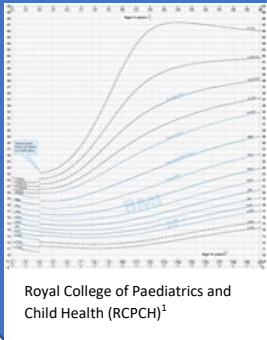


Body Mass Index centile charts in child overweight and obesity



What are BMI centile charts?

Body Mass index (BMI) is an index of weight and height. It is a simple indicator of a healthy body weight in people over the age of two years. In children, the normal range of BMI is different for boys and girls, and it changes with age. BMI centile charts allow a child's BMI to be plotted so that it can be interpreted, taking into account the age and gender of a child. The BMI is at its lowest in early childhood, and gradually increases with age

Why measure BMI in children?

BMI corresponds well with direct measures of body fat, and it has been shown to correlate with the health risks of obesity in childhood. BMI is cheap to obtain and easy to calculate.

Research shows that parents and health professionals often underestimate overweight and obesity in children if they look only at their appearance. Trying to judge by looking at height and weight on a growth chart can also be misleading. Over-nourished children grow in height as well as putting on weight.

How is BMI calculated?

It is important that children are measured accurately before calculating BMI. The height is squared in the BMI formula so any inaccuracies will be magnified. Staff responsible for measuring and weighing children should be suitably trained. RCPCH and the National Child Measurement Programme (NCMP) resources detail the equipment and techniques required.^{1,2}

$$\text{BMI} = \frac{\text{Weight (in kg)}}{\text{Height (in m)} \times \text{Height (in m)}}$$

A simple way of inputting this into a calculator is: weight(kg) ÷ height(m) ÷ height(m)

Ensure weight in kg, and height in meters. Divide the weight by the height twice. Eg, Sally's height is 132cm, and her weight is 28kg. BMI = 28 ÷ 1.32 ÷ 1.32 = 16.1

Unlike in adults, children's BMI can't be interpreted just by looking at the figure. You need to find the **centile** – this is usually done using a BMI centile chart. The NHS online calculator for children³ gives BMI, the BMI centile and an interpretation. Weight and height can be entered in imperial or metric. However, the maximum centile BMI is goes to is 99th, so it may say that a child's BMI is above the 99th centile and that they are very overweight, but it won't say by how much.

¹ <https://www.rcpch.ac.uk/resources/uk-who-growth-charts-guidance-health-professionals>

² www.gov.uk/government/publications/national-child-measurement-programme-operational-guidance

³ <https://www.nhs.uk/live-well/healthy-weight/bmi-calculator/#childrens-bmi>

What are the recommended cut offs for BMI in children?

Thresholds for overweight and obesity in individual children, as recommended by the National Institute for Health and Care Excellence (NICE):

Classification	BMI centile
Underweight	<2 nd
Overweight	≥91 st
Obese	≥ 98 th

Which charts should I use to interpret BMI?

Many BMI charts currently available on electronic systems are not useful above 99th centile, and so management paper charts should be used when there are concerns about severe obesity. There are two types of BMI chart available from Harlow Printing:⁴

- An **identification** chart that goes up to 99.6th centile. These are not useful for management of severe obesity
- A **management** chart that shows centile lines and also SD lines at +3.5SDs and +4SD (ie severe levels of obesity) These are needed to know when referral to a paediatrician is needed, and for monitoring BMI in more obese children. Copies of these charts are available on:

https://www.rcpch.ac.uk/sites/default/files/2018-03/boys_and_girls_bmi_chart.pdf

What about children under the age of two?

BMI is not a good indicator of body fat in children under 2, and there are no simple definitions for overweight or obesity in this age group. Therefore, a clinical judgement has to be made, based on the child's height and weight centiles, their trajectory, the family history and how the child appears. If a child's weight crosses 2 or more major centile lines upwards, it should always be considered whether they might be overweight or obese. The younger the child and the higher the starting centile, the more concerning this is, and the greater the risk of obesity at age 5 and at age 10.

What do I do now? The Portsmouth Child Obesity Pathway⁵

The Portsmouth Child Obesity is a collaborative multiagency for use across health providers in Portsmouth. It details the thresholds for intervention for children found to be overweight or obese at different ages, including when obesity becomes a safeguarding issue. Children should generally be referred to health visitors (pre-schoolers) or school nurses (school aged children) in the first instance. Referral criteria for paediatricians and dieticians are outlined in the pathway.

Dr Helen Daley, Designated Doctor for Safeguarding, Portsmouth V2 -updated February 2023

⁴ Growth charts and BMI charts can be ordered from Harlow printing (if ordering BMI charts to monitor obesity you may consider ordering management charts which go beyond 99.6th centile).

<https://www.healthforallchildren.com/product-category/shop/growth-charts/page/3/>

⁵ [Portsmouth SCB Child obesity pathway](#)