

ASSESSING GROWTH AND DETERMINING HEALTHY WEIGHT RANGE

Growth is influenced by many factors including ethnicity, family genetics, timing of puberty, chronic disease, psychosocial environment and nutrition. These factors should be considered as part of a comprehensive history and examination. If an organic growth disorder is suspected, a paediatrician should assess the patient. In some cases referral to a specialist paediatric endocrinologist may be indicated.

METHODS TO ASSESS GROWTH

For adolescents with an eating disorder the most important growth assessment methods are:

- Accurately measuring height and weight and plotting on growth charts.
- Obtaining previous height and weight measurements; plotting on growth charts.
- Using growth charts to determine the growth trajectory.
- Calculating BMI and interpreting using BMI-for-age percentile charts.
- Other methods may be used to assess growth but require specialist training and facilities.

MEASURING WEIGHT AND HEIGHT

Weight

- Scales should be calibrated regularly and weight should be measured consecutively on the same scales.
- Patients should wear minimal clothing, empty their pockets and remove shoes.
- Where possible, weigh patients early in the morning, before breakfast and after urination.
- Limit weighing to once or twice weekly; frequent weighs can overemphasize its importance.
- Patients may manipulate their weight by water loading or concealing heavy objects. If this is suspected consider random or “surprise” weight measurement.

Height

- Height should be measured as accurately as possible, ideally with a stadiometer, on admission and subsequently at three monthly intervals.

OBTAINING PREVIOUS HEIGHT AND WEIGHT MEASUREMENTS

- Plotting and interpreting one-off measurements is not as useful as a series so obtain as many previous height and weight measurements as possible.
- The Personal Health Record or “blue book” can provide useful information on weight and length measurements in infancy and early childhood.
- Check previous medical records and seek previous measures from the parents or GP.

USING GROWTH CHARTS TO DETERMINE GROWTH TRAJECTORY

- The National Health and Medical Research Council (NH&MRC) has recommended that the American Centre for Disease Control (CDC) growth charts be used in Australia. Copies of these charts are included in Appendix 2. For additional charts and information visit www.cdc.gov/growthcharts
- Plot the accurate height and weight measurements on growth charts to obtain a pattern of growth or growth trajectory.

MID PARENTAL HEIGHT

Mid parental height (MPH) is a calculation that estimates the expected adult height of an individual based on their parents' heights. This measurement may be helpful if there are inadequate data to determine growth trajectory.

HOW TO CALCULATE MID PARENTAL HEIGHT

Girls MPH = $[(\text{Dad's height} - 13) + \text{Mum's height}] / 2$

Boys MPH = $[(\text{Mum's height} + 13) + \text{Dad's height}] / 2$

For example, if mum is 165cm and dad is 176cm, their daughter's MPH would be:

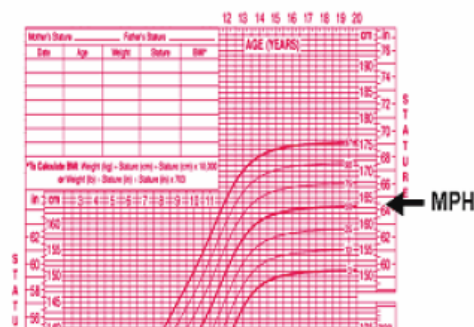
MPH = $[(176-13)+165]/2 = [163+165]/2 = 328/2 = 164\text{cm}$

And their son's MPH would be:

MPH = $[(165+13)+176]/2 = [178+176]/2 = 354/2 = 177\text{cm}$

In our example the expected adult height (or MPH) of 164cm for the daughter is at the 50th percentile (pictured).

It would be expected that this girl's height would track along the 50th percentile throughout her childhood and adolescence. If it is significantly above or below the 50th percentile, a referral to a paediatrician or paediatric endocrinologist for a more thorough growth assessment is indicated.



BODY MASS INDEX (BMI)

- BMI is an anthropometric index of weight and height. It is not a diagnostic tool.
- BMI is calculated as follows: $BMI = \text{weight (kg)} \div \text{height (m)}^2$

'BMI FOR AGE' IS USED FOR CHILDREN AND ADOLESCENTS

- Because body composition changes throughout childhood, BMI cannot be interpreted for children and adolescents in the same way as it is for adults. Instead, 'BMI-for-age' is used.
- BMI is plotted on gender-specific BMI percentile charts. Copies of the American Centre for Disease Control (CDC) BMI charts are included in Appendix 2. For additional charts and information visit www.cdc.gov/growthcharts
- The BMI-for-age charts contain a series of curved lines indicating specific percentiles. The following cut-off points have been used to identify underweight and overweight in children and adolescents.

BMI-for-age	< 5th percentile	Underweight
BMI-for-age	5th percentile to <85th percentile	Normal
BMI-for-age	85th percentile to <95th percentile	At Risk of Overweight
BMI-for-age	> 95th percentile	Overweight

DETERMINING A HEALTHY WEIGHT RANGE

- Determining a healthy weight range helps patients, their family and the treating team plan management and assess progress.
- A **healthy weight range (HWR)** rather than a specific target weight should be set.
- It is important to avoid long discussions or negotiations about HWR as this may 'collude' with the eating disorder and encourage a focus on weight rather than physical health as an outcome.
- The HWR is not necessarily the discharge weight. Patients may be discharged from hospital below the HWR and before full physical recovery depending on medical and/or psychological stability.
- Normal vital signs are indicators of physical recovery. However these can return to normal below a HWR or, if weight loss has been rapid, they can be abnormal within a HWR.
- For girls, return or commencement of menses is an indicator of physical recovery. Menses may take some time to return after weight restoration, or may sometimes return at a low weight.

Physical recovery is the best indicator of healthy weight; hence HWR will be unique to each individual

APPROXIMATING THE HEALTHY WEIGHT RANGE

- Assess previous growth trajectory and set a HWR. HWR must allow for continued growth along the individual patient's growth trajectory.
- Using BMI-for age, an estimation of a HWR can be made.
- A normal BMI is 5th percentile to <85th percentile. The 5th percentile is often too low for physical recovery to occur for patients with eating disorders.
- A BMI between the 25th and 85th percentiles is recommended, as this is more likely to correlate with physical recovery.
- BMI for 25th and 85th percentiles (ages 12 -18) are listed below.

Age	Male		Female	
	HWR BMI = 25 th %ile	HWR BMI = 85 th %ile	HWR BMI = 25 th %ile	HWR BMI = 85 th %ile
12.0	16.4	21.0	16.5	21.7
12.5	16.7	21.4	16.8	22.2
13.0	17.0	21.8	17.0	22.5
13.5	17.3	22.2	17.4	23.0
14.0	17.6	22.6	17.6	23.3
14.5	17.9	23	17.9	23.7
15.0	18.2	23.4	18.2	24.0
15.5	18.6	23.8	18.4	24.3
16.0	18.9	24.2	18.6	24.6
16.5	19.2	24.6	18.9	24.9
17.0	19.5	24.9	19.1	25.2
17.5	19.8	25.2	19.3	25.4
18.0	20.0	25.6	19.4	25.6

Example: a 12yr old girl who is 150cm tall would need to be 37-47kg to achieve a BMI of 16 to 21. If her growth has always previously been around the 25-50th percentiles her HWR may be set as 37-41kg.