Newest Approaches for Neuroblastoma Tailored to Patient Risk

Babies and young children with neuroblastoma may benefit from the focused experience and newest treatment options available at the University of Chicago Comer Children’s Hospital. This is one of few centers in the U.S. offering phase I clinical trials for this disease – the most common cancer among babies and one of the most prevalent cancers in children under age 10. Comer Children’s Hospital is among only 14 institutions nationally – and the only hospital in the Chicago area – that has open New Agents for Neuroblastoma Treatment (NANT) phase I clinical trials for infants and children with neuroblastoma who have failed treatment.

The neuroblastoma program is led by Susan L. Cohn, MD, director of clinical research, section chief of clinical sciences at the University of Chicago Institute for Molecular Pediatric Sciences, and a nationally respected authority on neuroblastoma. Additionally, Dr. Cohn is vice-chair of the Neuroblastoma Disease Committee of the Children’s Oncology Group (COG) of North America and is president-elect of the Advances in Neuroblastoma Research Association.

Dr. Cohn applies her national stature and depth of expertise in neuroblastoma research to further clinical advances at Comer Children’s Hospital. Neuroblastoma has a broad spectrum of clinical behavior, which is reflective of the tumor’s biologic heterogeneity. Modern treatment strategies are tailored according to patient risk, which is based on clinical and biologic prognostic factors. Although more than 90% of children who are classified with low- and intermediate-risk neuroblastoma will survive their disease, outcomes remain dismal for children with high-risk tumors.

The Children’s Oncology Group (COG) has developed a centralized reference laboratory and tracking center to ensure that children are assigned to the proper risk group. Dr. Cohn directs the COG Neuroblastoma Tracking Center, located at the University of Chicago, which collates information on each patient’s age, stage, tumor histology, and tumor biology; and assigns each child enrolled in the neuroblastoma COG biology study to a low-, intermediate-, or high-risk group.

“Most patients with low-risk disease are treated with surgery alone and followed on the COG registry,” says Dr. Cohn, “COG phase III studies have been developed for children with intermediate- and high-risk disease. Treatment for children with intermediate-risk disease is based on tumor genetics, including the presence or absence of chromosome 1p and 11q aberrations. Patients with high-risk disease are eligible for a clinical trial investigating new cytotoxic agents, intensification of consolidation, and novel post-consolidation immunotherapy and biologics.”

There also are several promising targeted treatments being tested in NANT phase I trials at the University of Chicago Medical Center.

continued on page 3

Dr. Susan Cohn wishes her patient Abigail Mendoza well as she is being discharged from Comer Children’s Hospital.
Dear Colleagues,

I AM PROUD to update you on our growing pediatric oncology program. As you may know, our clinical philosophy is to provide family-centered care combined with a dynamic team approach that brings together years of experience and current research, and to produce outstanding outcomes. We believe in trust-oriented relationships that keep families and patients in the treatment loop, assure excellent care for children, and minimize anxiety within their families.

Recent additions in our faculty assure our position as one of the strongest programs in the country and around the globe. International stem cell research expert John M. Cunningham, MD, has joined us as section chief of pediatric hematology/oncology. Prior to assuming this position, Dr. Cunningham was a senior member of the Division of Experimental Hematology and Bone Marrow Transplantation at St. Jude Children’s Research Hospital.

A world-renowned authority on neuroblastoma, Susan L. Cohn, MD, has joined us as director of clinical research, pediatric hematology/oncology and section chief of clinical sciences in the Institute of Molecular Pediatric Sciences. Prior to coming here, Dr. Cohn led the development of Children’s Oncology Group (COG) phase III studies for children with intermediate- and high-risk neuroblastoma–studies in which she is still very much involved.

Also new to our faculty are Tara Henderson, MD, MPH, who specializes in the diagnosis and medical treatment of patients with pediatric cancers and directs the Childhood Cancer Survivors Center and Kenan Onel, MD, PhD, director of our Familial Cancer Clinic. Dr. Onel is an expert in genetic cancer syndromes, assessment of individual and familial cancer risk, and development of individualized cancer prevention strategies for those found to be at increased risk.

Within these pages, you will find information on the work of these and our other fine physicians. All of us would welcome the opportunity to partner with you in the care of your patients who have or may be at risk for cancer.

Sincerely,

Steve A.N. Goldstein, MD, PhD
Professor of Pediatrics
Chairman, Pediatrics
Director, Institute for Molecular Pediatric Sciences

Dear Fellow Physicians,

WHETHER WE MEET CHILDREN with cancer when they are infants or when they are adolescents, we are here for them throughout their lives.

Our pediatric oncology program treats their cancer, addresses side effects of treatment, monitors survivors who are at risk for secondary cancers, identifies children whose genetic history could lead to cancer, and helps families cope with cancer in the family.

Cancer treatment is becoming the integration of genetics and clinical care. At the University of Chicago Comer Children’s Hospital, the physician treating a child is often the same physician who is making breakthroughs in cancer research. Our innovative therapies are internationally recognized, and our experts in many disciplines help more than 3,000 young people and their families every year.

We offer a world-class leukemia program and nationally recognized Pediatric Neurosciences Center. Our long list of “firsts” includes introduction of a pediatric stem cell transplant program, intensity-modulated radiotherapy (IMRT), and an on-site pediatric palliative care program.

Our Childhood Cancer Survivors Center supports survivors and their families as they cope with potential long-term effects of therapy and possible secondary cancers. Our Familial Cancer Clinic studies the genetic basis of cancer to discover the critical genetic factors that promote or prevent the development of cancer.

One of the many reasons families and their physicians turn to our pediatric oncology program is that we go to great lengths to help our patients “be kids or teens” despite having cancer. Wherever possible, young people receive treatment in our outpatient clinic. If inpatient attention is required, our state-of-the-art Comer Children’s Hospital is kid-friendly and family-focused.

We look forward to collaborating with you and helping your patients meet the challenges of cancer…a lifetime commitment.

Sincerely,

John M. Cunningham, MD
Professor of Pediatrics, Physiology, and Stem Cell Research
Chief, Section of Pediatric Hematology/ Oncology

International patients, please call toll-free 1-877-482-8318.
Clinical Trials Offer Options, Hope

With approximately 40 new or active clinical trials in pediatric oncology, the University of Chicago Comer Children’s Hospital offers a full range of state-of-the-art options for treating childhood cancers. Clinical trials here include both multi-center phase III trials sponsored by the Children’s Oncology Group (COG), as well as phase I studies available at only a few cancer centers in the U.S. Phase I trials are designated only for children with refractory or relapsed disease. In some cases, adolescents age 14 and older may be eligible for phase I trials offered in collaboration with the adult hematology/oncology program at the University of Chicago Medical Center.

Several physicians at Comer Children’s Hospital hold active leadership roles in the Children’s Oncology Group:

- Susan L. Cohn, MD, serves as vice-chair of COG’s Neuroblastoma Disease Committee, is on the COG Scientific Council and Executive Committee, and is active on other committees.
- James Nachman, MD, is a leader in COG’s Acute Lymphoblastic Leukemia (ALL) and Hodgkin’s Disease Study Committees. He also is a liaison between COG’s ALL Committee and international ALL strategy groups.
- Tara Henderson, MD, MPH, is study coordinator for a COG trial on Hodgkin’s disease.

To maximize efficiency, standardization, and accuracy, all clinical trials for pediatric cancer patients at Comer Children’s Hospital are coordinated through the new Section of Clinical Sciences, under the leadership of Dr. Cohn. This coordination allows for sharing of ideas and findings between disciplines, which ultimately can enhance treatment options for more patients.

CURRENT OPEN CANCER CLINICAL TRIALS AT COMER CHILDREN’S HOSPITAL INCLUDE:

- **XK469 in Treating Patients With Advanced Solid Tumors or Lymphoma**
  Conditions: Leukemia; lymphoma; small intestine cancer; unspecified solid tumors in minors greater or equal to 14 years of age and adults, protocol specific

- **Sorafenib in Treating Patients With Advanced Solid Tumors**
  Condition: Unspecified solid tumors in minors greater or equal to 14 years of age and adults, protocol specific

- **Isotretinoin With or Without Monoclonal Antibody, Interleukin-2, and Sargramostim Following Stem Cell Transplantation in Treating Patients With Neuroblastoma**
  Condition: Neuroblastoma

- **Irinotecan and Temozolomide in Treating Young Patients With Recurrent Neuroblastoma**
  Condition: Neuroblastoma

- **hu14.18-Interleukin-2 Fusion Protein in Treating Young Patients With Recurrent or Refractory Neuroblastoma**
  Condition: Neuroblastoma

- **CEP-701 in Treating Young Patients With Recurrent or Refractory High-Risk Neuroblastoma**
  Condition: Neuroblastoma

- **Fenretinide LXS in Treating Patients With Recurrent, Refractory, or Persistent Neuroblastoma**
  Condition: Neuroblastoma
Innovations in Stem Cell Transplant Match Parents to Children

UNTIL RECENTLY, the families of children in need of a stem cell transplant but lacking a sibling match could only hope that a close match from an unrelated donor would be found before their child’s disease progressed too far.

Now, a groundbreaking technique to refine stem cell grafts from biological parents is providing new hope for children with malignant and non-malignant blood diseases. John Cunningham, MD, section chief of pediatric hematology/oncology at the University of Chicago Comer Children’s Hospital, is among several physicians and scientists who have developed an approach to stem cell transplantation that makes biological parents viable donors.

Still in the pilot phase, the approach involves using stem cells procured from biological parents as well as more traditional donors in the treatment of several malignant and non-malignant pediatric conditions, including:

- Leukemia
- Sickle cell anemia
- Beta thalassemia
- Auto-immune conditions, such as rheumatoid arthritis and lupus
- Immunodeficiencies, including Wiskott-Aldrich Syndrome
- Metabolic storage diseases

“Weh this new approach, we can offer stem cell transplantation as an option for all kids who may need a transplant but don’t have a matched sibling,” says Dr. Cunningham. Stem cell transplantation is being performed at Comer Children’s Hospital on those as young as infants, and for children with refractory disease who have failed standard treatment.

“By using parents as donors, we’re able to provide a graft (transplant) to children quickly, eliminating the potentially long and sometimes unsuccessful wait to find an unrelated matched donor from the national registry,” says Dr. Cunningham. “We’re expanding applications to address malignancies as well as non-malignant genetic diseases of childhood. Early results are encouraging. More than 50% of children with refractory disease are alive one year post transplant.”

Meeting a Challenge

Because parents represent only a 50% genetic match for their children, conventional methods of stem cell transplantation using parent donors result in high rates of infection and peritransplant toxicity.

The innovative approach developed by Dr. Cunningham and others addresses the challenge presented when using a parent’s stem cells. Clinicians must carefully balance the need to remove T-cells from the donor specimen (which causes graft vs. host complications) with the need to obtain a small amount of T-cells to achieve the graft vs. tumor effect (which allows the immune system to fight against disease).

The solution lies in purifying large numbers of stem cells from parent blood samples. First, hormone therapy stimulates the parent’s production of stem cells, in preparation for procurement. After pheresis, the collected parental stem cell population is purified utilizing a novel antibody-based technology, while at the same time leaving behind all but a small quantity of unwanted T-cells. Initial studies suggest that this approach is highly promising. Dr. Cunningham’s group has observed a four- to five-fold reduction in the risk of severe graft complications vs. host disease.

Relapse remains a potential risk, which ongoing studies by the team are addressing utilizing post-transplant immunotherapy.

At the University of Chicago Medical Center, Dr. Cunningham leads an expanding team that combines clinical intervention, clinical research, and laboratory investigation, applicable to both pediatric and adult patients. Under his direction, the stem cell sciences program in the Institute for Molecular Pediatric Sciences is integrating research and clinical findings from diverse disciplines to improve the applicability and success of stem cell transplantation for all populations.

To refer a patient or for a physician consultation, please call (773) 702-6808.

Chloe’s Story: Novel Surgical Technique Used to Remove Tumor in Tiny Infant

4/26/06
Chloe Lobins and her twin brother, Brodie, of Kentland, Indiana, are born at 29 weeks. Chloe weighs 2 lbs. 7 oz.

6/16/06
Doctors at the Gary, Indiana, campus of Methodist Hospitals notice eating problems and perform a CAT scan that reveals a fast-growing tumor in Chloe’s liver. They transfer Chloe to the University of Chicago Comer Children’s Hospital.

6/28/06
Donald Liu, MD, PhD, surgeon-in-chief, assisted by Mindy Statter, MD, director of pediatric trauma, performs a liver resection on Chloe. At 4 lbs. 6 oz., her tiny size and small blood volume pose a significant operative risk. Dr. Liu chooses a novel technique: a linear stapler that simultaneously slices and staples the liver with 3.5 mm staples. The diseased portion of the liver is separated from the normal portion with minimal bleeding in about 30 seconds.
The Familial Cancer Clinic Helps Families Make the Most Important Decision

When Marc Myers was 5 years old, he was treated for acute lymphoblastic leukemia. His 39-month chemotherapy treatment was successful.

But when Marc started high school in Champaign, Ill., last fall, the 14-year-old teen was much shorter than most of his peers. At 4 ft. 11 in., the freshman in high school had fallen off the growth curve and stopped growing.

Marc’s parents brought him to a pediatric endocrinologist, who diagnosed growth hormone deficiency. The endocrinologist suggested the teen might be a candidate for human growth hormone (HGH) treatment. But before moving forward, Marc’s family history needed to be considered along with his personal medical history.

Jerry Myers, Marc’s father, had been diagnosed and treated for colon cancer in 2001. Testing at the University of Chicago’s Cancer Risk Clinic revealed that he had a hereditary colon cancer syndrome and carried the genetic mutation HNPCC. The risk of passing the mutation on to each offspring is 50%.

The dilemma faced by the family and the doctors: HGH can be procarcinogenic. It accelerates cell division, and in the case of colon cancer cells, it has been shown to promote their growth. If Marc carried the same genetic mutation as his father, treating him with HGH could prove detrimental.

“We had a decision to make and there were life-altering consequences on either side of that decision,” says Suzanne Lee, Marc’s mother. “We needed to know if the medical and social benefits of taking HGH outweighed the possible risk of colon cancer.”

The search for more information brought the Myers family to the Familial Cancer Clinic at the University of Chicago Medical Center. The clinic is the pediatric component of the Medical Center’s Cancer Risk Clinic, where Jerry Myers had been tested five years earlier.

Under the direction of hematologist/oncologist Kenan Onel, MD, PhD, the Familial Cancer Clinic’s research program focuses on the genetic basis of cancer and on the variations in genetic makeup that contribute to cancer risk. This research is tied directly to patient care.

“Dr. Onel was uniquely able to understand the different issues in our very complicated situation,” says Marc’s mother. “He had all the components: expertise in hereditary disease, pediatrics, and cancer. The first time Dr. Onel talked to us, he picked up right away on what we needed. It was a life-changing phone call.”

The family worked with the team of doctors, nurses, and genetic counselors to reach the decision to test the teen for the HNPCC mutation.

“We decided that Marc’s situation was compelling enough to warrant genetic testing at an early age,” says Dr. Onel. “We were able to give the family good news. The blood test revealed that Marc did not inherit the mutation that leads to colon cancer.”

In late 2006, Marc started human growth hormone treatment. Marc’s mother sees the treatment as a way for her son not only to grow taller, but also to become more confident. And having the knowledge that Marc does not have the mutation has relieved a lot of anxiety for the family. “For families with cancer, there is so much that is out of our control. Worrying about Marc inheriting the gene can be crossed off the list.”

Finding Clues to the Genetic Basis of Cancer

By testing Marc Myers for the genetic mutation known to be carried by his father, the Familial Cancer Clinic provided the Myers family with information critical to the teen’s current therapy and to his future cancer risk.

Identifying the presence or absence of a genetic mutation and recommending a highly individualized treatment plan form the continued on page 7
often face complications long after

Arusha Pratt was referred to the Pediatric Neurosciences Center in 1997, she was diagnosed with a malignant pineoblastoma. “It was a small and technically challenging tumor in a bad place,” explains David Frim, MD, PhD, section chief of pediatric neurosurgery.

Dr. Frim collaborated with pediatric neuro-oncologist Charles Rubin, MD, to address Arusha’s cancer through an innovative approach to treatment that included endoscopic biopsy and stem cell transplant.

Dr. Frim began by performing the endoscopic biopsy of the tumor, which was less invasive than an open craniotomy. When the biopsy revealed a malignant tumor and MRI scans showed that the disease had spread through the central nervous system from the brain to the spine, Drs. Frim and Rubin decided to treat Arusha aggressively. “We began a neo-adjuvant approach, using five cycles of chemotherapy to shrink her tumor in order that it could be removed safely and effectively,” says Dr. Rubin. Because the chemotherapy shrunk the tumor away from critical structures deep in the brain, Dr. Frim was able to surgically remove the pineoblastoma completely through a craniotomy without the slightest injury or trauma to Arusha’s brain.

Stem cells were harvested from Arusha’s blood for an autologous stem cell transplant to rebuild bone marrow and to counter the side effects of the high-dose chemotherapy used to kill remaining cancer cells. Once the transplant was complete, the final step for Arusha was radiation therapy administered five days a week for six weeks.

Today, Arusha, who would not have survived without immediate treatment, is a 15-year-old cancer-free high school student. She continues to visit the University of Chicago Medical Center’s Childhood Cancer Survivors Center for help with managing the long-term health issues associated with her treatment.

Arusha’s mother, Georgette Pratt, is enthusiastic about her daughter’s progress. “She graduated from grammar school with honors, and she enjoys reading and playing basketball. Our family appreciates everyone at the Medical Center. They always make sure she gets the right care.”

To refer a patient or for a physician consultation, please call (773) 702-6808.

Articular-sparing Bone Resection Maximizes Growth and Function

Children with osteosarcoma often face complications long after they have been cured of their bone cancer. Traditional treatment – amputation – has clear implications for the child’s long-term functioning. Less radical limb-salvage surgery preserves the child’s limb, but typically relies on prostheses and cadaver tissue that eventually degenerate.

Surgeons at the University of Chicago Comer Children’s Hospital now offer a significantly superior alternative: articular-sparing resection to maximize normal function and growth for children with osteosarcomas. Orthopedic surgeon Terrance D. Peabody, MD, explains: “We are using geometric and creative cuts to spare the child’s healthy cartilage and bone immediately adjacent to the joint. Then, we fit cadaver bone and tissue around the child’s own bone or joint.”

The technique can be likened to fitting together oddly shaped puzzle pieces. “It requires more creative carpentry and crafting than standard limb-salvage surgery,” says Dr. Peabody. “Instead of using straight cuts, we’re making geometric, angular, and circular cuts to preserve more of the child’s healthy bone and joint tissue and use as little cadaver tissue or prosthesis as possible.”

Straight versus geometric excision of cancercous bone and joint tissue has significant impact for the child’s long-term prognosis. Because children are growing and active, many metal or plastic prostheses eventually fail or deteriorate. Most children need follow-up surgeries to replace worn-out joints, either later in childhood or as adults.

Using more of the child’s natural bone and tissue – including as much of the joint as possible – creates a joint or limb that is more stable and more weight-bearing than standard limb-salvage techniques.

Because the child is growing, his or her bone will grow around the cadaver bone to keep up with the child’s development. “If we can save the growth plate at either end of the bone, the child can grow normally,” says Dr. Peabody.

The University of Chicago Medical Center has been a leader in less radical surgical treatment of bone cancer for two decades. As early as the 1980s, the Medical Center was one of the first in the U.S. to utilize limb-sparing surgical techniques as an alternative to amputation. This latest innovation – articular-sparing resection – improves long-term outcomes for children following surgical treatment of bone cancer. Surgeons here are applying this newer technique to improve the stability of knee, hip, and shoulder joints affected by cancer. Prior to surgery, the child undergoes a course of chemotherapy to shrink the tumor and inhibit metastasis.

Generating Healthy Cells

Scientists at the University of Chicago’s Molecular Oncology Laboratory also are exploring novel ways to generate new, healthy tissue that may eventually be used as an alternative to cadaver tissue. Their research seeks to identify the molecular and cellular pathways that lead to formation of tumors, as well as targeted agents that may restore normal cellular function.

This research – in conjunction with ongoing surgical innovations – is aimed at a single goal: “Offering kids the chance for normal and active function, development, and growth,” says Dr. Peabody.

To refer a patient or for a physician consultation, please call (773) 702-6808.
basis of the important research by Dr. Onel and his team. His studies, funded by the NIH and the American Cancer Society, focus on how genetic variations contribute to cancer risk. The goal is to discover the critical genetic factors that either promote or prevent the development of cancer, eventually charting a road map to identify cancer risk.

In one study, Dr. Onel’s laboratory is using an advanced technology called genotyping microarrays to compare genetic differences across their entire genome between children who develop a second cancer and those who do not. With this information, doctors could one day develop treatment plans that fight the first cancer without increasing the risk of a second cancer.

In another study, Dr. Onel is working to map the genetic differences among patients who have acute lymphoblastic leukemia (ALL). While the cure rate for ALL is close to 90%, there are still a significant number of children who die from the disease. By using a new technology that rapidly identifies genetic alterations throughout the entire genome, Dr. Onel hopes to identify genetic “markers” to detect which children might not survive. These patients could then receive more aggressive treatment from the beginning of therapy.

Finding and understanding the genetic differences in children who develop second cancers and in patients with ALL may lead to simple blood tests which will enable physicians to assess each patient’s risk of cancer. With a better understanding of a patient’s genetic makeup, doctors would then design more advanced individualized prevention strategies.

“We not only treat the patients, we learn from them,” says Dr. Onel. “And that knowledge will lead to better therapies in the future.”

To refer a patient or for a physician consultation, please call (773) 702-6808.

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**Acute Lymphoblastic Leukemia – Research Produces Results**

“FIFTY YEARS AGO acute lymphoblastic leukemia (ALL), the most common cancer in children, was considered a fatal diagnosis,” notes James Nachman, MD, director of the pediatric clinical oncology program at the University of Chicago Comer Children’s Hospital. “Today close to 90% of children with this disease are cured.”

An aggressive chemotherapy regimen for ALL, augmented BFM, was developed by Dr. Nachman and his team at the University of Chicago. This regimen is utilized by the Children’s Oncology Group (COG) to treat patients with T-cell ALL and High Risk B-Precurser ALL and is being studied in patients with standard risk B-Precurser ALL. Dr. Nachman also was the first to demonstrate that patients 16 – 21 years of age had a significantly higher cure rate when treated on pediatric versus adult protocols.

“We continue to refine treatments to make sure kids get the most effective therapy with the least toxicity,” Dr. Nachman says. “Many children with ALL, from infancy through adolescence, are eligible for national protocol trials through our Medical Center.” Also, very importantly, new outpatient-based therapies have reduced the number of long-term side effects in ALL patients as compared to patients with other cancers.

Dr. Nachman consults with physicians across the country to help them treat ALL patients. To refer a patient or for a physician consultation, please call (773) 702-6808.

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study, cancer survivors at the highest risk for secondary sarcomas are those first diagnosed with soft tissue or bone sarcomas, renal tumors, or Hodgkins lymphoma.

“Doctors should be vigilant when caring for childhood cancer survivors,” Dr. Henderson says. “They should investigate complaints quickly and order tests as appropriate.” Dr. Henderson also recommends regular screening for survivors of pediatric cancer. “They should have follow-up appointments with physicians who have knowledge of the late effects of childhood cancer.”

The Childhood Cancer Survivors Center strives to address all the specific needs of these patients throughout childhood, adolescence, and adulthood. In addition to the risk of secondary and recurring cancer, these patients eventually may need to be assessed and treated for:

- Heart problems, including early congestive heart failure, coronary heart disease, and heart attacks
- Endocrine disorders, including thyroid dysfunction, obesity, growth delay, osteoporosis, and premature menopause
- Lung disease
- Renal problems
- Dental problems
- Fertility problems
- Social, emotional, and psychological problems

The experts at the Center work to identify the risk factors related to each patient’s cancer and treatment. Working with the patient’s primary care physician and family, they develop an individualized set of recommendations for health maintenance and screening.

If a subspecialist is needed to treat a complicated health problem, that care is coordinated with other experts at the University of Chicago. When the childhood cancer is known to have a genetic basis, patients may be referred to the Familial Cancer Clinic at the University of Chicago (see story on page 5).

“We are here not only to educate and treat cancer survivors today, but to improve the health of future survivors,” says Dr. Henderson. “We want to provide a lifetime of excellent care to these patients.”

For consultation and referral, please call (773) 702-6808.
JUST A GENERATION AGO, children diagnosed with cancer had a slim chance of surviving the disease. Today, the cure rate for childhood cancer is approaching 80%, and with some cancers, such as acute lymphoblastic leukemia, 90%. But, as this new generation of cancer survivor patients approach their teens and 20s, they sometimes have complex and, possibly long-term, health issues.

“We are now seeing the effects of therapy on growing bodies,” says Tara Henderson, MD, MPH, director of the University of Chicago Childhood Cancer Survivors Center. “Unfortunately, some of these children will develop secondary sarcomas.”

In a recent study published in the Journal of the National Cancer Institute, Dr. Henderson and her colleagues reported that childhood cancer survivors are nine times as likely as the general population to develop a sarcoma. The study described indicators to help physicians identify who is most at risk for a secondary cancer.

It is known that radiation therapy for childhood tumors is associated with the development of secondary sarcomas. In addition to confirming that connection, the researchers in this study also named other contributing factors that include:

- Younger age at the time of primary diagnosis
- Type of cancer

- High doses of two types of chemotherapy: anthracyclines and alkylators

For the more than the 14,000 participants from 26 institutions across the United States and Canada, the median age for secondary sarcoma diagnosis was 20 years. The median time from primary to secondary diagnosis was 11 years. According to the