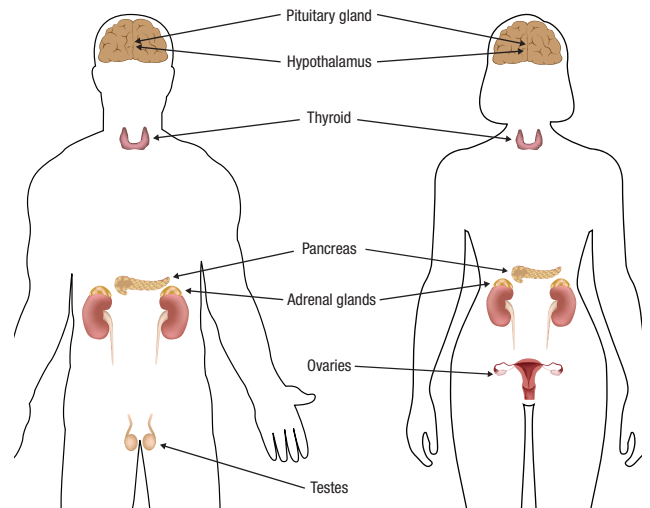


## Precocious Puberty after Cancer Treatment

Some people who were treated for cancer during childhood may develop endocrine (hormone) problems as a result of changes in the function of a complex system of glands known as the endocrine system.

### What is the endocrine system?

The endocrine system is a group of glands that regulate body functions including growth, puberty, energy level, urine production, and stress response. Glands of the endocrine system include the pituitary, hypothalamus, thyroid, pancreas, adrenal, ovaries, and testes. The hypothalamus and pituitary are sometimes called the “master glands” because they control many of the other glands in the endocrine system. Unfortunately, some treatments given for childhood cancer can damage the endocrine system, resulting in a variety of problems.



### What are hormones?

Hormones are chemical messengers that carry information from the endocrine glands through the bloodstream to the body's cells. The endocrine system makes many hormones (such as growth hormone, sex hormones, adrenal and thyroid hormones) that work together to maintain specific bodily functions.

### What is the normal age for puberty to begin?

Puberty normally begins between the ages of 8 and 13 in children born with ovaries, and 9 and 14 in children born with testes. The timing of puberty is influenced by a person's genetic background, and the onset of puberty at a young age may run in families. Most children born with ovaries begin to develop breasts and then pubic hair at around age 10 or 11. Menstrual periods usually start at around 12 to 13 years of age but may occur earlier or later and still be normal. Children born with testes usually begin to develop enlargement of the testicles and then pubic hair between 11 and 12 years of age.

### What is precocious puberty?

Precocious puberty means having signs of puberty (such as pubic hair or breast growth) at an age younger than is normally expected. Most healthcare providers agree that a child born with ovaries has precocious puberty if sexual traits develop earlier than age 8, and a child born with testes has precocious puberty if sexual traits develop prior to age 9.

The early release of hormones that cause precocious puberty also causes a growth spurt, with rapid bone growth. Early bone maturation results in less time for growth, so the child with precocious puberty will have a final adult height that is actually much shorter than expected.

### What are the risk factors for developing precocious puberty?

- Radiation to the head or brain, especially doses of 18 Gy (1800 cGy/rads) or higher
- Children with ovaries
- Younger age at the time of cancer treatment
- Being overweight or obese

## Why does precocious puberty happen?

The hypothalamus and pituitary gland in the brain may be damaged after radiation treatments. The damage causes them to signal the ovaries or testicles to make sex hormones at an earlier time. In other cases, signs of puberty occur early because of abnormalities in the ovaries, testes or adrenal glands. Tests are done to learn if the cause of precocious puberty is in the brain or in another part of the body.

## What screening is recommended?

All childhood cancer survivors should have a yearly comprehensive health check-up including measurement of height and weight, and evaluation of pubertal progress. If there are signs of accelerated growth or precocious puberty, your healthcare provider may order a blood test to check sex hormones produced in the brain (FSH—follicle stimulating hormone; LH—luteinizing hormone), testes (testosterone) or ovaries (estradiol) as well as possibly order an x-ray that measures the developmental age or maturation of bone (bone age). Your healthcare provider should refer you to an endocrinologist (hormone specialist) for further evaluation and treatment.

## How is precocious puberty treated?

Endocrinologists may use medications to temporarily stop puberty and to decrease the rate of bone maturation. It is also important to evaluate and manage the psychological effects of beginning puberty too early. Although children with precocious puberty may have a mature physical appearance, their thoughts, emotions, and behaviors may still be that of their actual (chronological) age.

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**Additional health information for childhood cancer survivors is available at**  
[www.survivorshipguidelines.org](http://www.survivorshipguidelines.org)

**Note:** Throughout this *Health Links* series, the term “childhood cancer” is used to designate pediatric cancers that may occur during childhood, adolescence, or young adulthood. Health Links are designed to provide health information for survivors of pediatric cancer, regardless of whether the cancer occurred during childhood, adolescence, or young adulthood.

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