Data Recording

Measurement 1
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 2
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 3
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 4
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 5
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 6
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 7
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 8
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 9
Recording Date
Weight
Length/Height
Location
Health worker name

Measurement 10
Recording Date
Weight
Length/Height
Location
Health worker name

BOYS
UK Growth chart 2-18 years

RCPCH Royal College of Paediatrics and Child Health
Leading the way in Children's Health

DH Department of Health

Anyone who measures a child, plots or interprets charts should be suitably trained or supervised. For further information and training materials see fact sheet and presentation on www.growthcharts.rcpch.ac.uk

This chart is mainly intended to assess the growth of school age boys. It combines data from the UK 1990 growth reference for children at birth and from 4 -18 years[1], with the WHO growth standard for children aged 2 years to 4 years[2]. The growth of children under 2 years of age should be plotted on the more detailed UK-WHO 0-4 years growth charts.

The 2-18 years chart includes a number of new features to help plotting and interpretation.

- birth centile plotting scale
- BMI lookup and plotting grid
- scales to estimate adult height and mid-parental centile
- guide to assessing puberty

Measurement procedure

Accurate measurement is essential and shoes must be removed for all measurements

Height:
Measure height recorded to the last millimetre. A correctly installed stadiometer or approved portable measuring device is the only equipment that can be reliably used (see illustration). If a child cannot stand, measure lying down, using an approved length measuring device and plot as for height.

Weight:
Remove heavy clothing and shoes and weigh using class III clinical electronic scales in metric setting.

Plotting

Plot each measurement by placing a small dot where a vertical line through the child's age crosses a horizontal line through the measured value.

The lettering on the charts ('weight', 'length' etc.) sits on the 50th centile to provide orientation.

Birth centile plotting scale

The chart starts at age 2 years, but there is a plotting scale on the left of the chart where for term infants birth weight (and, if measured, length) can be plotted to allow comparison of the birth centile with later growth.

Please place sticker (if available) otherwise write in space provided.

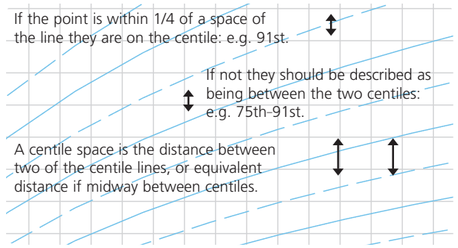
Name: _____

NHS/CHI No: | | | | | | | | | | |

Hospital No: | | | | | | | | | | |

Date of Birth: | | | / | | / | | | | |

Centile terminology



Adult Height Predictor

This allows you to predict the child's adult height based on their current height, but with a regression adjustment to allow for the tendency of very tall and short children to be less extreme in height as adults. Four boys out of five will have an adult height within ±6 cm of the predicted adult height.

Instructions for use

Plot the most recent height centile on the centile line on the Adult Height Predictor (on the flap to the right of the height centile chart) and read off the predicted adult height for this centile.

Mid-Parental Centile

The 'mid-parental centile' is the average adult height centile to be expected for all children of these parents. It incorporates a regression adjustment to allow for the tendency of very tall and short parents to have children with less extreme heights. Comparing this to the child's current height centile can help assess whether the child's growth is proceeding as expected. The larger the discrepancy between the two, the more likely it is that the child has some sort of growth disorder. Most children's height centiles (nine out of ten) are within ±two centile spaces of the mid-parental centile, and only 1 percent will be more than three centile spaces below.

Instructions for use

The Mid-parental Centile Comparator is on the flap to the right of the height centile chart. If possible measure both parents' heights, or else use reported heights. Plot their heights on the Mother's and Father's height scales. Join the two points with a line between them. The mid-parental centile is where this line crosses the centile line in the middle. Compare the mid-parental centile to the child's current height centile, plotted on the adult height predictor centile scale.

Mid-parental target height

This can be obtained by plotting the mid-parental centile on the main chart at age 18 and reading off the corresponding height. Four boys out of five will have an adult height within ±7 cm of this target height. However the predicted adult height (above) is usually closer than mid-parental target height to the child's final height.

Pubertal Assessment

The puberty 'phase' may be ascertained through simple questions about the appearance of secondary sexual characteristics as well as by clinical examination.

Phases of puberty

Pre-puberty (Tanner stage 1) *All of the following*	**In Puberty** (Tanner stages 2-3) *Any of the following*	**Completing Puberty** (Tanner stages 4-5) *Any of the following*
High voice	Slight deepening of the voice	Voice fully changed (broken)
No growth of testes or penis	Reddening of the scrotum and growth of the testes	Adult size of testes and penis with adult pubic and axillary hair growth
	Early penile anlargement	
No pubic hair	Early pubic or axillary (armpit) hair growth	Early moustache and facial hair growth

Is the timing of puberty normal?

The three vertical black lines (puberty lines) on the right hand page (9-18 years) of the chart indicate the normal age limits for the phases of puberty described above.

- Boys with measurements plotted on the left page will usually be in the 'Pre-puberty' phase. Puberty before 9 years in boys is likely to be precocious and further assessment is necessary.
- Between 9-14 years most boys will be either 'Pre- puberty' or 'In puberty'. If there are no signs of puberty by 14 years, then puberty is delayed and further assessment is indicated.
- From 14-17 years most boys will be either 'In puberty' or 'Completing puberty'.
- After 17 years boys will usually be 'Completing puberty'. If this is not the case, maturation is delayed and further assessment may be needed.

Growth patterns before and during puberty

Successive height measurements can show wide variation, because it is difficult to measure height accurately. If there are concerns it is useful to measure on a few occasions over time. Assessing growth during puberty is complex because the age when puberty starts varies. For detailed assessment of growth in puberty use the Puberty Phase Specific chart.

What does a height in the shaded area below the 0.4th centile mean?

This chart provides some extra guidance about the lower limit (0.4th centile) for height in boys 9-14 years. If a plot falls within the shaded area on the height chart between 9 and 14 years, pubertal assessment will be required and mid-parental centile should be assessed.

If they are **In** puberty or **Completing** puberty, they are below the 0.4th centile and should be referred. In most instances a **Pre**-pubertal boy plotted in this area is growing normally, but comparison with the mid-parental centile and growth trajectory will assist the assessment of whether further investigation is needed.

When is further assessment required?

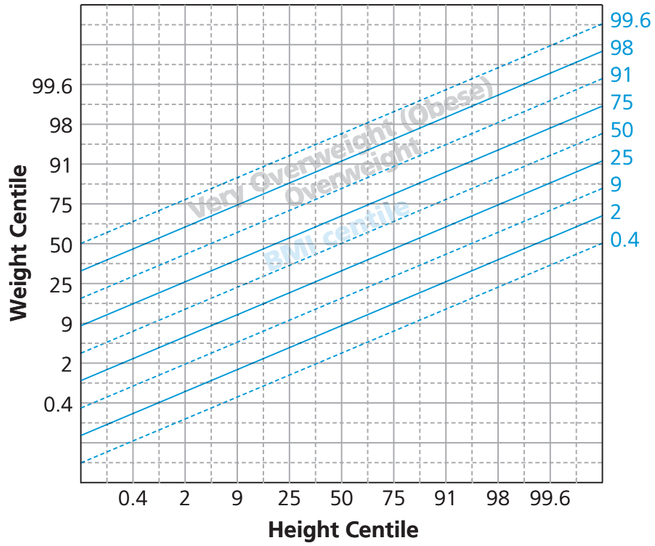
- Where weight or height or BMI is below the 0.4th centile, unless already fully investigated at an earlier age.
- If the height centile is more than 3 centile spaces below the mid-parental centile.
- A drop in height centile position of more than 2 centile spaces, as long as measurement error has been excluded.
- Smaller centile falls or discrepancies between child's and mid-parental centile, if seen in combination, or if associated with possible underlying disease.
- If there are any other concerns about the child's growth.

Body Mass Index (BMI) centile look-up

If weight is above the 75th centile or if weight and height centiles differ, the BMI centile should be calculated, as the BMI centile is the best indicator of thinness and fatness. The BMI look-up allows you to read off the BMI centile, accurate to a quarter of a centile space. There is a BMI centile grid at the top of the growth chart where the centiles for children with high or low values can be plotted.

Instructions for use

1. Note the weight and height centiles from the growth chart.
2. Plot the weight centile against the height centile on the the BMI look-up.
3. If between centiles, read across in this position.
4. Read off the corresponding BMI centile from the blue slanting lines.
5. Plot the centile in the BMI grid at the top of the growth chart at the appropriate age.



What does a high or low BMI mean?

A BMI above the 91st centile suggests overweight. A child above the 98th centile is very overweight (clinically obese). BMI below the 2nd centile is unusual and may reflect undernutrition, but may simply reflect a small build.

References
1. Freeman JV, Cole TJ, Chinn S, Jones PRM, White EM, Preece MA. Cross sectional stature and weight reference curves for the UK, 1990. Arch Dis Child 1995; 73:17-24.
2. www.who.int/childgrowth/en

For further relevant references see fact sheet downloadable from www.growthcharts.RCPCH.ac.uk

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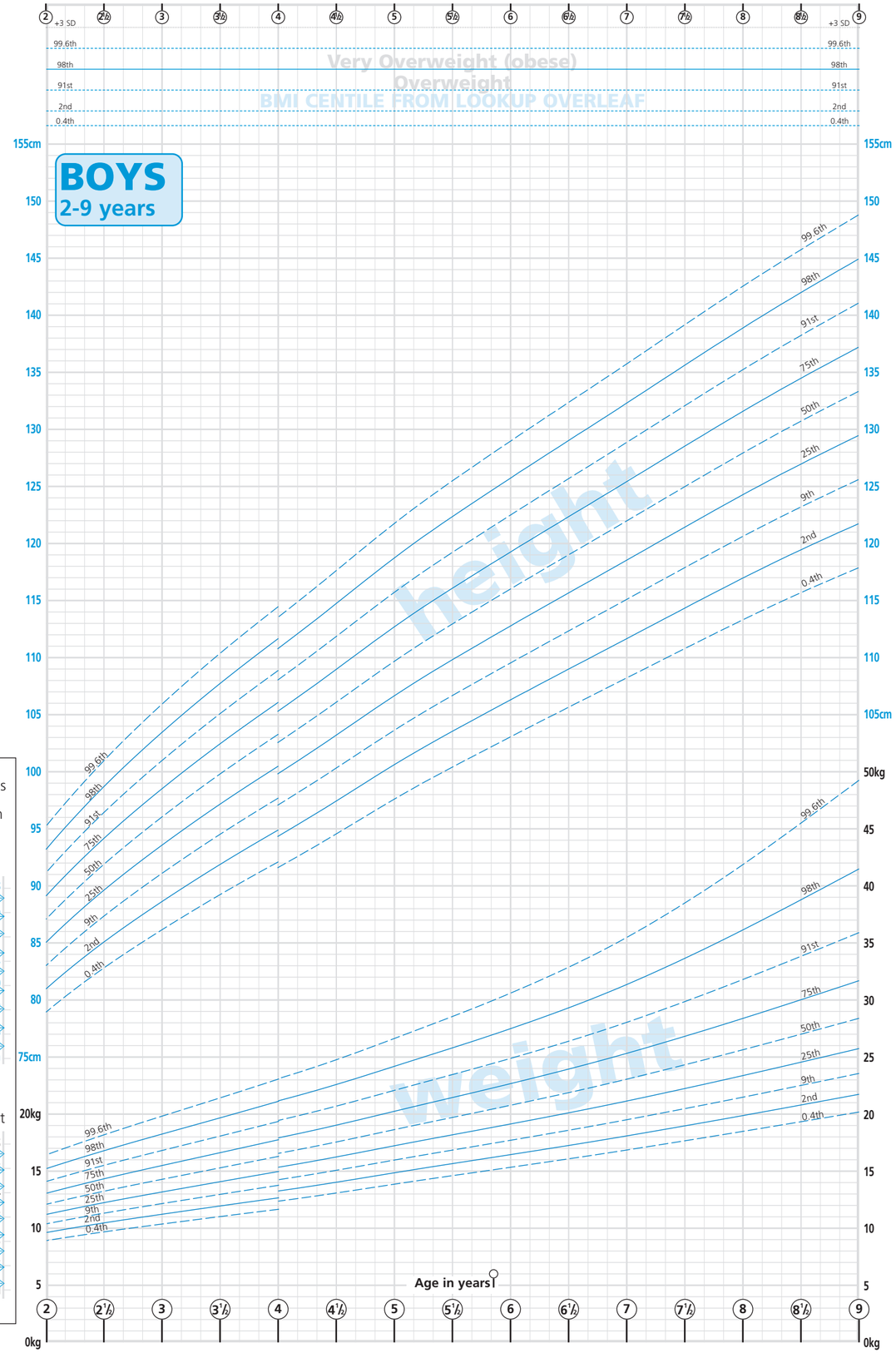
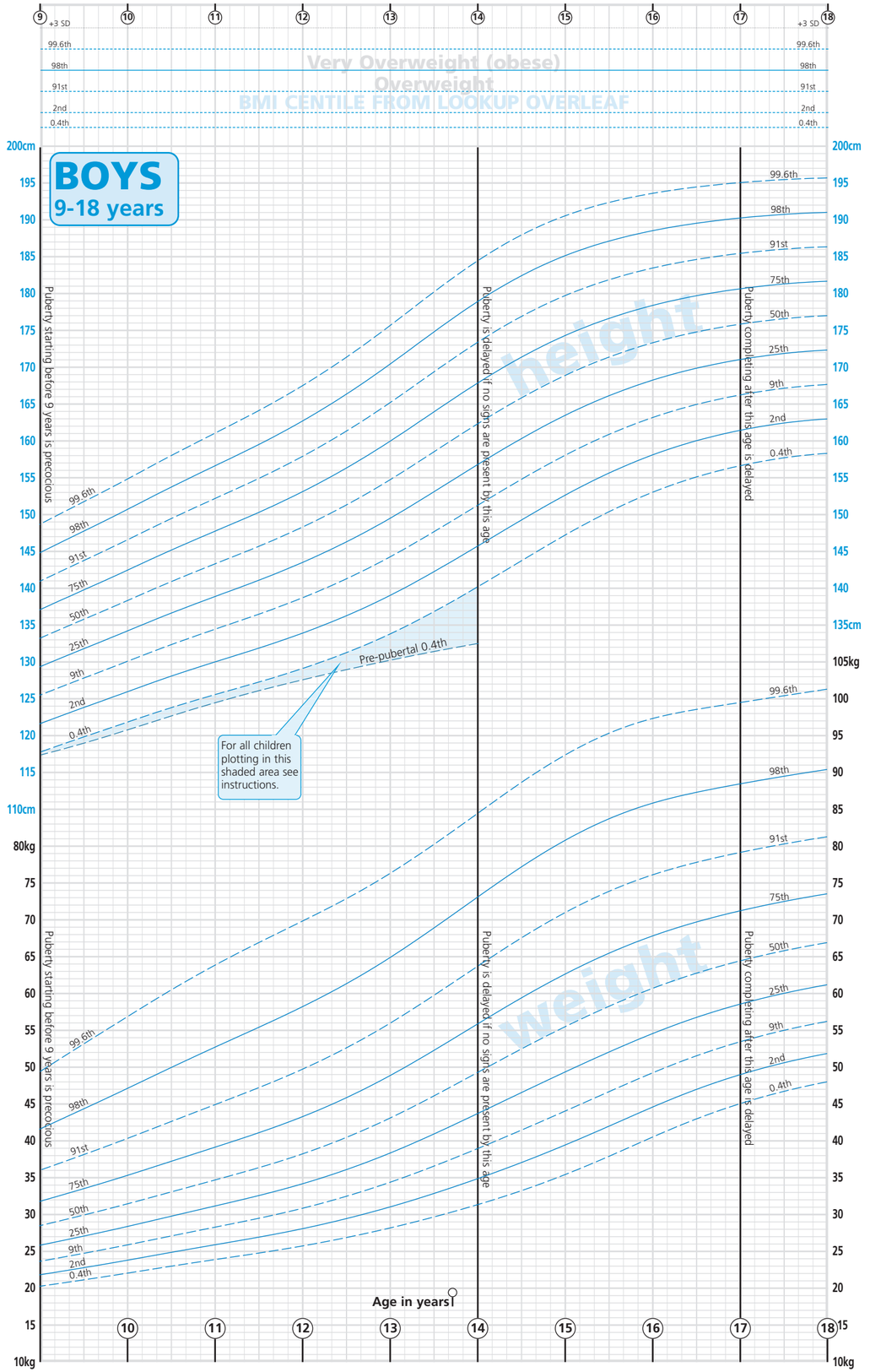
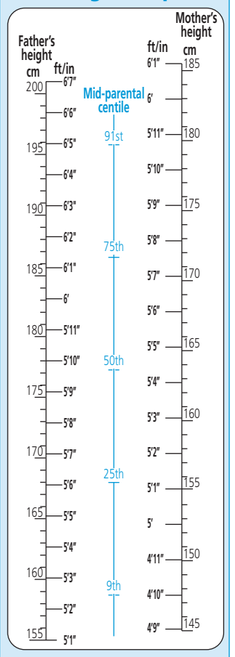




Parent Height Comparator



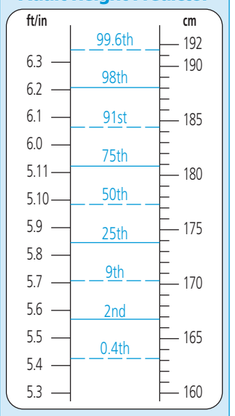
Father's height: _____

Mother's height: _____

Mid-parental Centile

- Plot the the Mother's and Father's heights on their respective scales and join the two points with a line. The mid-parental centile is where this line crosses the centile line in the middle.
- Compare the mid-parental centile to the child's current height centile, plotted on the adult height predictor centile scale.
- Nine out of ten children's height centiles are within ±two centile spaces of the mid-parental centile.

Adult Height Predictor



Predicted Adult Height

- Plot the most recent height centile on the relevant centile line and
- Read off the predicted adult height for this centile.
- Four out of five children will be within ±6 cm of this value.