

## Normal Growth in Children

### What is normal growth?

Growth in children is as unique as each individual child. Many factors influence how much and how rapidly a child grows, and how tall he or she will be as an adult, including **heredity, nutrition, hormones, and underlying illness**. Some of these factors can be controlled and others cannot. In addition to that, there are certain times of the year and periods of development, such as puberty, when children have growth spurts.

**Heredity** (the genes we inherit from our parents) is one of the most important factors influencing a child's growth. Height varies widely among different ethnic groups, among different families within the same ethnic group, and even among members of the same family. Overall there is a strong association between the height of a child's parents and the height of the child. Those kids with tall parents will probably end up tall, whereas those kids with short parents will likely end up short. The expected adult height of a child can be estimated based on the height of the parents.

**Nutrition** is another important factor in a child's growth. A well-balanced, age-appropriate diet that includes carbohydrates, proteins, fats, and vitamins and minerals can have a positive affect on how well a child grows. Children who receive an inadequate amount of calories or nutrients may grow poorly; improving the diet of children can improve growth. However, there really is no "average" diet that is best for all children. A child's specific dietary requirement varies with age, physical activity level, and other factors.

**Hormones** are chemical messengers of the body. They are released from glands and circulate in the blood, affecting everything from growth and metabolism to blood pressure and mood. Almost all hormones affect growth to some extent, but some have particularly important roles in your child's growth, including **growth hormone and thyroid hormone, and cortisol**.

**Growth hormone** is essential for normal growth. It is made by the pituitary gland (located at the base of the brain), then released into the bloodstream, where it travels to the body's tissues. Here it stimulates production of a growth factor, called insulin-like growth factor 1 or **IGF-1**. Growth hormone works to stimulate growth in large part due to the effect in releasing IGF-1.

### **How is normal growth assessed?**

The best measure of the general health of a child is the child's height and weight. It is helpful to have **past height and weight measurements** from the primary care physician or school records available. It is also important to know the **parental heights**. One of the most important things to do is to ensure that your child is measured **without shoes** and plotted on a growth chart at least once every year.

### **What are normal growth rates for children?**

Infancy (0-12 months) 9-11 inches/year or 23-28 cm/year

Toddler (12-24 months) 3-5 inches/year or 7.5-13 cm/year

Childhood (3 years to puberty) 2-2.5 inches/year or 5-6.5 cm/year

### **How will I know if my child's growth is normal?**

The doctor will review your child's records and determine his/her growth pattern by plotting the measurement on a **growth chart**. Growth charts provide standards for children at various ages. The doctor will view the growth of your child over the years, as well as, how your child compares to other children who are the same age and sex. A **medical history** and **physical exam** may be done. This information will help determine whether your child is growing at a normal rate and/or a normal pattern for his age and genetic potential. Occasionally an **X-ray** of the left hand and wrist may be obtained, to measure the bone age in comparison to the chronological (actual) age, if there are concerns about height.