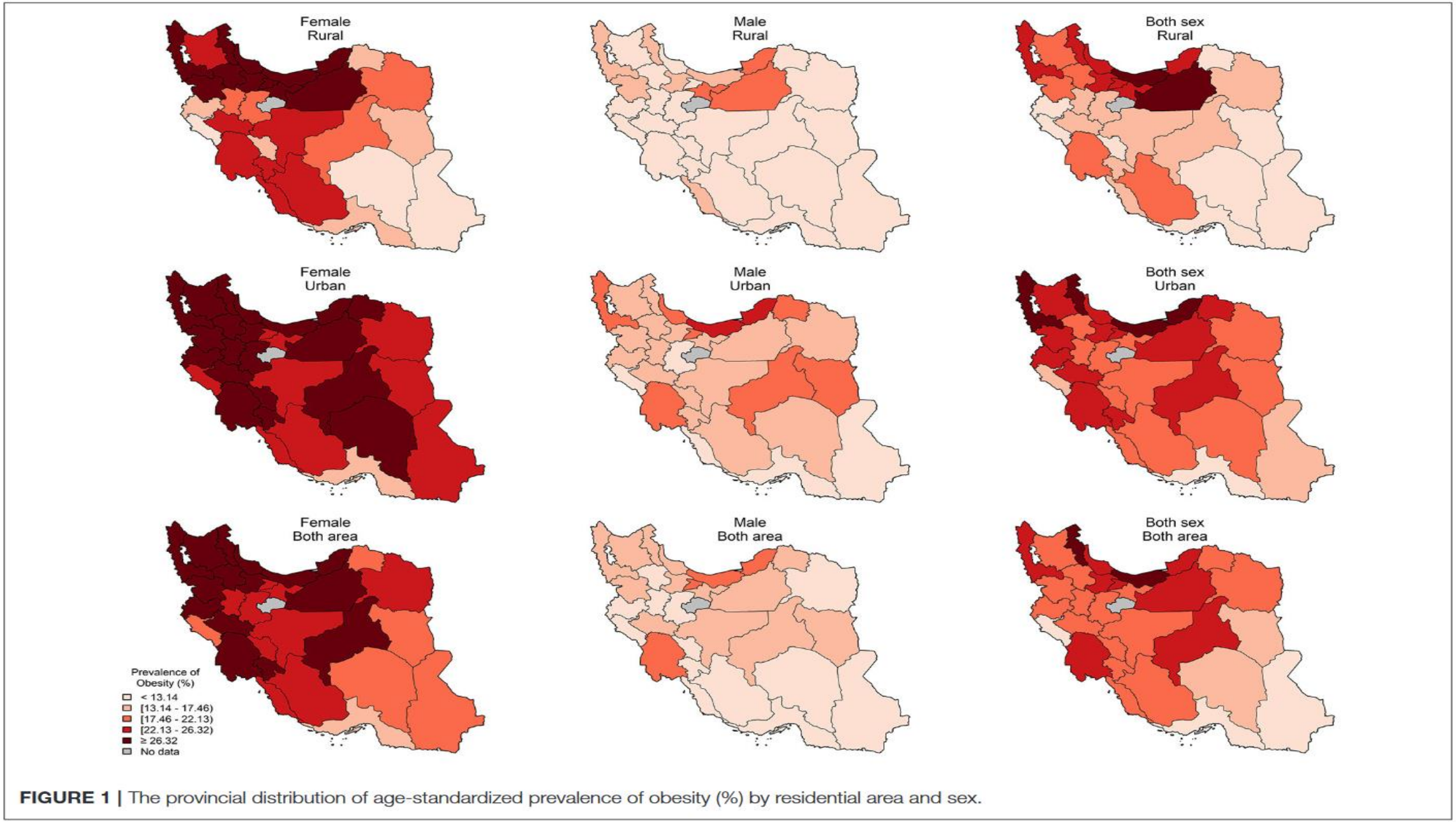
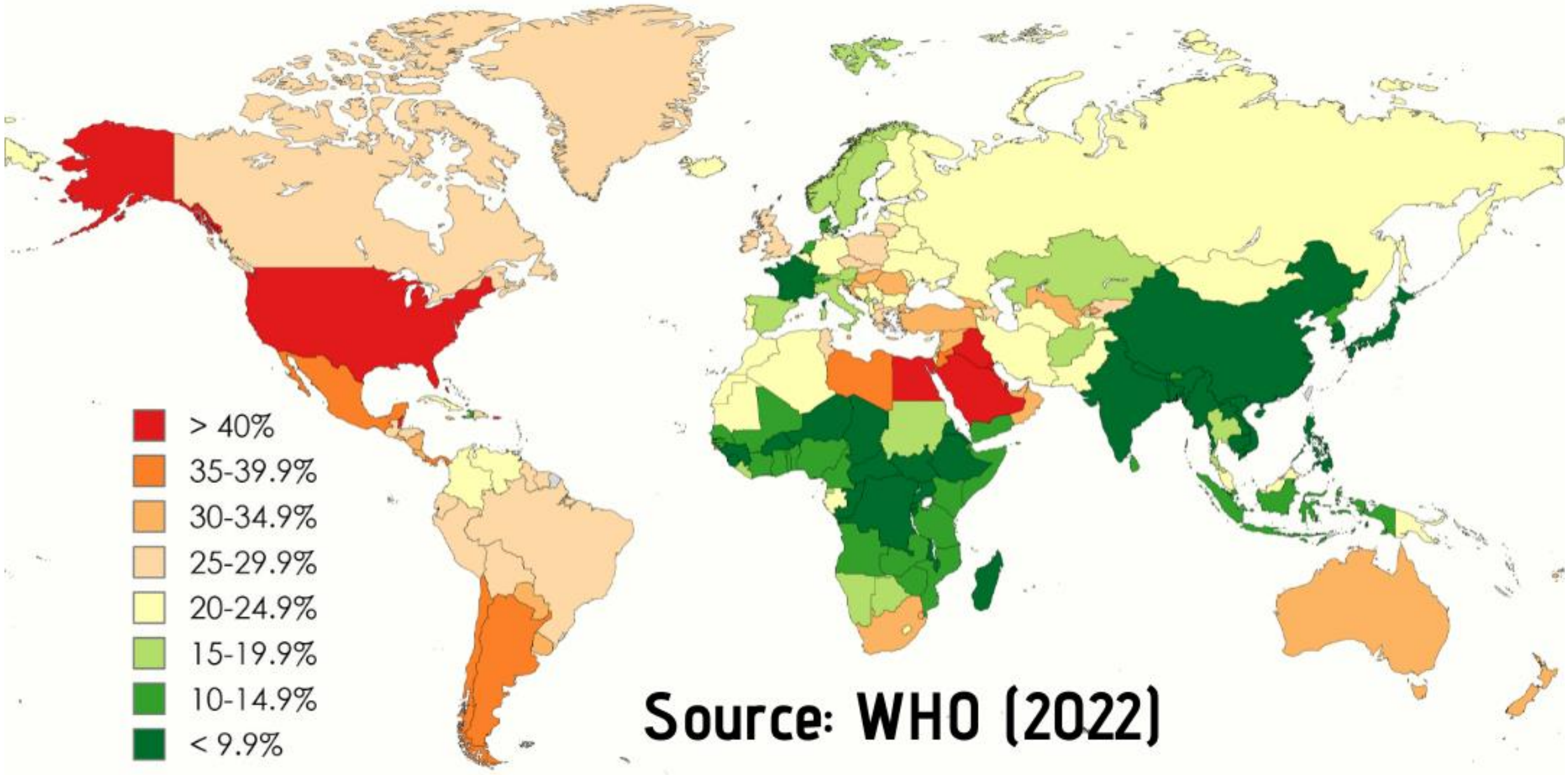


FIGURE 1 | The provincial distribution of age-standardized prevalence of obesity (%) by residential area and sex.


> 40%
35-39.9%
30-34.9%
25-29.9%
20-24.9%
15-19.9%
10-14.9%
< 9.9%
Source: WHO (2022)

Facts about overweight and obesity

In 2022, 2.5 billion adults aged 18 years and older were overweight, including over 890 million adults who were living with obesity. This corresponds to 43% of adults aged 18 years and over (43% of men and 44% of women) who were overweight; an increase from 1990, when 25% of adults aged 18 years and over were overweight. Prevalence of overweight varied by region, from 31% in the WHO South-East Asia Region and the African Region to 67% in the Region of the Americas.

About 16% of adults aged 18 years and older worldwide were obese in 2022. The worldwide prevalence of obesity more than doubled between 1990 and 2022.

شیوع اضافه وزن و چاقی

- میزان پایین تر چاقی در:
  - افراد با سطح درآمد بالاتر
  - افراد دارای تحصیلات دانشگاهی
- میزان بالاتر چاقی در:
  - زنان در مقایسه با مردان
  - در نژاد سیاه پوست و آمریکای لاتین در مقایسه با نژاد آسیایی

Prevalence in Iran (selected studies)

- BMC Public Health systematic review (Dehghani et al., 2024): overall overweight 18.4%, obesity 10.9% (note: variation by age groups).
- Meta-analysis (Abiri et al., 2023): overweight 20.1%, obesity 13.4% in Iran (pooled estimates).
- Iran faces urban–rural and sex differences; rising childhood overweight noted.
- در ایران، بررسی های ملی اخیر نشان می دهد شیوع چاقی در زنان میانسال بیشتر از سایر گروه های سنی بوده است

- Dehghani et al. (2024); Abiri et al. (2023)

رتبه بندی ده عامل خطر اول در ایران:

۱) رژیم غذایی نامطلوب (مصرف بالای قند، نمک و چربی)

۲) پرفشاری خون

۳) چاقی

۴) تحرک ناکافی

۵) سیگار

۶) دیابت

۷) آلودگی هوا

۸) کلسترول بالا

۹) خطرات شغلی

۱۰) مصرف مواد مخدر

پاتوفیزیولوژی چاقی

عوامل نوروکمیکال تنظیم کننده اشتها و دریافت غذا

- اشتها تحت تاثیر گروهی از سیگنال های عصبی است که از دهان، معده و روده کوچک به مغز (هیپوتالاموس) می رسند.
- همچنین ترشحات پانکراس و هورمون های دستگاه گوارش نیز تاثیرگذار هستند.
- **انسولین، گلوکاگون، آمیلین، کوله سیستوکینین، GLP-1، پپتید YY و گرلین**
- افزایش قند خون به دنبال غذا ← ترشح انسولین و آمیلین ← کاهش اشتها و دریافت غذا

پاتوفیزیولوژی چاقی

فعالیت متابولیک بافت چربی

- آدیپونکتین و لپتین ⟸ تنظیم بالانس انرژی و ذخیره چربی
- آدیپونکتین سیگنال وجود ظرفیت ذخیره چربی در بدن
- لپتین سیگنال ذخیره چربی زیاد
- ارتباط معکوس میان سطح آدیپونکتین و محتوای چربی بدن
- ارتباط مستقیم میان سطح لپتین و محتوای چربی بدن
- لپتین با تاثیر بر هیپوتالاموس دریافت غذا را مهار می کند.
- در چاقی مقاومت به لپتین وجود دارد که باعث افزایش گرسنگی و کاهش هزینه انرژی و نهایتا افزایش دریافت غذا می شود.

افزایش توده بافت چربی از دو مسیر رخ می دهد:

- افزایش سایز آدیپوسیت های بالغ (هایپرتروفی) در اثر تجمع TG
- افزایش تعداد آدیپوسیت ها (هایپرپلازی)
- در اضافه وزن و چاقی متوسط ← هایپرتروفی که با کاهش وزن کاهش می یابد.
- در چاقی شدید (BMI بیشتر و مساوی از ۴۰) ← هایپریلازی (افزایش تعداد سلولهای چربی)

پروتیین هایی که در تنظیم وزن نقش دارند:

آدیپونکتین	اثرات کمی بر سیری دارد.
آپلین (Apelin)	احتمالا باعث کاهش اشتها می شود. داده های اندکی در دسترس است.
CCL2	مشخص نیست.
لپتین	باعث سیری می شود. در چاقی: مقاومت به لپتین در هیپوتالاموس وجود دارد.
لیپوکالین-۲	مشخص نیست.
رزیستین	احتمالا باعث سیری می شود.
رتینول بایندینگ پروتیین-۴	مشخص نیست.
ویسفاتین	احتمالا باعث سیری می شود. داده ها متناقض هستند.
آمیلین	احتمالا باعث کاهش اشتها می شود. باعث افزایش هزینه انرژی می شود.
گرلین	باعث افزایش اشتها می شود.
انسولین	احتمالا باعث کاهش اشتها می شود. باعث افزایش هزینه انرژی می شود.
اینترلوکین-۱	احتمالا باعث کاهش اشتها می شود.
اینترلوکین-۶	مشخص نیست. احتمالا در کاشکسی باعث کاهش اشتها می شود.
اینترلوکین-۱۰	مشخص نیست.
تومور نکروزیس آلفا	احتمالا باعث کاهش اشتها می شود. پاسخ کاشکسی را تعدیل می کند.

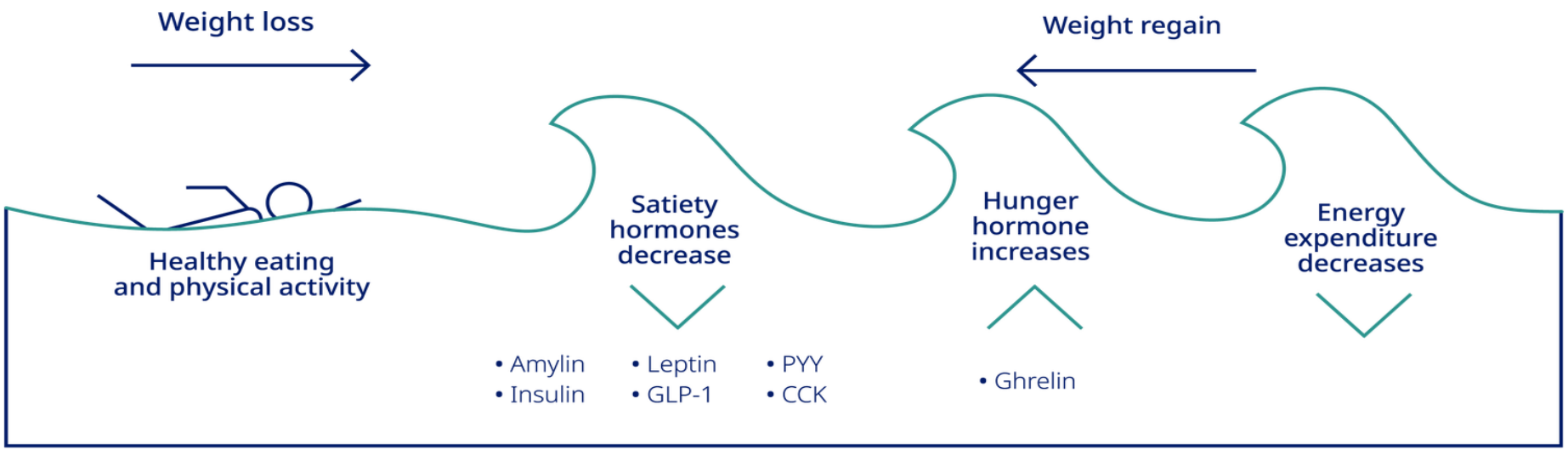
افراد دارای اضافه وزن یا چاقی متوسط در کاهش وزن و حفظ وزن کاهش یافته موفق تر خواهند بود (فقط هیپرتروفی).

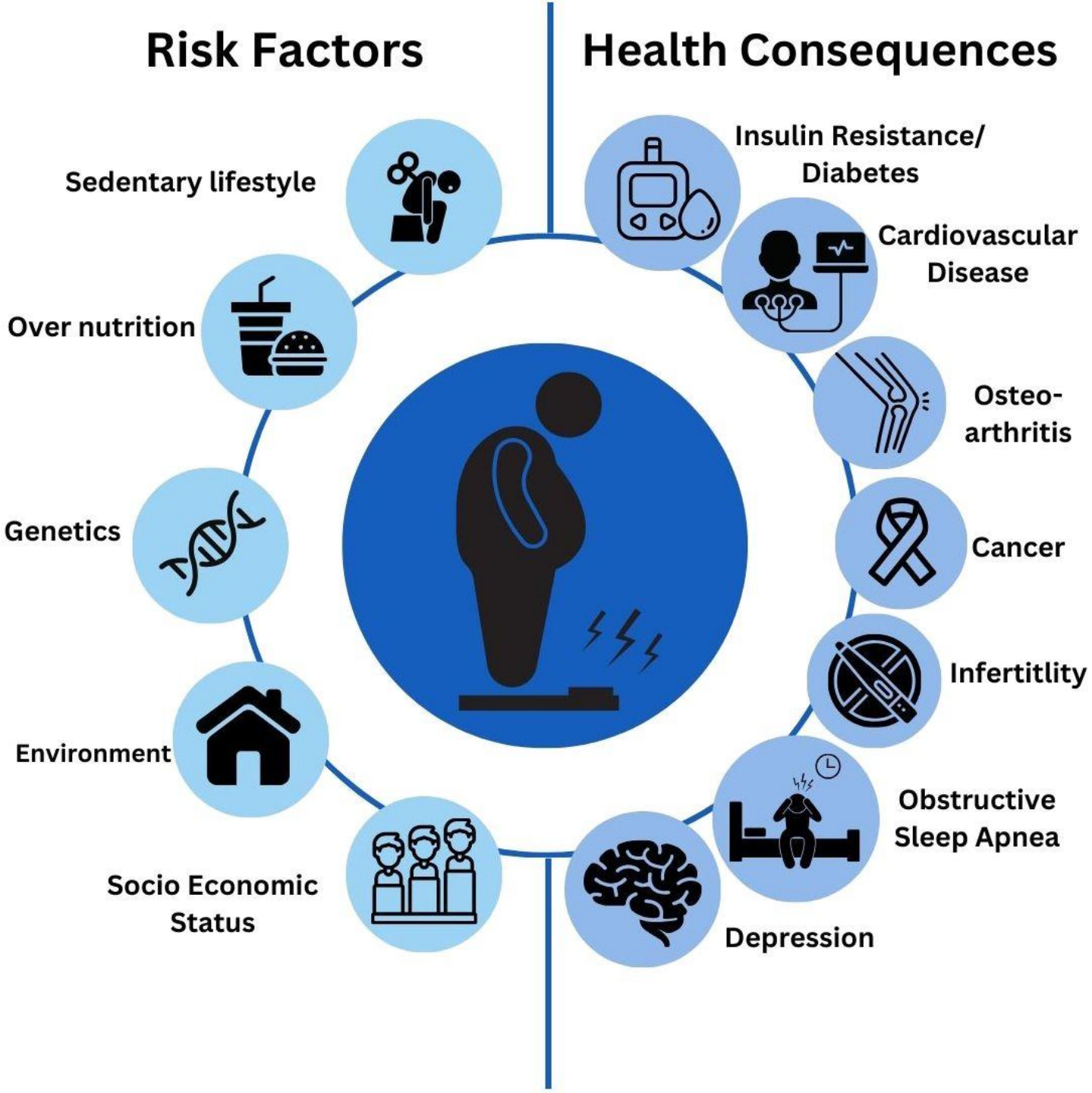
در صورت وجود هیپرتروفی و هیپرپلازی میزان موفقیت برنامه کاهش وزن بشدت کاهش می یابد.

کاهش انرژی دریافتی و از دست دادن توده چربی بدن عمدتا باعث تحریک محرکهای هورمونی و عصبی اشتهاآور می شودکه نهایتا با افزایش اشتها و کاهش هزینه انرژی (Resting Energy Expenditure) همراه است.

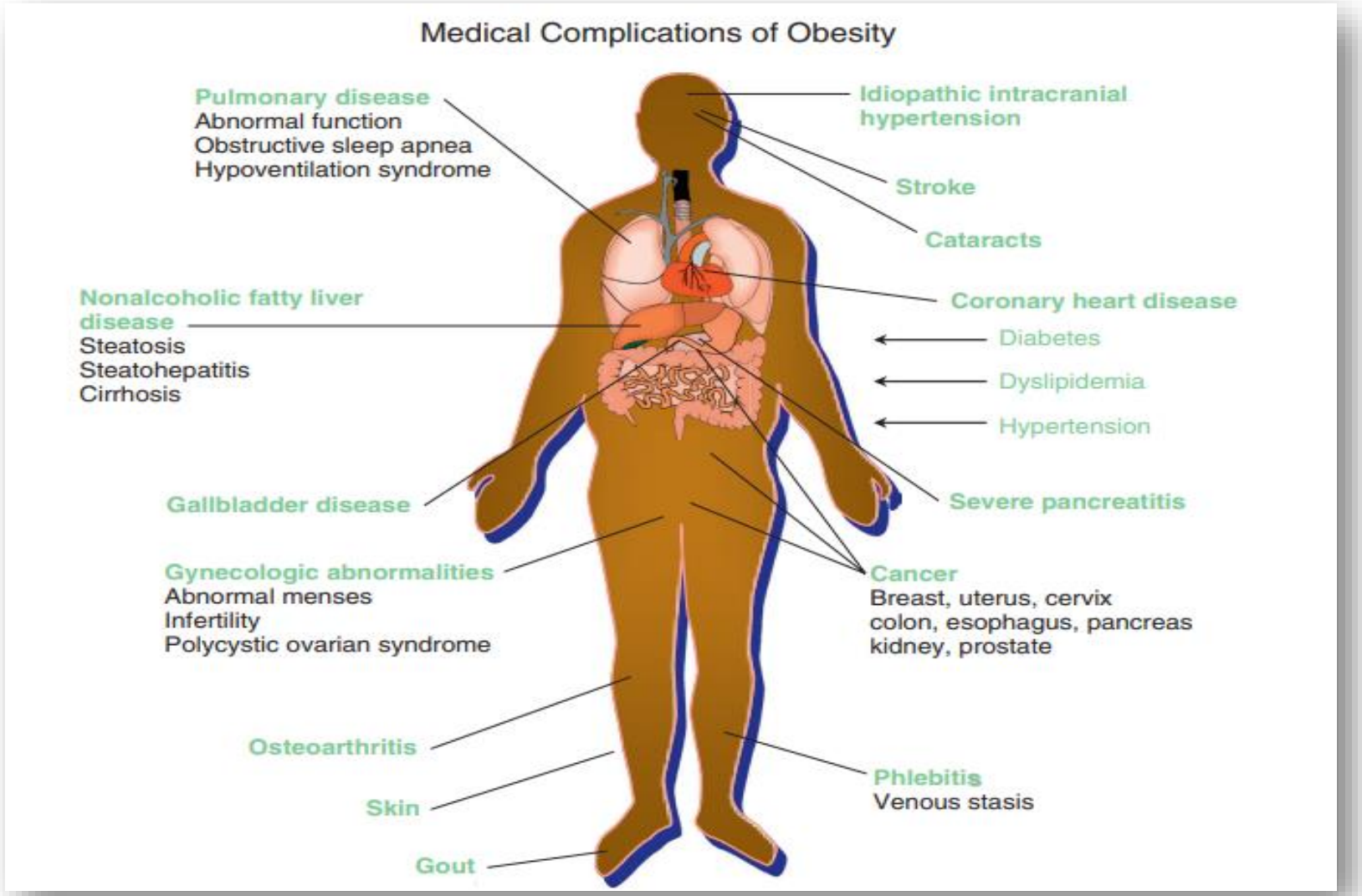
افزایش انرژی دریافتی و افزایش توده چربی عمدتا باعث افزایش محرکهای کاهش اشتها و نهایتا کاهش اشتها و افزایش هزینه انرژی می شود.

- A decrease in energy intake and loss of body fat mass typically result in **orexigenic** neural and hormonal stimuli that lead to increased appetite and decreased REE.
- Modest increases in energy intake and increased body fat mass typically result in **anorexigenic** stimuli that lead to decreased appetite and an increase in energy expenditure**.**




Risk Factors
Health Consequences
Sedentary lifestyle
Over nutrition
Genetics
Environment
Socio Economic Status
Insulin Resistance/ Diabetes
Cardiovascular Disease
Osteo-arthritis
Cancer
Infertitlity
Obstructive Sleep Apnea
Depression

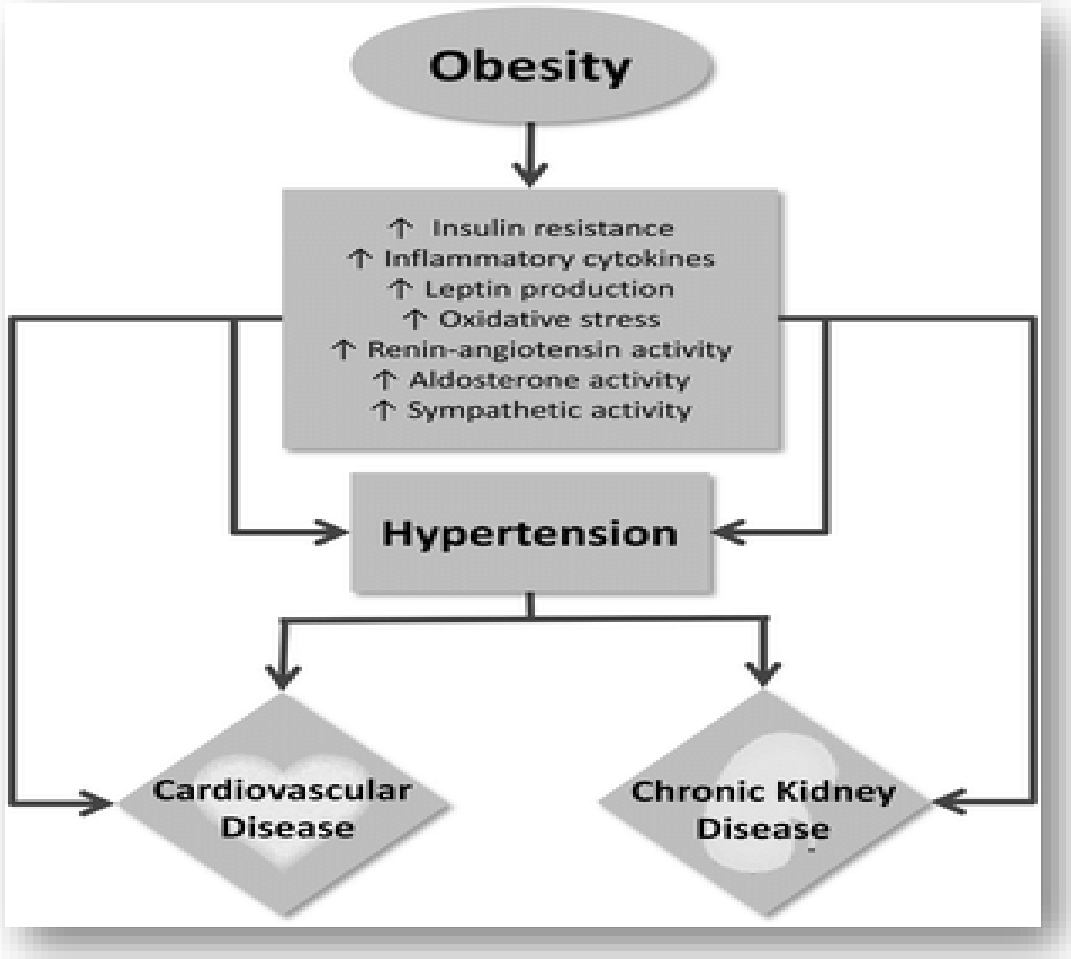
عوارض چاقی


Medical Complications of Obesity
Pulmonary disease
Abnormal function
Obstructive sleep apnea
Hypoventilation syndrome
Idiopathic intracranial hypertension
Stroke
Cataracts
Coronary heart disease
Diabetes
Dyslipidemia
Hypertension
Nonalcoholic fatty liver disease
Steatosis
Steatohepatitis
Cirrhosis
Gallbladder disease
Severe pancreatitis
Gynecologic abnormalities
Abnormal menses
Infertility
Polycystic ovarian syndrome
Cancer
Breast, uterus, cervix
colon, esophagus, pancreas
kidney, prostate
Osteoarthritis
Skin
Gout
Phlebitis
Venous stasis

عوارض چاقی


MIND HELP
Psychological Disorders Associated With Obesity
1
Major depression
Depression symptoms correlate with the onset of obesity.
2
Anxiety
Hurtful judgements related to obesity causes anxious thoughts.
3
Bipolar Disoder
People with bipolar disorder use food as a coping technique.
MINDJOURNAL

عوارض چاقی



- دیابت تیپ دو
- هایپرتانسیون
- دیس لیپیدمی
- اختلالات کبدی صفراوی
- کانسر
- اختلالات باروری

عوارض چاقی

Premature Death

- An estimated 300,000 deaths per year in the United States may be attributable to obesity.
- The risk of death rises with increasing weight.
- Even moderate weight excess (10–20 pounds for a person of average height) increases the risk of death, particularly among adults aged 30–64 years.
- Individuals who are obese (BMI >30 kg/m^2) have a 50%–100% increased risk of premature death from all causes, compared to individuals in the healthy weight range (BMI 18.5–24.9 kg/m^2).

Heart Disease

- The incidence of heart disease (myocardial infarction, congestive heart failure, sudden cardiac death, angina, and abnormal heart rhythm) is increased in persons who are overweight or obese (BMI >25 kg/m^2).
- High blood pressure is twice as common in adults who are obese as in those who are at a healthy weight.
- Obesity is associated with elevated serum triglycerides and decreased serum HDL-cholesterol.

Diabetes

- A weight gain of 11–18 pounds increases a person's risk of developing type 2 diabetes to twice that of individuals who have not gained weight.
- Over 80% of people with type 2 diabetes are overweight or obese.

Cancer

- Overweight and obesity are associated with an increased risk of some types of cancer including endometrial, colon, gallbladder, prostate, kidney, and postmenopausal breast cancer.
- Women gaining more than 20 pounds from age 18 to midlife double their risk of postmenopausal breast cancer, compared to women whose weight remains stable.

Breathing Problems

- Sleep apnea is more common in obese persons.
- Obesity is associated with a higher prevalence of asthma.

عوارض چاقی

Arthritis

- For every 2-pound increase in weight, the risk of developing arthritis is increased by 9%–13%.
- Symptoms of arthritis can improve with weight loss.

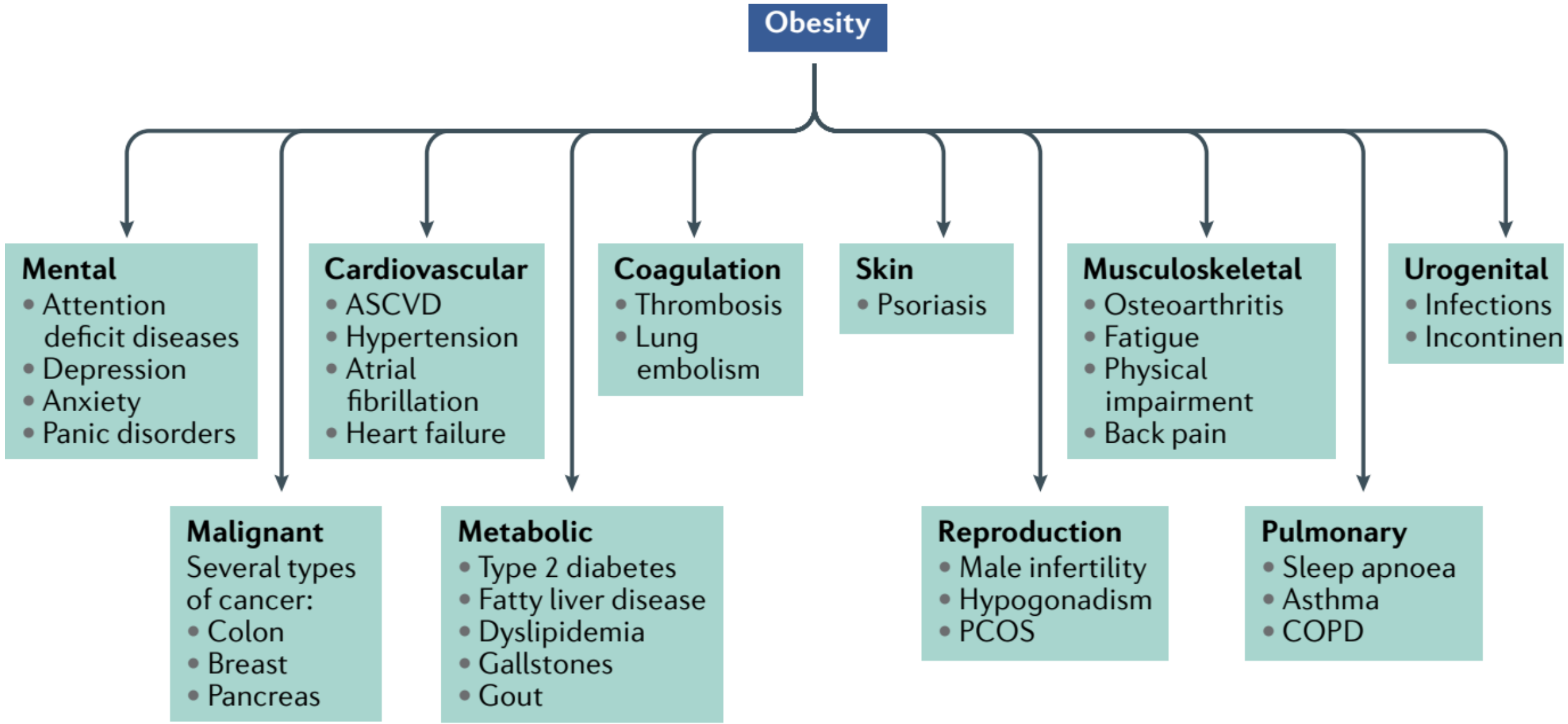
Reproductive Complications

- Obesity is associated with increased risk of menstrual abnormalities and polycystic ovarian syndrome (PCOS) in females and reduced levels of testosterone, increased levels of estrogen, and gynecomastia (enlarged mammary glands) in males.
- Obesity during pregnancy is associated with an increased risk of fetal and maternal death and increases the risk of maternal high blood pressure tenfold.
- In addition to many other complications, women who are obese during pregnancy are more likely to have gestational diabetes and problems with labor and delivery.
- Infants born to women who are obese during pregnancy are more likely to have high birth weights and, therefore, are more likely to be delivered by Cesarean section and experience hypoglycemia, which can be associated with brain damage and seizures.
- Obesity during pregnancy is associated with an increased risk of birth defects, particularly neural tube defects such as spina bifida.
- Obesity in premenopausal women is associated with irregular menstrual cycles and infertility.

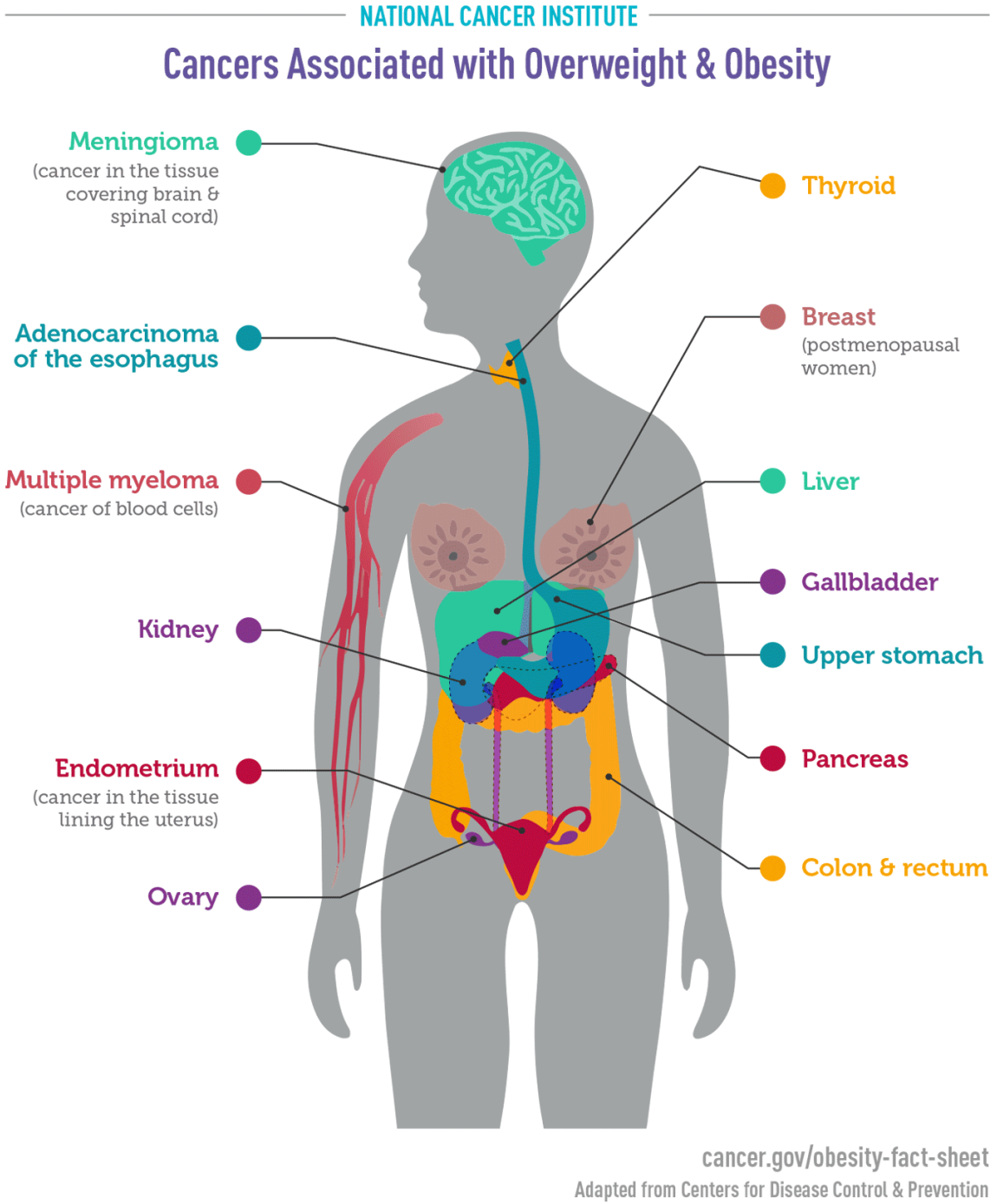
Children and Adolescents

- The most immediate consequence of overweight, as perceived by children themselves, is social discrimination.
- Risk factors for heart disease, such as hyperlipidemia and hypertension, occur more frequently in overweight and obese individuals than those in the healthy weight range.
- The prevalence of type 2 diabetes, often considered a disease primarily affecting adults, has increased dramatically in children and adolescents. Overweight and obesity increase the risk of type 2 diabetes.
- Overweight adolescents have a 70% chance of becoming overweight or obese as adults. This increases to 80% if one or more parent is overweight or obese.

- کودکان چاق در بزرگسالی شانس بیشتری برای ابتلا به دیابت نوع ۲، بیماری های قلبی عروقی، سرطان کولون، سرطان پستان و بیماری های مفصلی استخوانی دارند.
- استمرار چاقي كودكي
- كودك 6 ساله مبتلا به چاقی در بزرگسالي 25% شانس چاق شدن دارد.
- كودك 12 ساله مبتلا به چاقی در بزرگسالي 75% شانس چاق شدن دارد.
- نوجوانان دچار اضافه وزن، 70% شانس اضافه وزن در بزرگسالي دارند.
- اگر يكي يا هردوي والدين چاق باشند، اين شانس به 80% مي رسد.
- در حدود 50% زنان و مردان 64-15 ساله كشور دچار اضافه وزن و چاقی هستند.


Obesity
Mental
• Attention deficit diseases
• Depression
• Anxiety
• Panic disorders
Cardiovascular
• ASCVD
• Hypertension
• Atrial fibrillation
• Heart failure
Coagulation
• Thrombosis
• Lung embolism
Skin
• Psoriasis
Musculoskeletal
• Osteoarthritis
• Fatigue
• Physical impairment
• Back pain
Urogenital
• Infections
• Incontinen
Malignant
Several types of cancer:
• Colon
• Breast
• Pancreas
Metabolic
• Type 2 diabetes
• Fatty liver disease
• Dyslipidemia
• Gallstones
• Gout
Reproduction
• Male infertility
• Hypogonadism
• PCOS
Pulmonary
• Sleep apnoea
• Asthma
• COPD

What is known about the relationship between overweight and obesity and CANCER?



NIH NATIONAL CANCER INSTITUTE

- شواهد اپیدمیولوژیک نشان داده‌اند که افراد دارای اضافه وزن و چاقی در مقایسه با افراد با وزن طبیعی، خطر بیشتری برای بستری، نیاز به ونتیلاتور، و مرگ ناشی از کووید-۱۹ دارند. مکانیسم های احتمالی شامل التهاب مزمن، اختلال عملکرد ریوی و مقاومت به انسولین است.


The Struggle Over the Millenia to
Eliminate Arduous Effort Could Not
Foresee Modern Technology

Overweight and obesity management: the potential care journey

Person joins the pathway

This could be via...

- GP
- Secondary care
- Social worker
- Employment
- Place of education
- Community
- Self-referral

Progression through the steps only happens as needed

A person's choices and journey may vary depending on local or regional availability of services and interventions

Information and support

- Explain how a person's circumstances may affect their weight loss journey
- Recommend suitable **behaviour changes** (see below) to use throughout their care journey
- Explain the benefits
- Support the person's choices
- Encourage their progress

Referral and creating a personal care plan

Also see the visual summary on principles of care

- Discuss all options and combinations available
- Advise the person of what may be the best choice of options for them
- Support the person's decisions on **interventions**
- Set agreed, suitable goals
- Involve **family and friends**, if appropriate
- Remember it is the **person's choice**

Intervention choices

- Behaviour change support
- Diet
- Medicines
- Physical activity
- Surgery
- Psycho-logical support

See the guideline section on medicines for overweight or obesity for details of how and when the different medicine options can be used

Monitor and review

- Review a person's care plan regularly
- Change, add, remove or adjust interventions as appropriate
- Change or adjust goals as needed
- Keep encouraging the person's progress

Behaviour changes

- Identify behaviours that undermine a person's efforts to manage their weight
- Encourage positive behaviours
- Encourage healthy eating
- Encourage regular exercise
- Encourage stopping smoking and reducing consumption of alcoholic or sugary drinks

Additional behaviour changes for children and young people

- Create a supportive environment
- Address family behaviours that may contribute to weight gain or retention
- Encourage active play
- Act as a positive role model
- Encourage reducing consumption of sugary drinks and sweets
- Encourage getting enough sleep

NICE National Institute for Health and Care Excellence

This diagram covers only part of the guideline content. For full details, see NG246 Overweight and obesity management.

 Last updated January 2025. ISBN 978-1-4731-6742-1.

BEHAVIORAL/LIFESTYLE THERAPY FOR PEOPLE WITH OBESITY/ABCD

Consider social determinants of health, including access to care and specialists, nutritious food, safe spaces for physical activity, and sleep when developing a treatment plan.

NUTRITION

Focus on a reduced-calorie diet while maintaining diet quality.

- **Adopt healthful meal patterns (eg, Mediterranean diet).**
- **Prioritize minimally processed, nutrient-dense foods.**
- **Limit energy-dense foods and beverages.**
- **Ensure adequate nutrient intake of protein, fiber, iron, calcium, and other micronutrients with significant weight loss.**

Individualized energy plans may include:

- **Macronutrient-based strategies**
- **Meal replacements**
- **Strategic fasting**
- **Personalized calorie targets**

Consider referral to a registered dietitian. Combine evidence-based dietary approaches to suit individual and cultural preferences.

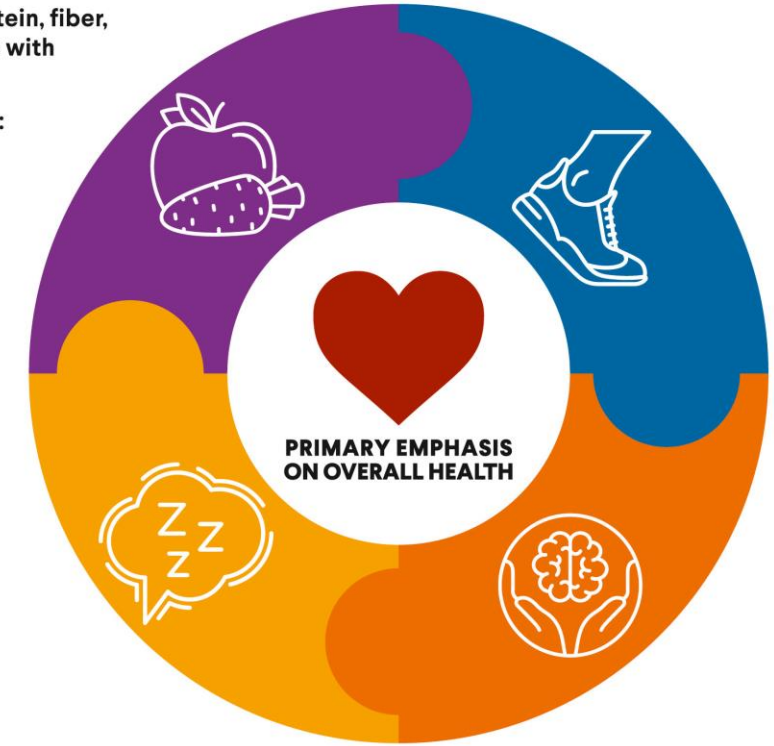
SLEEP

Screen for sleep disorders.

Promote good sleep hygiene.

Optimize sleep quality and duration.

Refer for polysomnography or sleep medicine evaluation if needed.



PHYSICAL ACTIVITY

Tailor to patient preferences and functional ability.

Incorporate:

- **Aerobic activity**
- **Resistance training***
- **Reduced sedentary behavior**

Gradually increase intensity and volume as tolerated.

Refer to an exercise specialist if needed.
**Resistance training helps preserve lean mass during significant weight loss.*

BEHAVIORAL THERAPY

Screen for anxiety, depression, eating disorders, and internalized weight bias.

Support behavioral adherence with:

- **Goal setting, self-monitoring, and problem-solving**
- **Cognitive behavioral therapy**
- **Stress reduction techniques**

Refer for psychological testing or behavioral health support as needed.

Abbreviation: **ABCD**, adiposity-based chronic disease

Algorithm Figure 7 - Behavioral/Lifestyle Therapy

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Conclusion

- Obesity = chronic, multifactorial disease
- Latest strategies: dietary, behavioral, pharmacological, surgical
- Future = precision, personalization, prevention

جمع بندی:

- پیشگیری و کنترل اضافه وزن و چاقی یکی از اولویت های نظام سلامت و مهمترین اقدام برای کاهش شیوع بیماری های غیر واگیر در کشور است.
- چاقی مشکلی اجتماعی و چندعلیتی است (Multifactorial).
- همکاری همه بخش های ذیربط برای اصلاح شیوه زندگی، ایجاد محیط زندگی سالم و ترویج و فرهنگ سازی تغذیه درست و ترویج الگوی غذایی سالم ضروری است

ویژه پزشکان

Adiposity-Based Chronic Disease

Causes of Adipose Tissue Expansion

- Genetic
- Environmental
- Psychological
- Behavioral
- Iatrogenic
- Comorbidities

Primordial and Primary Prevention

*Terminology used by the Lancet Commission on Obesity

Obesity

*Preclinical Obesity	*Clinical Obesity	*Obesity-Related Diseases
no complications, preserved quality of life	obesity complications: symptoms, organ involvement	eg, type 2 diabetes, cancer, MASH
AACE Stage 1	**AACE Stage 2 or 3**	

Treatment to prevent and ameliorate obesity-related complications and diseases

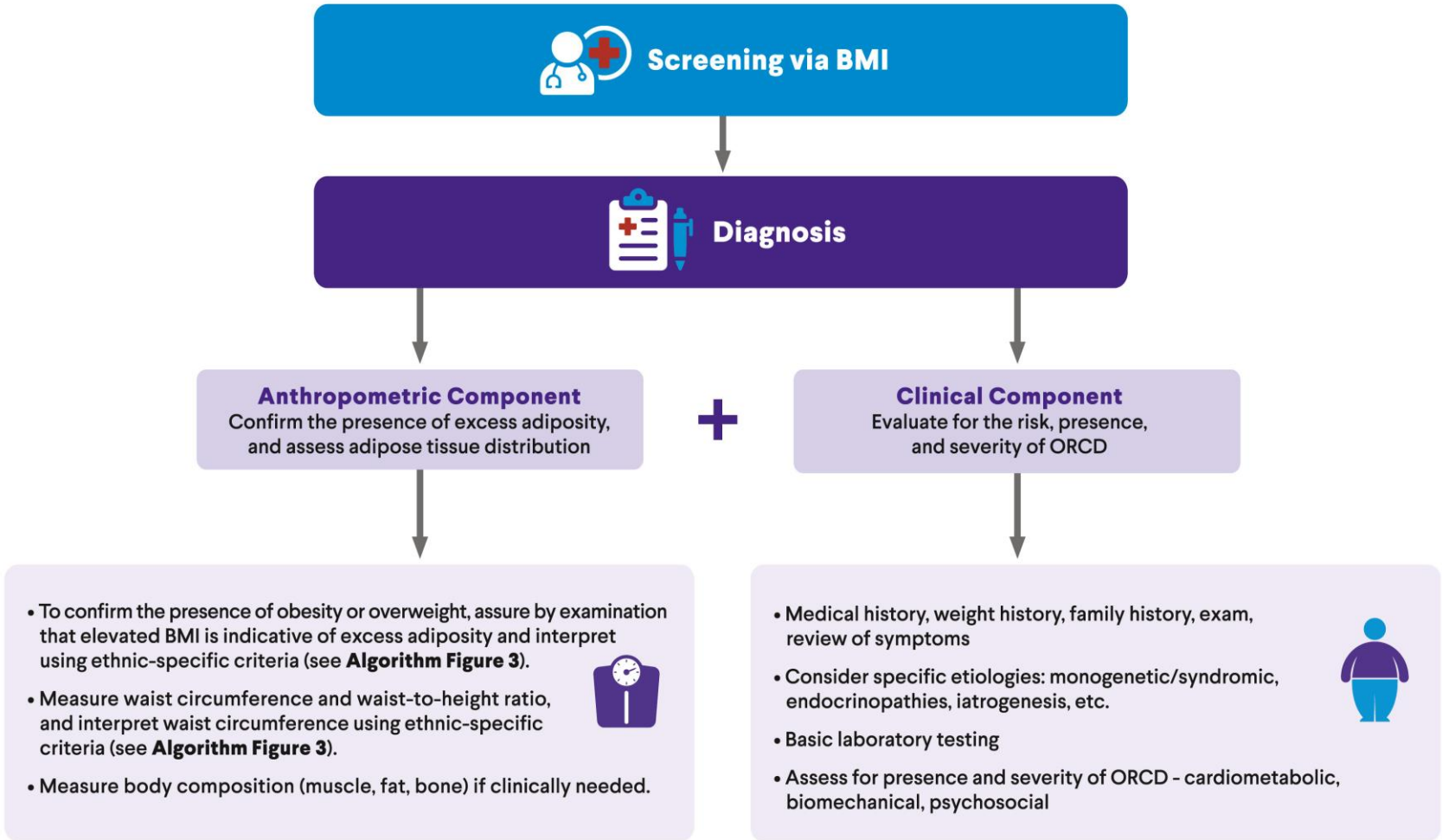
secondary prevention, risk reduction	tertiary prevention, complication-centric care

Examples of ORCD that May Be Detected in the Clinical Evaluation of ABCD

ABCD Stage 1	ABCD Stage 2 or 3	
No ORCD identified following intake evaluation	**Obesity Complications***	**Obesity-Related Diseases***
	• OA (knee, hip) • OSA • Obesity hypoventilation syndrome • Lymphedema • Stress urinary incontinence • GERD • Prediabetes and metabolic syndrome • MASLD • Obesity glomerulopathy, CKD • HFpEF • ASCVD • Thromboembolism • Idiopathic intracranial hypertension • Disability limiting activities of daily living	• T2D • MASH • HFrEF • Atrial fibrillation • Certain cancers • Cholelithiasis, cholecystitis • Asthma • Depression, anxiety • Internalized weight bias • Stigmatization • Disordered eating • Cognitive decline, dementia • Inflammatory skin diseases • Intertrigo

*There can be overlap between complications and related diseases depending on the pathophysical role of obesity in individual patients. See Box A for definitions.

CARE MODEL FOR PEOPLE WITH OBESITY/ABCD: SCREENING AND DIAGNOSIS



Abbreviations: **ABCD**, adiposity-based chronic disease; **BMI**, body mass index; **ORCD**, obesity-related complications and diseases

Algorithm Figure 2 - Screening and Diagnosis

DIAGNOSIS: ANTHROPOMETRIC COMPONENT

Anthropometric Screening & Classification

Measure BMI
Clinically examine and confirm excess adiposity

+

Measure Waist Circumference
for BMI <35.0 kg/m^2, and
Calculate Waist-to-Height Ratio
for classifying abdominal obesity and cardiometabolic risk

Class	WHO BMI Classification
Overweight*	25.0 – 29.9 kg/m^2
Class I Obesity*	30.0 – 34.9 kg/m^2
Class II Obesity	≥35.0 – 39.9 kg/m^2
Class III Obesity	≥40.0 kg/m^2

*In the Asia-Pacific region, the BMI threshold for obesity is generally considered to be ≥25 kg/m^2 and for overweight 23 kg/m^2 to 24.9 kg/m^2. See text for additional information.

+

Assess Body Composition
Using, for example, bioelectrical impedance analysis or DXA if clinically needed and available

International Diabetes Federation Waist Circumference Criteria for Cardiometabolic Risk[d]			National Institute for Health and Care Excellence, and World Health Organization
Region/Ethnic Background[e]	**Sex**	**Waist Circumference[f]**	**Waist-to-Height Ratio**
Europe, Sub-Saharan Africa, and Middle East	Male	≥94 cm	≥0.5
	Female	≥80 cm	≥0.5
United States & Canada	Male	≥102 cm	≥0.5
	Female	≥88 cm	≥0.5
Asia, South & Central America	Male	≥90 cm	≥0.5
	Female	≥80 cm	≥0.5

[d]Darbandi M et al. Discriminatory Capacity of Anthropometric Indices for Cardiovascular Disease in Adults: A Systematic Review and Meta-Analysis. Prev Chronic Dis. 2020 Oct 22;17:E131.

[e]See text for additional information.

[f]Increasing waist circumference correlates with increased severity of obesity.

Obesity: identification, assessment and management. NICE Guideline, No. 189.

London: National Institute for Health and Care Excellence (NICE); 2023 Jul 26. Recommendations 1.2.11 and 1.2.12

Abbreviations: **BMI**, body mass index; **DXA**, dual-energy X-ray absorptiometry; **WHO**, World Health Organization

Algorithm Figure 3 - Diagnosis: Anthropometric Component

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DIAGNOSIS: CLINICAL COMPONENT

Adiposity-Based Chronic Disease (ABCD) / Obesity-Related Diseases and Complications (ORCD)

Evaluate for Presence and Severity of ORCD

- Obtain medical and obesity-focused histories and review of symptoms
- Perform physical exam
- Conduct basic laboratory evaluation

Stage ABCD

Stage ABCD based on severity of ORCD

STAGE 1	• No known cardiometabolic, biomechanical, or other obesity-related conditions • Does entail risk of future ORCD
STAGE 2	≥1 mild-to-moderate* ORCD
STAGE 3	At least one severe* ORCD

When Evaluating Individuals with Obesity/ABCD, Consider:

Iatrogenic etiologies due to medications that promote weight gain
↓
Review/change medication(s)

Secondary medical etiologies including endocrinopathies and other medical conditions
↓
Conduct focused biochemical/dynamic testing

Genetic or syndromic obesity if signs and symptoms present
↓
Conduct genetic testing

Internalized weight bias/stigmatization and psychological disorders
↓
Assess or make referral

Social determinants of health, health literacy, access to health care resources, cultural beliefs, and priorities
↓
Assess/discuss, incorporate into individualized care plan

*The degree of severity for ORCD is based on clinical judgment, incorporating findings from physical examination, laboratory testing, and/or other diagnostic procedures, as well as a person's symptomatology, in ways that apply to each individual complication.

Algorithm Figure 4 - Diagnosis: Clinical Component

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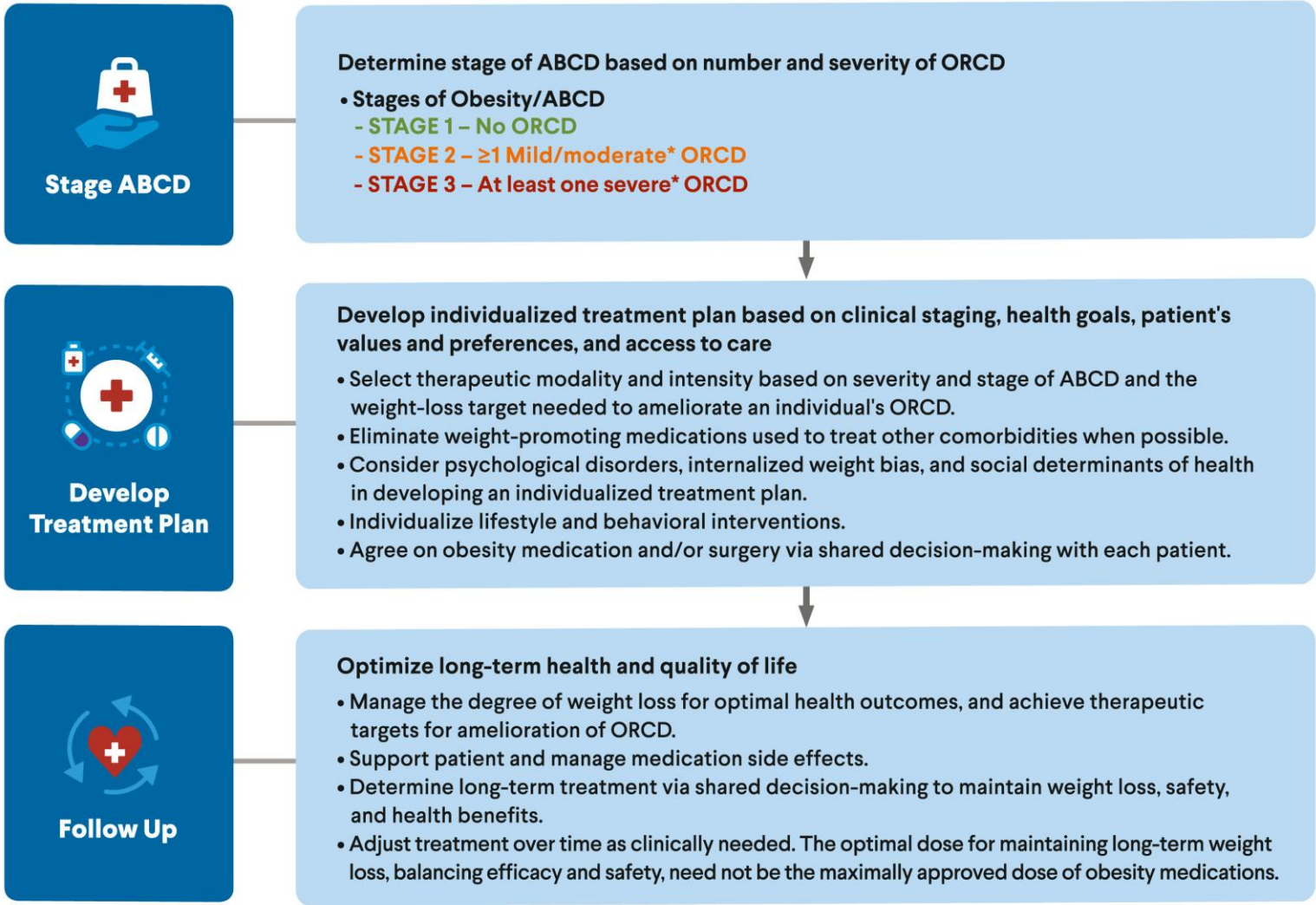
INDIVIDUALIZED TREATMENT PLAN, THERAPEUTIC GOALS, AND FOLLOW-UP



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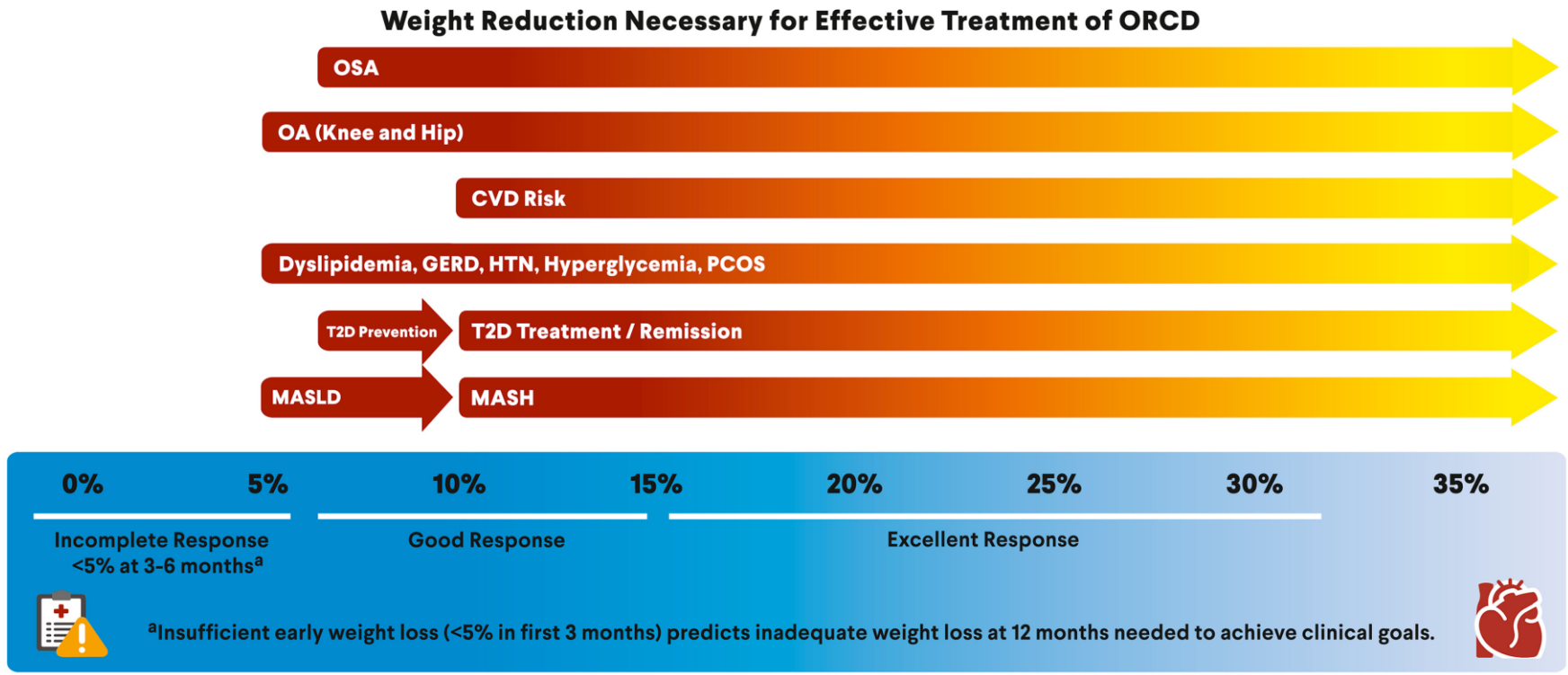
Abbreviations: **ABCD**, adiposity-based chronic disease; **ORCD**, obesity-related complications and diseases

Algorithm Figure 5 - Treatment Plan, Therapeutic Goals, and Follow-Up

RESPONSE TO THERAPY AND WEIGHT-LOSS TARGETS FOR PEOPLE WITH ABCD



Abbreviations: **ABCD**, adiposity-based chronic disease; **BMI**, body mass index; **CVD**, cardiovascular disease; **GERD**, gastroesophageal reflux disease; **HLD**, hyperlipidemia; **HTN**, hypertension; **MASH**, metabolic dysfunction-associated steatohepatitis; **MASLD**, metabolic dysfunction-associated steatotic liver disease; **OA**, osteoarthritis; **ORCD**, obesity-related complications and diseases; **OSA**, obstructive sleep apnea; **PCOS**, polycystic ovary syndrome; **T2D**, type 2 diabetes

Algorithm Figure 6 - Response to Therapy and Weight-Loss Targets

BEHAVIORAL/LIFESTYLE THERAPY FOR PEOPLE WITH OBESITY/ABCD

Consider social determinants of health, including access to care and specialists, nutritious food, safe spaces for physical activity, and sleep when developing a treatment plan.

NUTRITION

Focus on a reduced-calorie diet while maintaining diet quality.

- **Adopt healthful meal patterns (eg, Mediterranean diet).**
- **Prioritize minimally processed, nutrient-dense foods.**
- **Limit energy-dense foods and beverages.**
- **Ensure adequate nutrient intake of protein, fiber, iron, calcium, and other micronutrients with significant weight loss.**

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Promote good sleep hygiene.

Optimize sleep quality and duration.

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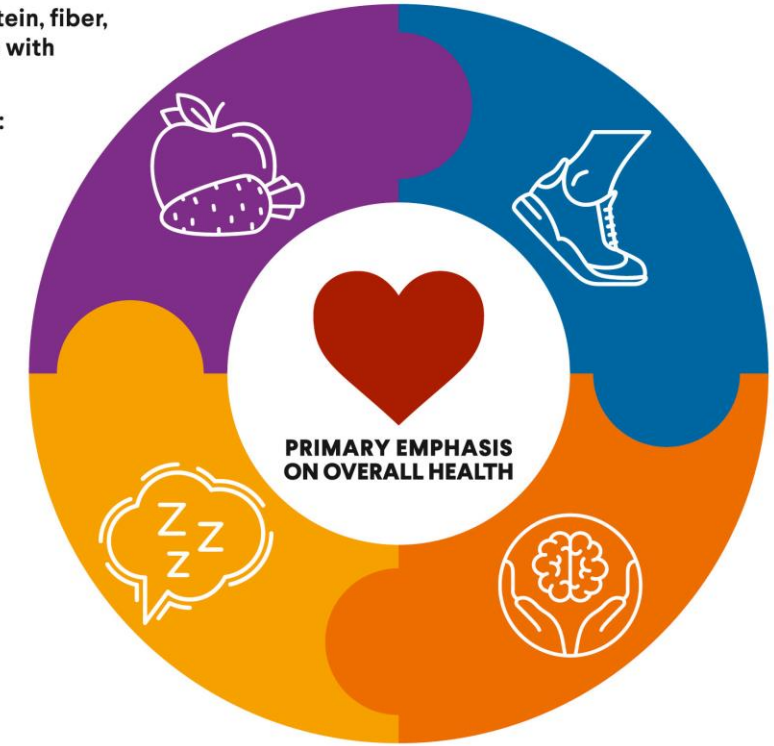

PHYSICAL ACTIVITY

Tailor to patient preferences and functional ability.

Incorporate:

- **Aerobic activity**
- **Resistance training***
- **Reduced sedentary behavior**

Gradually increase intensity and volume as tolerated.

Refer to an exercise specialist if needed.
**Resistance training helps preserve lean mass during significant weight loss.*

BEHAVIORAL THERAPY

Screen for anxiety, depression, eating disorders, and internalized weight bias.

Support behavioral adherence with:

- **Goal setting, self-monitoring, and problem-solving**
- **Cognitive behavioral therapy**
- **Stress reduction techniques**

Refer for psychological testing or behavioral health support as needed.

Abbreviation: **ABCD**, adiposity-based chronic disease

Algorithm Figure 7 - Behavioral/Lifestyle Therapy

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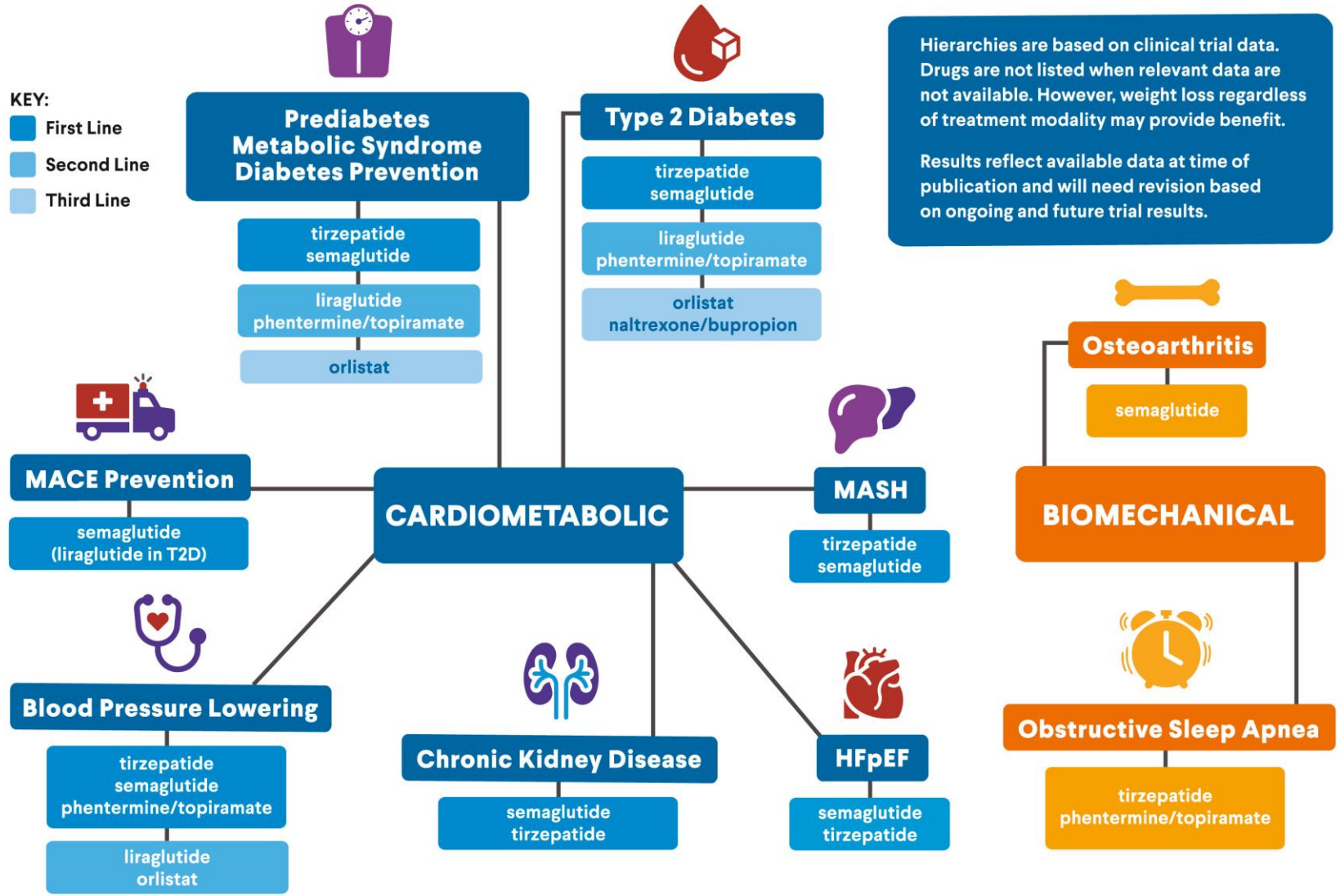
HIERARCHIES OF PREFERRED MEDICATIONS FOR COMPLICATION-CENTRIC CARE OF PEOPLE WITH ABCD



Abbreviations: **ABCD**, adiposity-based chronic disease; **HFpEF**, heart failure with preserved ejection fraction; **MACE**, major adverse cardiac events; **MASH**, metabolic dysfunction-associated steatohepatitis ; **T2D**, type 2 diabetes

Algorithm Figure 8 - Preferred Medications Hierarchies

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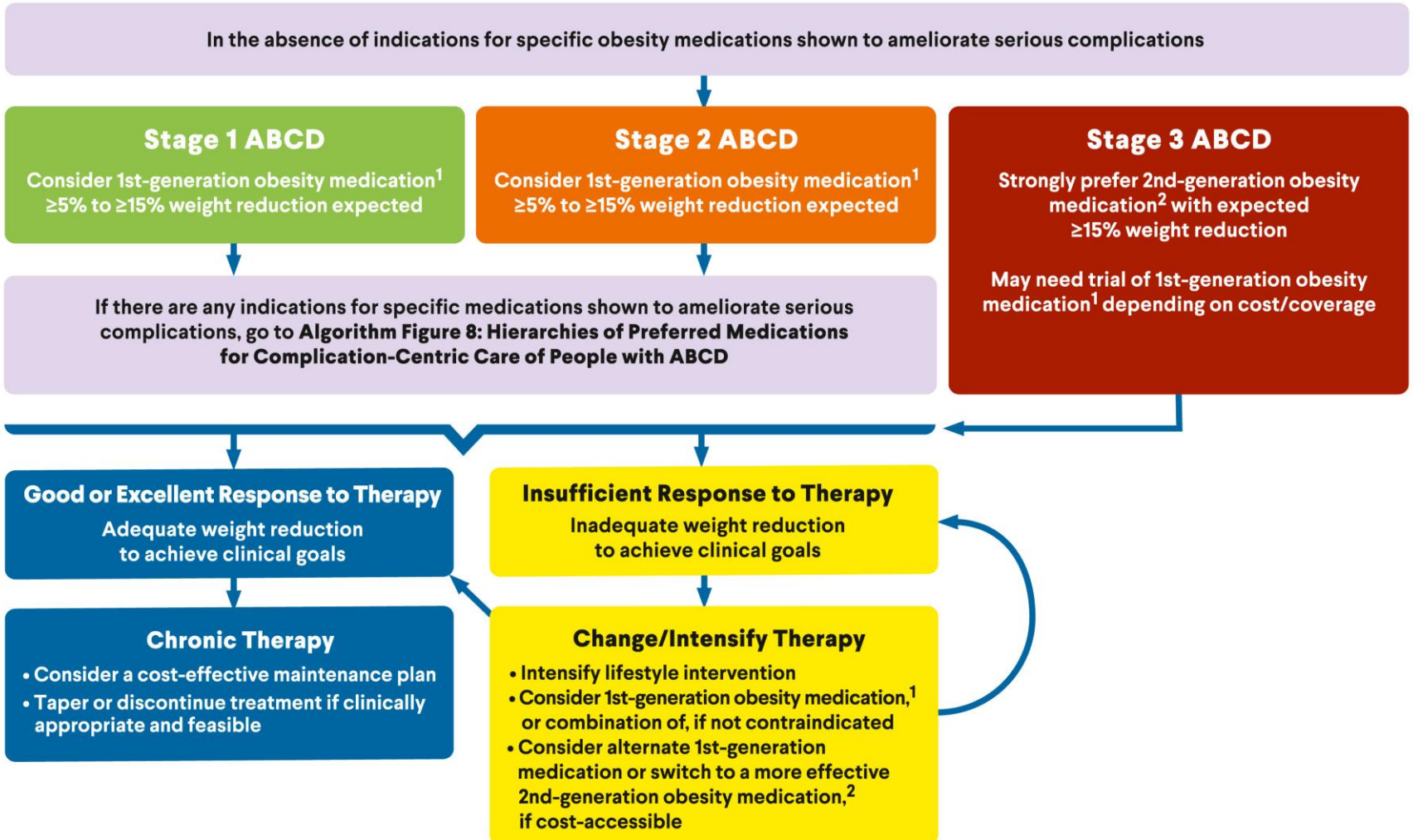
LOWER-COST PHARMACOLOGIC STEP THERAPY FOR ABCD



[1]1st-generation obesity medications: phentermine, phentermine/topiramate ER, nalextrone/buproprion ER, liraglutide

[2]2nd-generation more effective obesity medications: semaglutide, tirzepatide

Abbreviations: **ABCD**, adiposity-based chronic disease; **ER**, extended release

Algorithm Figure 9 - Lower-Cost Pharmacologic Step Therapy

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MEDICATIONS FOR OBESITY: INDIVIDUALIZATION OF THERAPY[a]

KEY: Preferred (evidence of benefit) | Insufficient evidence to prefer | Monitoring indicated | Contraindicated (evidence of risk/harm)

OBESITY-RELATED CONDITION	ORLISTAT	PHENTERMINE	PHENTERMINE/ TOPIRAMATE ER	NALTREXONE ER/ BUPROPION ER	LIRAGLUTIDE	SEMAGLUTIDE	TIRZEPATIDE
DIABETES PREVENTION	Benefit via weight reduction		Benefit via weight reduction		Benefit via weight reduction and incretin effect	Benefit via weight reduction and incretin effect	Benefit via weight reduction and incretin effect
TYPE 2 DIABETES	Benefit via weight reduction		Benefit via weight reduction	Benefit via weight reduction	Benefit via weight reduction and incretin effect	Benefit via weight reduction and incretin effect	Benefit via weight reduction and incretin effect
HYPERTENSION	Benefit via weight reduction	Monitor heart rate, BP Contraindicated in uncontrolled HTN	Monitor heart rate, BP; BP benefit observed in trials*	Monitor heart rate, BP Contraindicated in uncontrolled HTN	BP benefit observed in trials; Monitor heart rate	BP benefit observed in trials; Monitor heart rate	BP benefit observed in trials; Monitor heart rate
ASCVD		Contraindicated	Use with caution; Monitor heart rate, BP	Monitor heart rate, BP	Demonstrated prevention of ASCVD in T2D	Demonstrated prevention of ASCVD	Evidence in T2D and obesity pending
MASLD					Benefit observed in trials	Benefit observed in trials	Benefit observed in trials
DEPRESSION			Appropriate monitoring	Appropriate monitoring	Appropriate monitoring	Appropriate monitoring	Appropriate monitoring
ANXIETY		Appropriate monitoring	Appropriate monitoring	Appropriate monitoring			
CHRONIC KIDNEY DISEASE	Monitor for oxalate nephropathy		Do not exceed 7.5 mg/46 mg per day	Do not exceed 8 mg/90mg twice a day	Benefit in T2D; Avoid vomiting and volume depletion	Benefit in T2D; Avoid vomiting and volume depletion	Benefit in T2D; Avoid vomiting and volume depletion
SEVERE KIDNEY IMPAIRMENT	Monitor for oxalate nephropathy	Urinary clearance of drug	Urinary clearance of drug	Urinary clearance of drug	Avoid vomiting and volume depletion	Avoid vomiting and volume depletion	Avoid vomiting and volume depletion
NEPHROLITHIASIS	Calcium oxalate stones		Calcium phosphate stones				
HEPATOBILIARY IMPAIRMENT	Monitor for cholelithiasis	Do not exceed 8 mg per day	Do not exceed 7.5 mg/46 mg per day	Do not exceed 8 mg/90 mg daily	Monitor for cholelithiasis	Monitor for cholelithiasis	Monitor for cholelithiasis
SEVERE HEPATIC IMPAIRMENT	Not recommended						

[a]All medications are contraindicated in pregnancy and breastfeeding. *Blood pressures are significantly decreased in clinical trials.

Abbreviations: **ASCVD**, atherosclerotic cardiovascular disease; **BP**, blood pressure; **ER**, extended release; **HTN**, hypertension; **T2D**, type 2 diabetes

Algorithm Figure 10 - Medications for Obesity: Individualization of Therapy

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MEDICATIONS FOR OBESITY APPROVED BY THE U.S. FOOD AND DRUG ADMINISTRATION[a,b]

	ORLISTAT	PHENTERMINE[c]	PHENTERMINE/ TOPIRAMATE ER	NALTREXONE ER/ BUPROPION ER	LIRAGLUTIDE	SEMAGLUTIDE	TIRZEPATIDE
CLASS/MECHANISM OF ACTION	Lipase Inhibitor	NE-releasing agent	NE-releasing agent GABA Receptor Modulation	Opioid-Receptor Antagonist DA-NE Reuptake Inhibitor	GLP-1 RA	GLP-1 RA	GIP/GLP-1 RA
AGE	≥12 years[d]	>16 years	≥12 years	≥18 years[d]	≥12 years[e]	≥12 years[e]	≥18 years[d]
DELIVERY	Oral	Oral	Oral	Oral	Subcutaneous Injection	Subcutaneous Injection	Subcutaneous Injection
STARTING DOSE	60 mg 3 times/day AC	8mg or 15mg QAM	3.75 mg/23 mg QAM	8 mg/90 mg QAM	0.6 mg QD	0.25 mg QWK	2.5 mg QWK
DOSE ESCALATION	Titrate up to needed dose Slow dose titration if side effects occur Formulations: 60 mg cap 120mg cap	Titrate up to needed dose Slow down dose titration if side effects occur Formulations: 8mg tab 15 mg cap 37.5mg tab	Titrate up bi-weekly to needed dose Slow down dose titration if side effects occur 3.75 mg/23 mg QAM x 2 wk 7.5 mg/ 46 mg QAM x 12 wk 11.25 mg / 69 mg QAM x 2 wk 15 mg/92 mg QAM	Titrate up weekly to needed dose Slow down dose titration if side effects occur 8 mg/90 mg QAM x 1wk 8 mg/90 mg twice daily x 1 wk 16 mg/90 mg QAM and 8 mg/90 mg QPM x 1 wk 16 mg/90 mg twice daily	Titrate up weekly to needed dose Slow down dose titration if side effects occur 0.6 mg QD x 1 wk 1.2 mg QD x 1 wk 1.8 mg QD x 1 wk 2.4 mg QD x 1 wk 3.0 mg QD	Titrate up monthly to needed dose Slow down dose titration if side effects occur 0.25 mg QWK x 4 wk 0.5 mg QWK x 4 wk 1.0 mg QWK x 4 wk 1.7 mg QWK x 4 wk 2.4 mg QWK	Titrate up monthly to needed dose Slow down dose titration if side effects occur 2.5 mg QWK x 4 wk 5.0 mg QWK x 4 wk 7.5 mg QWK x 4 wk 10 mg QWK x 4 wk 12.5 mg QWK x 4 wk 15 mg QWK
MAXIMUM DOSE	120 mg 3 times/day AC	37.5 mg QAM[f]	15 mg/92 mg QD	16mg/180mg twice daily	3.0 mg QD	2.4 mg QWK	15 mg QWK
WEIGHT REDUCTION[g]	4% (52 weeks)	5%-6% (28 weeks)	9.6%-9.9% (52 weeks) dose dependent	4.2%-5.2% (52 weeks)	9.2% (56 weeks)	16.9% (68 weeks)	22.5% (72 weeks)
POTENTIAL SIDE EFFECTS[h]	Flatulence Fecal Urgency Oily Stools Fat-Soluble Vitamin and Drug Malabsorption Potential Drug-Drug Interactions	Restlessness Insomnia Headache Dry Mouth Tachycardia BP Elevation	Paresthesia, Dizziness Dysgeusia, Insomnia Constipation, Dry Mouth Fatigue Blurred Vision Mental Clouding Mood Changes	Nausea, Constipation Headache Vomiting Dizziness Insomnia Dry Mouth, Diarrhea Anxiety	Nausea Diarrhea Constipation Dyspepsia Vomiting Abdominal Pain GERD	Nausea, Diarrhea Constipation Dyspepsia Vomiting Abdominal Pain Headache Fatigue	Nausea, Diarrhea Constipation Dyspepsia Vomiting Abdominal Pain Headache Fatigue
CAUTIONS, RELATIVE AND ABSOLUTE CONTRAINDICATIONS[i]	Cholestasis Chronic Malabsorption Syndrome Nephrolithiasis Vitamin Malabsorption Encourage Supplementation Potential for Misuse	CAD, CVA, Arrythmias, CHF, Uncontrolled HTN* Hyperthyroidism Agitated States History of Drug Abuse MAOI Use Angle-Closure Glaucoma	MAOI Hyperthyroidism Angle-Closure Glaucoma Monitor for Increased Heart Rate Nephrolithiasis Metabolic Acidosis[c] Monitor for Worsening Anxiety or Depression[c]	Seizure Disorder Uncontrolled HTN Chronic Opioid Use Anorexia Nervosa Bulimia Nervosa MAOI Use Abrupt Drug or Alcohol Withdrawal Angle-Closure Glaucoma Monitor for Worsening Anxiety or Depression[c]	History or Family History MTC/MEN2 Gallbladder Disease Pancreatitis Increased Heart Rate	History or Family History MTC/MEN2 Gallbladder Disease Pancreatitis Diabetic Retinopathy[j]	History or Family History MTC/MEN2 Gallbladder Disease Diabetic Retinopathy[j]
ACCESS/COST	$$	$	$$	$$	$$$	$$$$	$$$$

[a]Monogenic obesity treatment, devices for weight reduction, and setmelanotide can be found in narrative. [b]FDA-approved for CWM. [c]This class of medications includes diethylpropion (or amfepramone), phendimetrazine, and benzphetamine. [d]EMA approved for age 18 years and above for CWM. [e]EMA approved for age 12 years and above for CWM. [f]Maximum dose allowed for phentermine; however, many patients will see results on 8 mg 3 times a day which is also considered a maintenance dose in patients with diabetes and obesity. [g]Percent body weight reduction in treatment in Phase 3 trial. [h]Complications requiring caution or monitoring in order of observed frequency. [i]All FDA-approved medications for obesity are contraindicated in individuals who are pregnant or breastfeeding; effective birth control should be recommended/prescribed. A negative pregnancy test is recommended before initiating, with monthly monitoring. [j]In patients with T2D and obesity. *Blood pressures are significantly decreased in clinical trials for phentermine/topiramate ER.

Abbreviations: **AC**, before meals; **BP**, blood pressure; **CAD**, coronary artery disease; **CHF**, congestive heart failure; **CVA**, cerebrovascular accident; **CWM**, chronic weight management; **DA**, dopamine; **EMA**, European Medicines Agency; **ER**, extended release; **FDA**, U.S. Food and Drug Administration; **GERD**, gastroesophageal reflux disease; **GIP**, glucose-dependent insulinotropic polypeptide; **GLP-1 RA**, glucagon-like peptide-1 receptor agonist; **HTN**, hypertension; **MAOI**, monoamine oxidase inhibitors; **MEN2**, multiple endocrine neoplasia, type 2; **MTC**, medullary thyroid cancer; **NE**, norepinephrine; **QAM**, every morning; **QD**, every day; **QPM**, every afternoon or evening; **QWK**, every week; **wk**, week(s)

Algorithm Figure 11 - FDA-Approved Medications for Obesity: Prescribing Information

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تشکر

از توجه شما