HEALTH BASICS

Growth chart

A growth chart compares a child's body measurements with those of similar children.

WHAT IT IS
A visual record comparing a child's growth over time

WHERE IT COMES UP
Routine child health visits and growth assessments

WHY IT MATTERS
Helps identify growth patterns needing closer assessment

WHAT IT IS NOT
Not a disease or diagnosis

WHO TO ASK
A pediatrician, family clinician, nurse, or dietitian

HOW IT IS CHECKED
Accurate measurements plotted for age and sex

Overview

A growth chart is a graph used to follow a child's physical growth. It compares measurements such as weight and height with measurements from other children of the same age and sex.

Growth charts are used from infancy through adolescence. Depending on the child's age, a chart may show:

A growth chart is not a test that a child passes or fails. It is also not a diagnosis or a prediction of adult height. Its main value comes from showing a pattern across several accurate measurements.

Different charts may be used in different countries and age groups. In the United States, World Health Organization growth standards are generally used from birth to age 2, followed by Centers for Disease Control and Prevention charts from age 2 through 20. Other health systems may use different national or international charts.

- Weight
- Length or height
- Head circumference

- Weight compared with length
- Body mass index, or BMI

How it works

Measurements are plotted by age along curved lines called percentiles. A percentile shows how one measurement compares with a reference group.

For example, a child whose height is at the 25th percentile is taller than about 25% of children in the reference group and shorter than about 75%. This does not mean that the child is 25% of a healthy height. Percentiles are rankings, not grades.

The 50th percentile is the middle of the reference group. It is not an ideal that every child should reach. Healthy children can grow along lower or higher percentiles.

Charts are designed for particular measurements:

BMI uses weight and height together. In children, BMI is interpreted by age and sex because body composition changes during growth. A child's BMI number should not be interpreted using adult BMI categories.

Some charts use a z-score instead of, or alongside, a percentile. A z-score describes how far a measurement is from the middle of the reference group. Clinicians may use z-scores to assess change more precisely.

Accurate plotting requires the correct date of birth, measurement date, sex-specific chart, and measurement method. Babies are usually measured lying down for length. Older children stand for height without shoes. Weight should be measured on a suitable, calibrated scale.

Children born early may have their growth assessed using an age adjusted for prematurity. Ask the child's clinician whether an adjusted age is being used and for how long.

- Weight-for-age compares weight with age
- Length- or height-for-age compares body length or standing height with age
- Weight-for-length compares an infant's weight with length
- BMI-for-age compares BMI with age
- Head circumference-for-age compares the size around an infant's head with age

Why it matters for your health

One measurement gives only a snapshot. Several measurements show whether a child is

growing at a steady rate.

Children do not have to remain on exactly the same percentile. Growth can shift during infancy, puberty, or other periods of change. Family traits also matter. Children with shorter parents may follow a lower height percentile, while children with taller parents may follow a higher one.

A clinician looks at the full pattern rather than one plotted point. They may consider:

A growth pattern can help start a useful conversation. It cannot explain the cause by itself. If a measurement is unexpected, the first step may simply be to repeat it and check that the correct chart was used.

- How quickly weight, height, or head size is changing
- Whether measurements are moving across several percentile curves
- Whether weight and height are changing together
- The child's stage of puberty
- Birth history and family growth patterns
- Eating, digestion, activity, sleep, medicines, and general health

What can go wrong

The most common problem is a measurement or recording error. Clothing, shoes, movement, a poorly positioned infant, or an incorrect birth date can change the plotted result. Switching between different chart types can also make growth appear to shift.

A confirmed pattern may relate to several situations or health conditions.

Faltering growth describes weight gain or growth that is slower than expected. Possible contributors include feeding difficulty, limited access to enough food, swallowing problems, digestive conditions, chronic illness, or increased nutritional needs. A growth chart alone cannot identify which, if any, applies.

Short or tall stature may reflect family traits or the timing of puberty. Less commonly, it may relate to hormone, genetic, nutritional, or long-term medical conditions.

Higher weight or BMI percentiles may lead to an assessment for overweight or obesity. BMI is a screening measure, not a direct measurement of body fat. Muscle mass, puberty, health conditions, medicines, and the overall growth pattern may affect its interpretation.

Unexpected head growth in a baby may reflect measurement error, family head size, or a condition affecting skull or brain growth. Head circumference must be considered with development, examination findings, and repeat measurements.

Some children have medical or genetic conditions that affect growth in distinctive ways. Condition-specific charts exist for some groups, but they may have limitations. A clinician may use them alongside standard charts rather than as a replacement for an individual assessment.

A surprising chart result is usually suitable for routine follow-up, especially if the child seems well. Arrange a routine appointment if measurements repeatedly shift, clothes no longer fit as expected, feeding is difficult, puberty seems unusually early or late, or you have concerns about development.

Seek urgent medical advice when growth concerns occur with signs of acute illness, such as repeated vomiting, inability to keep fluids down, much less urination, unusual sleepiness, or worsening weakness.

Call emergency services for severe breathing difficulty, unresponsiveness, a seizure lasting several minutes, or other immediately life-threatening symptoms. These emergencies are not caused by the chart; they require attention because of the child's current condition.

What you can do

Keep a record of measurements taken by a health professional, including the date and the chart used. Home measurements can be useful for context, but small differences in equipment or technique can create misleading changes.

At an appointment, you can ask:

Further assessment is not always necessary. When it is, it may include a detailed feeding and health history, a physical examination, or repeat measurements after an agreed interval. Blood tests or other investigations are used only when the history, examination, or growth pattern suggests a reason.

Avoid putting a child on a restrictive diet or using supplements solely because of a percentile. If food intake or weight is a concern, ask a pediatrician, family clinician, nurse, or pediatric dietitian for advice suited to the child's age and needs.

- Which chart is being used, and is it appropriate for this age?
- Is the pattern changing, or is this one unusual measurement?
- Should the measurement be repeated?
- Are weight, height, BMI, and head size being considered together?
- Could prematurity, puberty, medicines, or family growth patterns matter?
- Is any further assessment needed?

Common questions

Is a higher percentile better?

No. A higher percentile is not automatically healthier. The overall pattern and the relationship between measurements matter more than being near the middle or top of the chart.

Does a low percentile mean something is wrong?

Not by itself. Some healthy children consistently grow on lower percentiles. A clinician will consider the child's previous measurements, family pattern, development, eating, and general health.

Why did the percentile change?

Possible reasons include normal growth shifts, puberty, illness, changes in nutrition, or measurement error. A repeat measurement can help show whether the change is real.

Can a growth chart predict adult height?

It may provide broad context, but it cannot predict adult height with certainty. Genetics, puberty timing, nutrition, health conditions, and other factors affect final height.

Are online growth-chart calculators reliable?

They may calculate a percentile correctly if the data and chart are correct, but they cannot assess measurement quality or the child's wider health. Check unexpected results with a clinician.

Do all children use the same chart?

No. Charts differ by age, sex, country, and purpose. Premature infants and children with certain conditions may need additional interpretation.

Sources

- Centers for Disease Control and Prevention: Growth Chart Training
- Centers for Disease Control and Prevention: Clinical Growth Charts
- World Health Organization: Child Growth Standards
- World Health Organization: Growth Reference Data for 5-19 Years
- National Institute for Health and Care Excellence: Faltering Growth-Recognition and Management of Faltering Growth in Children, NICE Guideline NG75



- Kuczmarski RJ, Ogden CL, Guo SS, et al. 2000 CDC Growth Charts for the United States: Methods and Development. National Center for Health Statistics, 2002