

Growth after Childhood Cancer Treatment

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Survival rates for childhood cancer have grown greatly over the last few decades thanks to many advances in pediatric cancer treatment. Today the majority of children diagnosed with cancer will become long-term survivors. Survivors can be at risk for developing health problems after cancer treatment. These health problems are called late effects and can include problems with growth. Many parents of survivors worry about their child's growth after cancer treatment. In a study of the patients seen in the Aflac Cancer Survivor Clinic, 18% of patients had a problem with growth.

Growth is a normal process throughout childhood and puberty. Teenagers finish growing at the end of puberty, typically around age 15 old for girls and 18 for boys. Doctors can use the heights of the biological parents as a predictor for a child's final adult height. This is done by calculating the average height of the two parents, factoring in a correction for gender. This predicted height is used as a target for the percentile at which the child should be growing. If the parents are short, the child's final height will likely be much less than his peers. Likewise, if the parents are tall, the child is expected to be tall as well

When a child is significantly below the average height for peers (of the same age and gender) and/or well below the expected percentile based on the parents' heights, this is called short stature. Short stature can sometimes be related to poor nutrition or differences in the timing of puberty. If a child or teen has a low weight and low body mass index (BMI), growth can be slower and height percentiles lower than expected. It is important for children and teens to maintain a healthy weight in order to grow.

When a child begins puberty and hormones are released, this results in an increase of the growth rate - the pubertal "growth spurt". However, pubertal hormones also affect the growth plates. A few years after puberty begins the growth plates will begin to close. Once the plates are closed, no more growth can take place. Puberty causes more rapid growth, but it also begins the process of ending growth. If a child had delayed puberty compared to peers (a "late bloomer"), he may be shorter during adolescence, but eventually catch up when puberty finally occurs. On the other hand, if puberty occurs too early, the child will grow faster for a period of time but the growth plates will close early, and the final result could be short stature as an adult.

Cancer treatments can effect growth in many ways. When a child is undergoing treatment for cancer, growth may be slowed because weight loss and poor eating are often side effects of cancer treatments. If there is weight loss or failure to gain adequate weight, the growth will be temporarily slowed and can recover when the weight gain recovers. Some medications, such as prednisone and Decadron, which are used to treat certain cancers, can slow growth during treatment. Other causes of poor growth include hypothyroidism, growth hormone deficiency, anemia and renal disease.

Growth hormone is produced by the pituitary gland, a gland in the center of the brain. If the pituitary gland is damaged, growth failure can occur because not enough growth hormone is produced. Among

children treated for cancer, the most common cause of growth hormone deficiency is radiation to the head or total body irradiation, as is used for bone marrow transplant. In addition, certain brain tumors and brain surgery can damage the pituitary gland, resulting in growth hormone deficiency.

If your doctor is concerned about your child's growth, he may send you to see an endocrinologist, which is a hormone doctor. The endocrinologist will evaluate your child's growth pattern and hormone levels and may test your child for growth hormone deficiency. If your child has growth hormone deficiency he may be treated with growth hormone injections to help him grow. There are many factors to consider before starting growth hormone, and the endocrinologist will discuss the benefits and risks of growth hormone therapy with you before starting any injections.

To learn more about childhood cancer survivorship visit www.cancersurvivorlink.org or www.choa.org/cancersurvivorship.

- Survivors of childhood cancer can have problems with growth after treatment
- If you are concerned about your child's growth, talk with your oncologist about seeing an endocrinologist
- Survivors who have received radiation to the head are at highest risk for problems with growth