

# Diagnosing clinical obesity

## Limitations of the current definition of obesity

Obesity is currently defined solely by an individual's body mass index (BMI)

The criteria for populations of European descent\* are:

Diagnosis	Underweight	Normal	Overweight	Obesity
BMI (kg/m <sup>2</sup> )	Under 18.5	18.5 to 24.9	25 to 29.9	30 and over

\*Criteria for other ethnic groups are different

✓ Although BMI is **useful** for identifying individuals at increased risk of health consequences...

✗ It **is not** a direct measure of fat

✗ It **does not** establish the distribution of fat around the body

✗ It **cannot** determine when excess body fat is a health problem

Relying on BMI alone to establish if someone has obesity is problematic as this can inaccurately classify a person as having or not having excess body fat, and also lead to under-diagnosis of many whose health is impaired and over-diagnosis of many who are healthy.

#	1	2	3	4
BMI (kg/m <sup>2</sup> )	28.2	30.1	36.2	36.2
Diagnosis	Overweight	Obesity	Obesity	Obesity
Excess body fat?	✓ Yes	✗ No	✓ Yes	✓ Yes
Signs and symptoms?†	✗ No	✗ No	✗ No	✓ Yes
Notes	Under-diagnosis of obesity	Over-diagnosis of obesity	Obesity with preserved health	Obesity with ongoing illness

### Limitations of BMI-based diagnosis



People with excess body fat do not always have a BMI above 30, meaning that their health risk can go unnoticed.

Individuals with high muscle mass (eg, athletes) tend to have high BMIs despite normal fat mass. Diagnosing such people as having obesity or a disease is inappropriate.

Some people with excess body fat (and high BMI) can nevertheless maintain normal organ function and an unhindered ability to conduct daily activities (hence, they have no illness); others instead manifest objective evidence of ongoing illness. Current definition and measures of obesity do not reflect health/illness at individual level and are therefore inadequate for disease diagnosis.

†Signs and symptoms of organ dysfunction due to excess body fat

Read the *Lancet Diabetes & Endocrinology* Commission on the definition and diagnostic criteria of clinical obesity online at: [www.thelancet.com/commissions/clinical-obesity](http://www.thelancet.com/commissions/clinical-obesity)

## Diagnosing clinical obesity

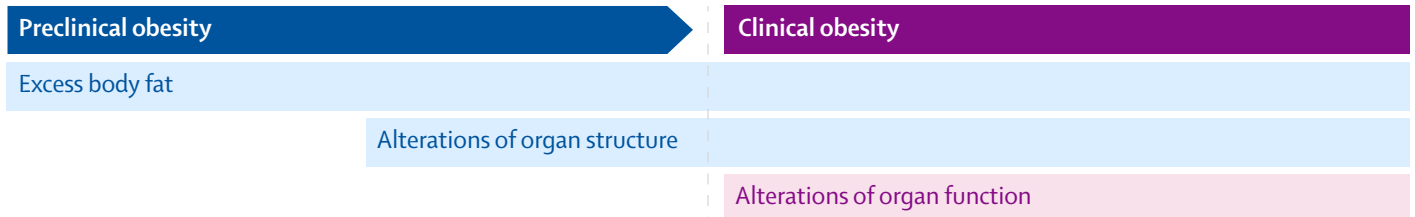
### A more accurate and clinically relevant approach

The Commission proposes a new diagnostic approach to obesity that focuses on other measures of body fat and objective signs and symptoms of ill health. The Commission also introduces two new categories of obesity: preclinical obesity and clinical obesity.

Preclinical obesity	Clinical obesity
<p><b>A condition of excess body fat associated with variable level of health risk, but no ongoing illness</b></p> <p>People living with preclinical obesity:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> <li> Have no evidence of reduced organ or tissue function due to obesity</li> <li> Can complete day-to-day activities unhindered</li> </ul> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> <li> Are generally at a higher risk of developing diseases, such as:                             <ul style="list-style-type: none"> <li>• Clinical obesity</li> <li>• Cardiovascular disease</li> <li>• Some cancers</li> <li>• Type 2 diabetes</li> </ul> </li> </ul> </div> </div>	<p><b>A chronic disease due to obesity alone, and characterised by signs and symptoms of ongoing organ dysfunction and/or reduced ability to conduct daily activities</b></p> <p>People living with clinical obesity have reduced tissue or organ function due to obesity, such as:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> <li> Breathlessness caused by effects of obesity on the heart or lungs</li> <li> Knee or hip pain with joint stiffness and reduced range of motion</li> </ul> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> <li> A cluster of metabolic abnormalities</li> <li> Dysfunction of other organs including kidneys, upper airways, nervous, urinary, and reproductive systems</li> </ul> </div> </div>

Full details of these new categories can be found in the Commission report

#### The pathophysiology of preclinical and clinical obesity



#### Traditional measurement of obesity vs new diagnostic method

#	1	2	3	4	5	6
BMI (kg/m <sup>2</sup> )	23.7	28.8	28.8	32.4	39.2	39.2
Excess body fat?	No	No	Yes	No	Yes	Yes
Muscle mass	Normal / High	Normal	Normal / Low	High	Normal / Low	Normal / Low
Signs and symptoms?*	No	No	No	No	No	Yes
Old diagnosis	No obesity	Overweight	Overweight	Obesity	Obesity	Obesity
New diagnosis	No obesity	No obesity	Preclinical obesity	No obesity	Preclinical obesity	Clinical obesity

\*Signs and symptoms of organ dysfunction due to excess body fat

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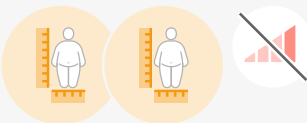
## Diagnosis and management of clinical and preclinical obesity

### Diagnosis

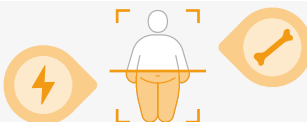
**1 Excess body fat?**  
The first step in such a diagnosis is confirming excess body fat, which can be achieved via one of the following three criteria:



At least one measurement of body size and BMI



At least two measurements of body size, regardless of BMI



Direct body fat measurement, such as a DEXA scan

#### Measurements of body size

The commission defines three measurements of body size that can be used to confirm excess body fat:



**Waist circumference**  
≥102 cm for men\*  
≥88 cm for women\*



**Waist-to-hip ratio**  
>0.90 for men\*  
>0.85 for women\*



**Waist-to-height ratio**  
>0.50 for all\*

Excess body fat can pragmatically be assumed if BMI is >40 kg/m<sup>2</sup>

No → **2 No obesity**

Yes → **3 Obesity**

### 3 Obesity

Confirmation of excess body fat should be followed by further assessment to establish whether an individual with obesity has an illness

### 4 Medical history, physical examination, and standard blood test

- Are there signs/symptoms of organ dysfunction?
- Does the individual experience limitations of day-to-day activities?

No signs/symptoms and no limitations

Yes, signs/symptoms of organ dysfunction

Yes, limitations of day-to-day activities

### 5 Is organ dysfunction obesity related?

No

Yes

Preclinical obesity

Clinical obesity

### Management

This new diagnosis approach will support evidence-based, personalised prevention and treatment, ensuring more efficient and cost-effective use of resources

#### Preclinical obesity management

Focus on risk reduction and prevention of progression to clinical obesity or other obesity-related diseases



Health counselling for weight loss or prevention of weight gain



Monitoring over time



Active weight loss interventions in people at higher risk of developing clinical obesity, and other obesity-related diseases

#### Clinical obesity management

Focus on improvement or reversal of organ dysfunction



Evidence-based treatment and management, with an aim to fully regain or improve functions



Treatment type should be informed by individual risk—benefit assessments and decided via an active discussion with the patient



Success should be assessed by improvement of signs and symptoms, rather than measures of weight loss

\*White Caucasians only. Criteria for other ethnic groups may be different

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