

# LIFELINE

St. Jude for Life



Spring 2015

## Research MATTERS: Pituitary Hormone Deficiencies

Dear St. Jude Alumni,



One of the major goals of the St. Jude Lifetime Cohort (SJLIFE) study is to understand the hormone-related side effects of treatment.

In this issue's featured research, we looked at brain radiation and deficiencies in the hormones, such as growth hormone, that are produced by the pituitary gland. This "master gland" controls many parts of the body's hormonal system.

Hormone deficiencies often go undiagnosed and untreated, creating unexplained problems for survivors. We were surprised to find that 212 people—more than 60 percent of the 348 participants in this study who had growth hormone deficiency—were diagnosed with the deficiency for the first time during the St. Jude Life study evaluation. This fact points out an important benefit of participating in the study evaluation. It also underlines the importance of having regular health screenings based on your specific treatment risk factors.

Thanks, participants, for making this research possible, and remember to stay up-to-date with your recommended health screenings!

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Research Hospital  
ALSAC • Danny Thomas, Founder

### WHAT are pituitary hormone deficiencies and why did we study them?

Hormones are chemicals produced by the body that influence growth and development and control how cells and organs work. Some cancer treatments can result in decreased hormone production. In particular, radiation therapy to the brain can lead to hormone deficiencies by damaging the pituitary gland. This pea-sized structure in the brain produces many hormones that help regulate important bodily functions. Pituitary hormone deficiencies are linked to serious health problems, including heart disease, osteoporosis (loss of bone strength), and early aging.

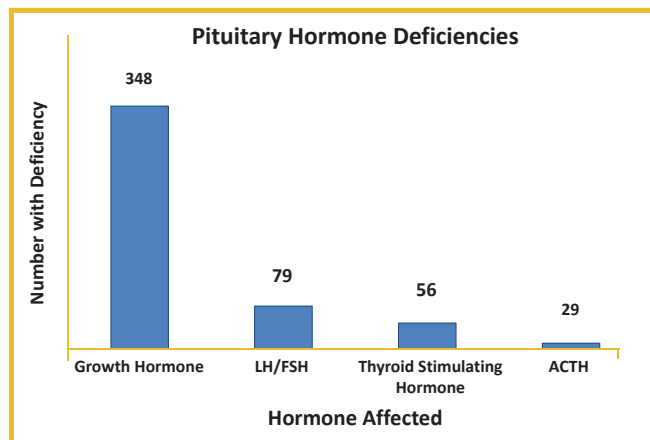
### WHO participated in this study?

748 St. Jude Life study participants took part—394 men and 354 women. Their average age at the time of the St. Jude Life evaluation was 34.2 years. The participants had been diagnosed with many different types of childhood cancer. However, all had been treated with brain radiation.

### WHAT hormone deficiencies did we find?

We looked at four pituitary hormones. Many study participants had deficiencies in one or more of the following:

- **Growth hormone (GH):** Affects how the body uses fat, makes muscle, and strengthens bones. It influences overall health throughout life.
- **Reproductive hormones (LH/FSH):** Stimulate the testes and ovaries to produce sex hormones and play a role in sexual development.
- **Thyroid stimulating hormone (TSH):** Stimulates the thyroid gland, which helps regulate heart and digestive functions and sets the speed of metabolism.
- **ACTH:** Controls production of the stress hormone cortisol, which plays an important role in the body's response to stress and illness.



### WE FOUND that . . .

- The most common deficiencies were of growth hormone and the reproductive hormones LH and FSH. Almost half (47 percent) of the study participants were deficient in growth hormone; 11 percent were deficient in LH/FSH.
- Hormone deficiencies were linked to any dose of radiation to the head. Compared to doses of less than 22 Gy, the risk of growth hormone deficiency was increased for doses from 22 Gy to less than 30 Gy and the risk of LH/FSH deficiency was increased for doses of 22 Gy or more.
- Untreated growth hormone deficiency was linked to decreased muscle mass and reduced capacity for exercise; untreated LH/FSH deficiency was linked to high blood pressure, high cholesterol, thinning bones, and slow walking (a sign of frailty, a condition that is associated with early aging).
- Both growth hormone deficiency and LH/FSH deficiency were linked to central obesity, low energy expenditure (another sign of frailty), and muscle weakness.
- More than 99 percent of participants with growth hormone deficiency were untreated; 79 percent of participants with LH/FSH deficiency were untreated.

## Research underlines the value of lifelong risk-based screening

Untreated pituitary hormone deficiencies can lead to health problems, including high cholesterol and other risk factors for heart disease, thinning bones, muscle weakness, reduced ability to exercise, decreased energy, and a decreased sense of psychological and emotional well-being. Unfortunately, as Dr. Wassim Chemaitilly, the leader of the hormone study research team, observes,

*“With an average of 27 years of follow-up we found a substantial number of hormone deficiencies decades after treatment. Strikingly large numbers of new cases of growth hormone deficiency were uncovered by the St. Jude LIFE study systematic screening.”*



Dr. Wassim Chemaitilly  
led the research study

The hormone deficiencies analyzed in this study were linked to radiation therapy to the head. Growth hormone deficiency was the most commonly found hormone problem. Dr. Chemaitilly notes that “it occurred even at relatively low doses of radiation.” In addition to the health problems listed above, the research team found that growth hormone deficiency, in particular, was linked to the condition known as frailty. Frailty is defined by loss of muscle mass, strength, and overall stamina, or “staying power.” People often become more frail as they age and the condition is associated with reduced life span. *(Please see the Spring 2014 LIFEline newsletter for additional information about frailty.)*

### What survivors should know about hormone deficiencies and replacement therapy

- It's possible that hormone replacement therapy can improve health problems for many survivors with hormone deficiencies.
- While we were not able to determine if growth hormone replacement therapy could lead to improvements in conditions like heart disease and frailty, we do know the therapy has proved beneficial in many other studies among adults with growth hormone deficiencies.
- Unfortunately, the results of this study suggest that a large proportion of hormone deficiencies go undiagnosed, even though many could likely be found with regular risk-based screening.

The findings from this study, especially the fact that so many deficiencies were uncovered decades after cancer treatment, underline **the importance for all survivors** to take part in lifelong health screenings that are recommended for them based on the specific cancer treatments they received. The Children's Oncology Group Survivorship Guidelines recommend the following for survivors at risk of pituitary hormone deficiencies:

*“All cancer survivors should have a yearly physical examination including measurement of height and weight, assessment of their progression through puberty for younger individuals, and assessment of overall well-being. If a hormone problem is suspected, further tests may be done and a referral may be made to a doctor who specializes in hormone problems (endocrinologist).”*

Doctors from St. Jude Children's Research Hospital took a lead role in developing the survivorship guidelines. The guidelines are based on decades of research like that presented here. They can be found at:

<http://www.survivorshipguidelines.org>

Please review the guidelines and share them with all your healthcare providers. And **please make it YOUR priority** to participate in the health screenings that are recommended for you!

The results of this study were recently published in the *Journal of Clinical Oncology*.

### LIFEline

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### If you'd like to learn more about hormones . . .

The Endocrine Society hosts a patient-centered resource site with materials in English and Spanish:

<http://www.hormone.org>