Dear Friends,

September is National Childhood Cancer Awareness Month. While it is heartbreaking for any family to experience cancer in their child, it is important to know the facts of those cancers most at risk to young populations. Cancer is the leading cause of death by disease in children under the age of 15 in the United States, and it is estimated that every year 263,000 new cases of cancer affect children under the age of 20 worldwide. Childhood cancer occurs randomly and spares no ethnic group, socioeconomic class, or geographic region. In the United States, the incidence of cancer among adolescents and young adults is increasing at a greater risk than any other age group, except those over 65 years.

This month's e-newsletter provides an overview of childhood cancer and can help educate you and your loved ones to learn ways to combat these horrible diseases.

Sincerely,

The Institute Staff
The types of cancers that children develop often differ from those of adults. Often, cancer can develop in children when DNA changes take place in the cells early on in life, sometimes even before birth. Therefore, unlike many cancers that affect adults, childhood cancers are not strongly linked or correlated with lifestyle risk factors. Chemotherapy is a primary combative treatment for childhood cancers, and children's bodies tend to respond better to this treatment than some adults. However, chemotherapy treatments can cause long-term side effects (for instance, loss of fertility) for children, so follow-up appointments are often necessary for these patients well into their adult lives.

Pediatric oncology centers began to emerge in the 1960's to provide patients and their families access to facilities that specialize in childhood cancer treatment. These centers have specialized pediatric oncologists, surgeons, radiation oncologists, pathologists, nurses, psychologists, and social workers who all work as a team to treat childhood cancers.

The Most Common Childhood Cancers

The most prevalent childhood cancers are different from those seen in adults. The most common cancers for children are:

- Leukemia
- Brain and other central nervous system tumors
- Neuroblastoma
- Wilms tumor
- Lymphoma
- Rhabdomyosarcoma
- Retinoblastoma
- Bone cancer

Children may also develop other types of cancer and even cancers that are more common in adults, but this is very rare.

Leukemia

Leukemias are cancers of the bone marrow and blood; these are the most common childhood cancers accounting for about 30% of all childhood cancers. The most common types are lymphocytic leukemia and acute myelogenous leukemia, which
can cause bone and joint pain, fatigue, weakness, pale skin, bleeding or bruising, fever, and weight loss.

**Brain and central nervous system tumors**

These are the second most common cancers in children and account for roughly 26% of childhood cancers. Most childhood brain tumors originate in the lower parts of the brain, including the cerebellum and brain stem, whereas adults are more likely to develop tumors in the upper parts of the brain. These cancers cause headaches, nausea, vomiting, blurred or double vision, dizziness, and trouble walking or handling objects. Treatment and outlook for these cancers vary greatly by the type of tumor.

**Neuroblastoma**

Neuroblastoma occurs in infants and young children, starting in early forms of nerve cells found in a developing embryo or fetus. Neuroblastoma accounts for about 6% of childhood cancers. While this tumor can start anywhere, it is usually found in the abdomen and is noticed as swelling. Neuroblastoma can cause bone pain and fever and is rarely found in children over 10.

**Wilms tumor**

Wilms tumor is also known as nephroblastoma and originates in the kidney and accounts for about 5% of childhood cancers. This is most common in children ages 3-4, and is very uncommon in children older than 6 years. Wilms tumor presents as a swelling or lump in the abdomen and can be accompanied by fever, pain, nausea, and poor appetite.

**Lymphoma**

Lymphoma cancers originate in certain cells of the immune system called lymphocytes and most often grow in lymph nodes and other lymph tissues. Lymphomas can also impact bone marrow and other organs, causing a range of symptoms depending on where the cancer is. Lymphomas can cause weight loss, fever, sweats, fatigue, and lumps under the skin. The two main types of lymphoma, Hodgkin lymphoma and non-Hodgkin lymphoma, occur in both children and adults.

Hodgkin lymphoma is more common in ages 15-40 and older than 55. Non-Hodgkin lymphoma is more likely to occur in younger children, though is rare in children younger than 3. Non-Hodgkin lymphoma in children is fast-growing and requires intensive treatment, but children tend to respond better to treatment than most non-Hodgkin lymphomas in adults.
Rhabdomysarcoma

This cancer originates in cells that normally develop into skeletal muscles. Rhabdomysarcoma can start in nearly any place in the body, including the head and neck, abdomen, groin, pelvis, or in an arm or leg. This cancer may cause pain or a lump and makes up about 3% of childhood cancers.

Retinoblastoma

Retinoblastoma is a cancer of the eye and typically occurs in children around the age of 2. In children with retinoblastoma, their pupil will look white or pink when shined with a light. This white glare can be noticed after a flash picture is taken. Children treated for retinoblastoma have a risk of cancer returning in and around the treated eye.

Bone cancers

While bone cancers can develop at any age, they are most prevalent in older children and teens. Primary bone cancers are different than metastatic bone cancer, which is a cancer that originates elsewhere in the body and spreads to the bones. The two most common bone cancers that occur in children are Osteosarcoma and Ewing sarcoma. Osteosarcoma usually develops in areas where bones grow quickly, such as arms and legs, and causes bone pain that intensifies at night or with activity. Ewing sarcoma is less common but can also cause bone pain and swelling. This cancer typically originates in the pelvic bones, the chest wall, or in the middle of long leg bones.

Risk Factors and Causes of Childhood Cancer

Lifestyle-related risk factors play a major role in many types of cancer in adults, but they are not thought to play much of a role in childhood cancers. Recently, scientists have made great progress in understanding how changes in DNA can cause cells to become cancerous. Oncogenes are genes that help cells grow, divide, or stay alive, while tumor suppressor genes help slow down cell division or cause cells to die at the right time. Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.
suppressor genes.

Some children may inherit DNA mutations from a parent that may increase their risk of certain types of cancer or syndromes that impact their health or development, though this is rare. Most childhood cancers are results of DNA changes that occur early in the child's life, not from inherited DNA mutations. These mutations can be very random, and it is important to know that if a child develops cancer, it is extremely unlikely there is anything that the parent or child could have done to prevent it.

**Symptoms of Cancer in Children**

Childhood cancers are rare and there is yet no widely recommended screening test to look for cancer in children, but there are some symptoms or possible signs you can look for in children. Cancers can be hard to recognize right away because early symptoms often present as common illnesses or injuries. Some symptoms to observe include:

- An unusual lump or swelling
- Unexplained paleness and loss of energy
- Easy bruising
- An ongoing pain in one area of the body
- Limping
- Unexplained fever or illness that does not go away
- Frequent headaches, often with vomiting
- Sudden eye or vision changes
- Sudden unexplained weight loss

While most of these symptoms are more likely caused by something other than cancer, it is important to consult your doctor and undergo regular check-ups when unusual signs or symptoms persist.

If you are interested in learning about ways you can support research in childhood cancer, please browse the [Lurie Children's Hospital website](https://www.luriechildrens.org/), the [American Childhood Cancer Organization website](https://www.acco.org/), or the list of organizations found [here](https://www.acco.org/organizations). Increased research should be devoted to discerning the causes of childhood cancer to better improve early detection and improved treatment options for those affected.

**Sources**

- [American Cancer Society](https://www.cancer.org)
- [Alex's Lemonade Stand](https://www.alexslemonade.org/)
Institute Happenings

The Women's Health Research Institute is excited to launch our Introduction to Reproduction MOOC through Coursera. This is a free, online course covering topics related to reproductive health. Introduction to Reproduction is a crash-course in human reproductive health through fact and biology-based information on a variety of topics. We will cover reproductive anatomy, key biological changes during puberty, sexual biology and contraceptive methods, reproductive disorders, and a special introduction to the exciting field of oncofertility. Specific lecture titles are as follows: 1) Reproductive Anatomy & Hormones, 2) Menstrual Cycle, Oocyte Maturation, & Sperm Activation, 3) Sexual Biology, Fertilization, & Contraception, and 4) Reproductive Health & Disorders. Click here to learn more today!

Illinois Men's Health Registry

The Women's Health Research Institute is excited to launch the Illinois Men's Health Registry! The registry is an online database that records confidential information on men's health and matches willing participants to ongoing research studies and trials. The registry will aid researchers in preventing disease and improving health conditions in men. The registry does not focus on any one disease or condition, but rather we invite all individuals to provide information that could help scientists learn more about chronic conditions, lifestyle behaviors and sex differences.

If you are interested in joining the Illinois Men's Health Registry today, click here!
Upcoming Events

October 14, 4:00pm-5:00pm: The Asher Center for the Study and Treatment of Depressive Disorders is presenting How to Get a Seat at the Table: Steps You Can Take to Advance Your Career, presented by Susan M. Essock, PhD, Professor of Psychiatry, Division of Mental Health Services and Policy Research, Department of Psychiatry, Columbia University. This program is geared towards faculty members. Please RSVP to b-sutcliffe@northwestern.edu.

October 20, 12:00pm-1:00pm: The Women's Health Research Institute's monthly research forum featuring Dr. Teresa Woodruff presenting The Upsetting Truth about Modern Medicine: Why We Need to Balance the Study of Males and Females. The event will be held in Prentice Women's Hospital, 3rd Fl., Conference Rm. L South. Lunch will be provided. Click here to register today!

October 30, 11:30am-5:00pm: Treating Women Differently: The Case for Sex-Based Medicine Symposium. This program is designed to facilitate a series of lectures and workshops for clinicians to include sex- and gender-based care in the fields of Cardiology, Dermatology, Gastroenterology, Infectious Disease, Neurology, Pelvic Health, Psychiatry, and Rheumatology. Click here to learn more and register!