Center for Cancer and Blood Disorders

2009 Annual Report

Children's Memorial Hospital
Where kids come first.
We rank 10th in the nation by U.S. News & World Report for pediatric oncology – the only pediatric cancer program in Illinois on the magazine’s 2010 list.  •  We offer one of the nation’s most comprehensive pediatric brain tumor programs.  •  As home to the area’s largest pediatric thalassemia program, we also have the most comprehensive pediatric sickle cell program.  •  A pioneer in outpatient stem cell transplants, we were the nation’s first free-standing pediatric program to earn accreditation from the Foundation for the Accreditation of Cellular Therapy. We also are one of a few institutions to offer comprehensive pediatric care for chronic graft vs. host disease.  •  Our Survivors Taking Action and Responsibility Program offers continuity in care, especially for teens moving into adulthood.  •  Treating the entire child and family, we boast one of the nation’s most comprehensive parent-to-parent support programs, ParentWise, and the area’s largest group of pediatric oncology social workers. Home to the most comprehensive palliative care program in the region, we also offer Heartlight, one of the country’s oldest hospital-based pediatric bereavement support programs.  •  To learn more about us, visit childrensmemorial.org/cancer

We offer a multidisciplinary approach to research and treatment. The following entities play a vital role in achieving our mission:

Children's Memorial Research Center
Robert H. Lurie Comprehensive Cancer Center of Northwestern University
NCI Designated Comprehensive Cancer Center

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Center for Cancer and Blood Disorders Committee Members

Morris Kletzel, MD, MBA
Division Head and Meryl Suzanne Weiss Endowed Professor of Hematology, Oncology and Stem Cell Transplant; Director, Stem Cell Laboratory; Professor of Pediatrics, Northwestern University Feinberg School of Medicine

Tamar Ben-Ami, MD
Attending physician, Medical Imaging (Radiology); Director of Education, Medical Imaging; Professor of Radiology, Northwestern University Feinberg School of Medicine

Pauline Chou, MD
Division Head, Anatomic Pathology, Pathology and Laboratory Medicine; Director, Pediatric pathology fellowship program; Professor of Pathology, Northwestern University Feinberg School of Medicine

Reggie E. Duerst, MD
Director, Stem Cell Transplant Program; Associate professor of Pediatrics, Northwestern University Feinberg School of Medicine

Jason R. Fangusaro, MD
Attending physician, Neuro-Oncology; Assistant professor of Pediatrics, Northwestern University Feinberg School of Medicine

Nobuko Hijiya, MD
Section Head, Oncology; Associate professor of Pediatrics, Northwestern University Feinberg School of Medicine

Mary Beth Madonna, MD
Attending physician, Pediatric Surgery; Assistant professor of Surgery, Northwestern University Feinberg School of Medicine

MaryAnne Marymont, MD
Director, Pediatric Radiation Oncology, Co-director GAMMA Knife Radiosurgery Program; Assistant professor of Radiation Oncology, Northwestern University Feinberg School of Medicine

Marletta Reynolds, MD
Surgeon-in-Chief; Division Head, Pediatric Surgery; Director, Extracorporeal Membrane Oxygenation; Co-medical director, Institute for Fetal Health; Lydia J. Frederickson Professor of Pediatric Surgery; Professor of Surgery, Northwestern University Feinberg School of Medicine

Steve Rosen, MD, FACP
Genevieve Teuton Professor of Medicine, at the Feinberg School of Medicine, Northwestern University, Director of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University and Director of Cancer Programs at Northwestern Memorial Hospital

Alexis Thompson, MD, MPH
Director of Hematology Services; A. Watson and Sarah Armour Chair of Childhood Cancer and Blood Diseases; Associate professor of Pediatrics, Northwestern University Feinberg School of Medicine

Tadanori Tomita, MD
Yeager Professor and Chairman, Division of Pediatric Neurosurgery, Director, Falk Brain Tumor Center; Professor and Vice-Chair, Department of Neurosurgery, Northwestern University Feinberg School of Medicine

Jane Kilian, RN
Nursing director, Hematology, Oncology and Stem Cell Transplantation (Nursing)

Bonnie Okamura, CTR
Cancer registrar

Lina Patel, MHA, FACHE
Administrative director

Yolanda Santiago, CCRP
Clinical research associate

Jean Schwab, LCSW
Social Work

Julia Stepenske, RN, BSN, CPON
Oncology Quality Nurse

Heidi Thomalla, CCLS
Certified Child Life specialist

Nicole Underhill, RN, BSN, MBA, CPON
Stem Cell Transplant Program, Quality Manager
The end of the year is a fitting time to reflect on past activities and accomplishments while looking forward to the exciting changes and great opportunities that lie ahead at our new facility, Ann & Robert H. Lurie Children’s Hospital of Chicago, which will open in the summer of 2012.

By improving the flow and efficiency of our clinic space and offering greater flexibility to accommodate new technologies, Lurie Children’s will advance the level of care we provide our patients. This new downtown location also will offer opportunities for increased clinical and research collaborations with our neighbors at Northwestern University, Robert H. Lurie Comprehensive Cancer Center of Northwestern University and Northwestern Memorial Hospital.

The move to Lurie Children’s will support our commitment to deliver an even higher level of clinical care and service. As we prepare for this transition, we continue to enhance the outstanding services that have helped to distinguish our program from other providers in Chicago’s highly competitive healthcare market, such as our highly regarded neuro-oncology, therapeutic apheresis and stem cell transplant programs.

Research will remain an important complement to the outstanding clinical care we provide for children with cancer and blood disorders. Our teams are focusing on the late effects of multiple transfusions for sickle cell disease, intracranial radiation for brain tumors, osteoporosis as a result of radiation for cancers, associated effects of stem cell transplant and other pressing issues that impact the health and quality of life of our patients. Through our designation as a Phase I Children’s Oncology Group site, a member of the Phase I Pediatric Blood and Marrow Transplantation Consortium, the only Midwest member of the Pediatric Brain Tumor Consortium and a Centers for Disease Control Thalassemia Treatment Center of Excellence, we will grow in our ability to offer patients access to the latest therapies now in development.

For example, great strides made in studying hematologic disorders have resulted in opening of protocols lead by both our hematology and stem cell transplant physicians. As children are living longer with these chronic condition, our teams are working together to better understand and respond to the need for adolescent to adult transition programs — where patients can continue to receive optimal care as they enter early adulthood, and beyond. With the expertise, relationships, and ancillary support to ensure that each child receives the best care available, our teams can continue their synergistic efforts.

This is an unprecedented time and we look forward with great anticipation to the improvements and innovations that lie ahead. Thank you to the members of our center, hospital leadership, our medical partners throughout the community, our patients and their families and all the generous individuals and donors who have placed their confidence in our mission.

Morris Kletzel, MD, MBA
Division Head and Meryl Suzanne Weiss Endowed Professor of Hematology, Oncology and Stem Cell Transplant; Director, Stem Cell Laboratory and Apheresis Program; Professor of Pediatrics, Northwestern University Feinberg School of Medicine
In 2009, the Center for Cancer and Blood Disorders began laying the groundwork for our move to Ann & Robert H. Lurie Children’s Hospital of Chicago by undertaking important infrastructure and process improvements that will contribute to enhanced safety and quality of care for our patients.

The year marked the implementation of the Electronic Medical Record, or EMR. This was a major change that required our clinical care team to modify the ways in which we document the excellent care provided on a daily basis. Good documentation is essential to advancing clinical practices and our scientific pursuits. It also allows us to identify what we do well, and to understand where improvements can be made.

Oncology took on the bold task of establishing a formalized quality program. Designed to foster communication between clinical committees, streamline reporting efforts and enhance patient care, we today are one of a handful of pediatric hospitals in the nation to have such a program. There are few nationally recognized treatment guidelines in pediatric oncology, and there are few accrediting bodies that specifically guide clinical care. As such, we were determined to pioneer the process, establishing clear metrics, goals and recorded outcomes for our program.

Establishing such a quality program has been a challenging and time-consuming task. To elicit marked improvement, physicians and staff are asked to critically examine their behaviors or approaches to care, and, many times, rethink processes. They are also required to document their actions to ensure our protocols meet stringent patient safety guidelines. These efforts support our commitment to offering clinical trials to our patients that are highly audited and monitored by study sponsors, cooperative groups and the federal government.

Our involvement with these entities requires our team to think creatively about how we can continue to remain on the cutting edge of new developments and ethically deliver life saving therapies. Through a commitment to furthering the hospital’s academic mission, we offered 200 clinical trials in 2009. Together with our partners at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, our faculty, fellows, nurses and clinical research staff strive to ensure each child is presented with the most appropriate trial to advance his or her care, and the study of the disorders we treat.

Lina Patel, MHA, FACHE
Administrative Director
To advance, and continue to be a preeminent provider of pediatric care, the team knew it must develop data-driven, evidence-based practices. The purpose of the initiative was to establish a systematic and consistent approach – one that supports overall process and performance improvement and contributes to improved care for all pediatric, adolescent and young adult patients.

At the time, no regulatory body addressed safety, quality and/or clinical care. The team quickly became aware this was uncharted territory. Most quality programs referenced in literature pertain to adult oncology programs which cannot be tailored for pediatrics due to differences in oncology diagnoses and care plans.

To begin, the committee defined these areas of focus:
- Monitoring incidence of fungal infections;
- Chemotherapy (writing to administration) from chemo safety reporting;
- Nursing quality initiatives, and documentation of diagnosis;
- Proper staging and documentation;
- Radiation therapy process;
- Roadmap utilization;
- Eligibility for protocols initiated in house, inter-institutionally and through national cooperative group clinical trials;
- Mirroring hospital-based quality initiatives, such as surveillance of central line infections;
- Standardizing use of electronic medical records;
- Computerized physician order entry.

The team’s first major success was the medication reconciliation process. A “standard of practice” policy was drafted, then approved. Additional documentation earned positive staff feedback, and has helped prevent medication errors, as well as remind clinicians to verify home medication doses. Successful results were presented at the 2009 Children’s Oncology Group conference.

The team has drafted a reporting schedule and structure to improve communication. Looking ahead, it will develop a forum to share changes, provide ongoing education and empower staff with opportunities to voice opinions and provide positive recommendations.

Multiple leaders and clinical staff worked together to launch this new program, which has already improved communication, clinical teamwork and overall patient care.

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PROGRAM HIGHLIGHTS

ACcreditations and MEMBERSHIPS

- American College of Surgeons Commission on Cancer
- Center for International Blood and Marrow Transplant Research
- Childhood Cancer Survivors Study
- Children's Oncology Group Phase I Program
- Collaboration Ependymoma Research Network
- Foundation for the Accreditation of Cellular Therapy
- Center for International Blood and Marrow Transplant Research
- Joint Commission
- Modell Center of Excellence for Primary Immunodeficiencies
- National Marrow Donor Program
- Pediatric Brain Tumor Consortium Phase I Program
- Pediatric Bone and Marrow Transplant Consortium
- Therapeutic Advances for Childhood Leukemia Phase I Program

ONCOLOGY

In 2009, Children's Memorial maintained its market leadership as the largest provider of pediatric oncology services in the Chicago region. More than 200 new patients were treated, as the oncology team managed care of than 450 infants, children and teens diagnosed with cancer.

Dedicated physicians and nurse practitioners worked closely with pediatric surgeons, radiation oncologist, pathologists, social workers, geneticists, and dedicated ancillary staff to treat a broad spectrum of childhood cancers, from leukemias to rarer cancers such as retinoblastomas and post-transplant lymphoproliferative disorder. Oncology Section Head Nobuko Hijiya, MD, was also involved in prominent research. She chaired a multi-institution study that gained national attention for its study of clofarabine with etoposide and cyclophosphamide in pediatric patients with refractory or relapsed acute leukemias.

(continued next page)
**Oncology Clinical Research**

**Children’s Memorial** participated in clinical trials sponsored by:

- Children’s Oncology Group (COG), a National Cancer Institute-sponsored group formed by the merger of the Pediatric Oncology Group, the Children’s Cancer Group, the National Wilms Tumor Study Group and the Intergroup Rhabdomyosarcoma Study Group
- Children’s Oncology Group Phase I Consortium
- Institutional trials
- Industry trials (pharmaceutical)
- Collaborative Ependymoma Research Network
- Pediatric Brain Tumor Consortium
- Therapeutic Advances in Childhood Leukemia
- The Oncofertility Consortium

During 2009, there were 101 registrations on therapeutic trials and 74 on ancillary (laboratory classification, tumor biology, and epidemiology) protocols. The table below shows registrations by diagnosis.

### Protocol Registration

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<thead>
<tr>
<th>Diagnosis</th>
<th>Therapeutic</th>
<th>Ancillary</th>
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<tbody>
<tr>
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<tr>
<td>Lymphomas</td>
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<td>1</td>
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<tr>
<td>Neuroblastoma</td>
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<td>3</td>
</tr>
<tr>
<td>Central Nervous System</td>
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<td>0</td>
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<tr>
<td>Rhabdomyosarcoma</td>
<td>1</td>
<td>3</td>
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<tr>
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<td>Wilms’ tumor</td>
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</tr>
<tr>
<td>Hodgkin’s disease</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Hepatoblastoma</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retinoblastoma</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Germ cell tumors (outside CNS)</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>0</td>
<td>0</td>
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<tr>
<td>PNET</td>
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<td>0</td>
</tr>
<tr>
<td>Renal Tumor</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other (non-malignant)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td><strong>101</strong></td>
<td><strong>74</strong></td>
</tr>
</tbody>
</table>

**Clinical Research Professionals**

Alexis Castro, AA
Jennifer Dino, BS, CCRP
Lauren Evans, BS, CCRP
Carrie Kempler, MPH, CCRP
Maya Nikin, BS

Yolanda Santiago, CCRP
Kelly Verel, BS, CCRP
Jill Woodman, BS

(continued from page 7)

**Hemophilia and Thrombophilia**

The Comprehensive Hemophilia Program is a federally designated hemophilia treatment center caring for the largest group of children with hemophilia and related bleeding disorders in the Chicago region. Led by Alexis Thompson, MD, a multidisciplinary team including Dr. Rukhmi Bhat provided medical care, education, social support, genetic counseling, dental and physical therapy consultations to hundreds of children and adolescents. Clotting tendencies (thrombophilia) was an emerging area, and the program provided evaluations to determine the causes of blood clots in children as well as management of children who needed extended treatment with anticoagulation treatment (such as heparin and warfarin.) The anticoagulation team was staffed by a hematologist, an advanced practice nurse in hematology, a pharmacist and a cardiologist. Together, they coordinated care of children on anticoagulation medication, while the child’s primary clinical team met the complex needs of therapy.

**Hemoglobinopathies (Sickle Cell Anemia and Thalassemia)**

Also led by Dr. Thompson, the team of Robert Liem, MD, A. Kyle Mack, MD and Horace Smith, MD, cared for children with sickle cell disease and thalassemia. The Comprehensive Sickle Cell and Thalassemia Program participated in clinical studies of the National Institutes of Health, as well as national, regional, industry and institution-sponsored studies. The program continued to be a primary site for confirmation, counseling and initiation of treatment of infants identified through the statewide newborn screening program for hemoglobinopathies. An active participant in the National Heart Lung and Blood Institute-sponsored Thalassemia Clinical Research Network, the program is designated a “Thalassemia Treatment Center of Excellence” by the Cooley’s Anemia Foundation. It is also supported by the Centers for Disease Control and Prevention and other federal agencies to help prevent blood borne infections, complications of thalassemia and to devise improved models of comprehensive care.
NEURO-ONCOLOGY

In 2009, slightly more than 30 percent of the hospital’s cancer patients were treated for primary central nervous system tumors. Pediatric neuro-oncologist Stewart Goldman, MD, pediatric neurosurgeon Tadanori Tomita, MD, and Jason Fangusaro, MD, headed this area, and collaborated with additional pediatric specialists for decisions about the best approach for each child through a multidisciplinary Brain Tumor Board. Our patients had access to several innovative Phase I and II clinical trials made possible through our involvement with the Pediatric Brain Tumor Consortium, a national group helping diagnose and provide cutting-edge care for rare pediatric brain tumors. Children’s Memorial was one of just eight institutions (and the only Midwest member) of this prestigious research consortium. By participating in a wide range of cutting-edge clinical trials, our program has become the regional leader in the treatment of pediatric brain tumors, including some of the most complex cases that are referred from other institutions locally and nationally.

In addition, Children’s Memorial was one of four sites selected to participate in the planning phase of the Childhood Brain Tumor Tissue Consortium Registry and Repository. Launched by the Children’s Brain Tumor Foundation, this initiative will help establish a national repository of tissue samples that can be characterized, analyzed and used to evaluate new treatments for brain tumors. Few hospitals have sufficient volume of different kinds of tumors to conduct comprehensive research. By pooling the resources of many institutions, the consortium will be able to conduct meaningful analysis that might lead to new treatments and cures.

Interstitial chemotherapy was a major focus of our translational research program. This technique involves delivering a very small amount of chemotherapy directly into the tumor and circumventing the blood brain barrier, resulting in less overall exposure of the potentially damaging drugs to parts of the body not involved with tumor. Having developed a new animal model of brainstem glioma, the Neuro-oncology team is assessing in real time the tumor’s response to various combinations of interstitially administered therapies. This study has resulted in three publications in prominent medical journals including the Journal of Neurosurgery: Pediatrics.

In collaboration with Jin-Shei Lai, PhD, OTR/L, research associate professor at Feinberg School of Medicine, the brain tumor team continued to conduct research surrounding key factors that impact the health and survival of young brain tumor patients, including quality of life (QOL) measures. Dr. Lai has developed a methodology for measuring cancer related fatigue and other symptoms and health-related QOL issues such as pain, physical function, and positive and negative psychosocial impacts of cancer on brain tumor patients and their families. Of particular relevance, Dr. Lai has received funding through the National Institute of Neurological Disorders and Stroke to participate in a national study looking at neurocognitive outcomes in children with brain tumors.

Finally, the Children’s Brain Tumor Foundation presented Dr. Goldman with the Foundation’s Pioneer Award for outstanding contributions in pediatric neuro-oncology and brain tumor research.

STEM CELL TRANSPLANTATION

In 2009, the pediatric stem cell transplant program remained the region’s largest of its kind, completing more than 900 stem cell transplants (allogeneic and autologous) since initiated by Morris Kletzel, MD, in 1992. Since expanded to include clinical, laboratory and research components, Reggie Duerst, MD, directed the program in 2009. Highlights included:

• A reduced toxicity conditioning regimen to treat malignant disorders. This approach focuses on suppressing the recipient’s immune system while (continued next page)
promoting thorough donor cell engraftment through administration of relatively less toxic, chemo-radio-therapeutic treatments. Leukemic cell ablation is reduced compared to historical myeloablative treatments. This builds on even milder, reduced intensity regimens that are complicated by increased relapse rates and challenges achieving engraftment.

- A pilot protocol to assess minimal residual disease (MRD) immediately prior to HSCT for AML was conducted by the PBMT. This built on our published experience measuring Wilms Tumor-1 gene expression (WT-1) and research on flow cytometric analyses from St. Jude's Children's Research Hospital.
- State-of-the-art measurement of chimeric status of engraftment in allogeneic transplant recipients. This guided interventions that promoted engraftment/hinder relapse.
- MRD was increasingly appreciated as a harbinger of cancer recurrence or a prognostic factor with regard to risk for subsequent relapse. Dr. Kletzel's laboratory measured MRD in blood and/or marrow of patients with malignancies (including leukemia and neuroblastoma). Results were integrated into decision making regarding cellular/immunologic interventions that might avert or treat recurrent/progressive disease.
- Trials initiated by our staff and conducted here included assessment of novel cytoreduction regimens prior to transplantation and extracorporeal photopheresis in prevention and treatment of chronic graft vs. host disease. We also neared completion of a pediatric Phase I Trial assessing the efficacy of palifermin for prevention of mucositis.
- Additional laboratory research directed by William Tse, MD, continued in stem cell expansion and cellular biology of hematopoietic progenitor cells. The lab of Dr. Kletzel studied differentiation of blood stem cells toward other tissue lineages.

As home to the nation's first ambulatory pediatric stem cell unit, our team offered valuable experience for children who require reduced intensity transplants. Care was complemented by several unique programs that targeted patients with similar diseases or post-transplant complications. These included:

- **SEVERE PRIMARY IMMUNODEFICIENCY PROGRAM**, led by Dr. Tse and Jessica Ward, APN, provided multi-disciplinary care pre- and post-transplant with continued analysis of long-term outcomes.
- **CHRONIC-GRaFT. vs. HOST Disease Program (GVHD)**, led by Dr. Kletzel and Kimberly Thorman, APN, acknowledges the contributions of David A. Jacobsohn, MD, who launched the program in 2005 to serve as one of the few comprehensive pediatric programs to offer new approaches and studies to improving quality of life.
- **THERAPEUTIC APHERESIS CENTER**, led by Jennifer Schneiderman, MD, treated patients with Sickle Cell Disease, GVHD, leukemia and other cancers. The four-bed center and its team have been a resource for clinicians both nationally and internationally, presenting at American Society for Apheresis on topics such as choosing the appropriate venous access, and novel approaches for photopheresis and stem cell harvest procedures.
- **CONGENITAL NON-MALIGNANT Diseases Program**, headed by Sonali Chaudhury, MD, treated patients with sickle cell anemia or inborn errors of metabolism that may benefit from stem cell transplantation.

Additional facilities for stem cell transplant included six HEPA-filtered positive pressure rooms complete with centralized monitoring capabilities and a five-room Ambulatory Stem Cell Unit.

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### STEM CELL TRANSPLANTS PERFORMED IN CALENDAR YEAR 2009 (52 TOTAL)

**Allogeneic transplants** n=45

*Stem Cell sources:*
- Matched siblings: 12 (Peripheral blood stem cells 5, marrow 7)
- Unrelated Adult Donors: 25 (Peripheral blood stem cells 23, marrow 2)
- Unrelated Umbilical Cord Blood: 8

*Conditioning regimen:*
- Myeloablative: 32
- Reduced Intensity/Toxicity: 13

**31 Patients with malignancies**
- 18 Acute Lymphoblastic Leukemia
- 8 Acute Myeloblastic Leukemia
- 5 Myelodyplasia/Chronic Leukemia

**14 patients with non-malignant conditions**
- 4 immune deficiencies
- 1 congenital metabolic disorder
- 4 Marrow failure syndrome/ Hemoglobinopathy (thalassemia)

**Autologous transplants** n=7
- 5 neuroblastoma
- 2 other (1 Wilm's Tumor, 1 Primitive Neuronal Tumor)
CONNECTING CHILDHOOD LEUKEMIA WITH ADULT CANCERS

OVERVIEW
How a normal cell becomes cancerous is one of the most fundamental questions in biology with great consequences for human health. By figuring out the critical mistakes that transform a normal cell, physicians and scientists can develop ways to eradicate cancer. A cancer cell misbehaves by dividing uncontrollably, failing to mature, refusing to die, and spreading to vital organs. Our lab has been studying the biochemical reactions inside cells to identify the processes whereby cancer cells behave differently. We have identified inappropriately active kinases, enzymes that speed up chemical reactions a million times, in acute myeloid leukemia and breast cancer.

A crowning achievement of modern medicine has been to make what once an incurable disease, acute lymphoblastic leukemia (ALL) of childhood, and in less than a half-century make it curable with a combination of drugs in 90% of patients. These medicines (chemotherapy) make patients lose their hair and appetite and weaken their ability to withstand infections. Newer drugs, known as molecularly targeted therapies, do not have these side effects. One example has been the discovery of imatinib to treat chronic myeloid leukemia, which is caused by a genetic mutation that produces a hyperactive enzyme called Bcr-Abl. Bcr-Abl is a tyrosine kinase, and it causes blood cells to divide inappropriately. As a tyrosine kinase inhibitor, imatinib is a break that stops leukemic cell proliferation.

Our lab has been studying dasatinib, another tyrosine kinase inhibitor, in acute myeloid leukemia (AML) and breast cancer. AML is the second most common type of leukemia in childhood, and the most common type of leukemia in adults. Chemotherapy is intensive and successful in about 50%, especially if used with a stem cell transplant. AML results from an immature blood cell failing to stop dividing. Genetic analysis reveals that AML is a heterogeneous disease. Still, we found that Lyn, a Src kinase, is active in a variety of AML cell types and patient specimens.

Dasatinib inhibits AML cell growth by blocking Lyn. Because almost cancers are successfully treated by a combination of drugs, we next studied dasatinib in combination with either another molecularly targeted therapy (rapamycin) or a standard chemotherapeutic agent (etoposide). When combined with other drugs, dasatinib was even more powerful. This work was published in 2009 in Clinical Cancer Research.

To insure that a drug is effective, physicians measure their levels in the bloodstream. Our laboratory developed a simple assay to measure dasatinib’s ability to hit its target. By incubating blood cells with antibodies to detect Src kinase activity, Dr. Corey’s lab could use a flow cytometer (a highly sensitive laser that lights up labeled cells) to measure levels of Src kinases. Working with specimens collected in a Children’s Oncology Group study on dasatinib, Dr. Corey’s lab showed that dasatinib hit its target and that the higher the dose, the better the inhibition. This work was published in 2009 in Pediatric Blood and Cancer.

One property of solid tumor cancer cells is their ability to invade neighboring tissues and spread to vital organs, forming a metastasis. Because Src kinases act on the structural framework of the cell, they can rebuild the cell so that the cell makes finger-like protrusions to poke holes into its environment and gain access to the bloodstream. Src kinases can also assemble and reassemble these structural components, enabling the cell to crawl and spread. We have shown that in a highly metastatic cell line, dasatinib blocks the finger-like projections and ability to move. Currently there are no drugs being used to block metastasis. We propose to use Src inhibitors as a new form of anti-cancer therapy to prevent metastasis. This work was published in 2009 in British Journal of Cancer.

Lastly, we need to develop approaches to develop anti-cancer therapy more efficiently, economically, and speedily. To do this, our lab is developing systems biology. Using the power and speed of computation, we are seeking to identify the best combination of drugs. This will reduce the time and effort to get effective drug regimens to patients more quickly. Using engineering principles, we are also making a more accurate map of how a blood stem cell becomes a specialized white blood. Some of this work was published in 2010 in Blood.

- Seth Corey, MD, MPH
  Director of Oncology Research; Co-director of the Hematology/Oncology Fellowship Program; Sharon B. Murphy, MD, and Steven T. Rosen, MD, Research Professor in Cancer Biology and Chemotherapy
**ADOLESCENT AND YOUNG ADULT ONCOLOGY**
According to the National Cancer Institute, teens treated in pediatric centers have a better improvement in survival when compared to teens treated in adult hospitals. Caring for more teens than any other oncology program in the region, the Adolescent and Young Adult Oncology Program is led by Jennifer Reichek, MD. It provides expert care, access to unique clinical trials and addresses issues specific to teens. These issues can include peer interaction, psychosocial support for developmental tasks, fertility preservation, treatment adherence and more.

**BONE AND SOFT TISSUE SARCOMA**
Led by David Walterhouse, MD, a COG member of the Soft Tissue Sarcoma Committee, this program offers extensive pediatric clinical experience and access to unique clinical trials. Dr. Walterhouse is the study chair for COG ARST0331, a Phase III COG Group-Wide study for patients with newly diagnosed low-risk rhabdomyosarcoma. The goal of the study is to optimize outcome and quality of survival for patients with low-risk rhabdomyosarcoma. He also conducts studies of the regulation and function of the GLI1 oncogene. Activation of GLI1 has been associated with the development of rhabdomyosarcoma and other cancers.

**LEUKEMIA AND LYMPHOMA**
Led by Nobuko Hijiya, MD, and Elaine Morgan, MD, the leukemia and lymphoma program is the largest of its kind in the region, seeing roughly 200 patients each year. Children with acute myeloid leukemia, acute lymphoid leukemia, and other leukemias and lymphomas gain access to the latest treatments available through the hospital’s membership in the Therapeutic Advances of Childhood Leukemia consortium and Phase I consortium of COG.

Pediatric oncology researchers, in the laboratory overseen by Seth Corey, MD, study cancer cell signaling, the biochemical basis for abnormal cell growth. They identify drugs that may target specific cancer-promoting molecules. They also seek to learn how these processes occur in myeloid leukemias and the related disorders of myelodysplastic and inherited bone marrow failure syndromes. Recently, the laboratory discovered a new protein that alters invasion and migration of cancer cells. Learn more on page 11 regarding Dr. Corey’s research.

**BONE MARROW FAILURE**
Dr. Corey also focuses on acute and chronic myeloid leukemia, myelodysplastic syndromes (juvenile myelomonocytic leukemia) and bone marrow failure. Working closely with Division Head Morris Kletzel, MD, and Alexis Thompson, MD, Dr. Corey and Rebekah Maloney, APN, lead the team that treats patients with these difficult to diagnose, complex conditions.

**PATHOLOGY**
Essential to prompt and accurate diagnosis, pediatric pathologists use different techniques, specializing in areas including:
- **CYTOGENETICS**, led by Katrin Carlson Leuer, PhD
- **SOLID TUMORS**, led by Pauline Chou, MD, (and)
- **BRAIN TUMORS**, led by Veena Rajaram, MD
- **MOLECULAR DIAGNOSTICS**, led by Larry Jennings, MD
- **HEMATOLOGICAL MALIGNANCIES**, led by Maria Poytcheva, MD

In addition, the Pathology Department is led by Elizabeth Perlman, MD, an internationally recognized Wilms tumor specialist.

**PALLIATIVE CARE AND HOSPICE**
A multidisciplinary team of doctors, an advanced practice nurse, social workers, chaplains, child life therapists and pharmacists work together to provide symptom management and psychosocial support for children and their families.

Three medical directors lead the hospital’s palliative care service: Medical Director David Steinhorn, MD; Associate Directors Elaine Morgan, MD, and Joel Frader, MD. Board-certified in palliative care medicine, Dr. Morgan is also a co-director for a regional outpatient palliative care and hospice organization.

**POST-TRANSPLANT LYMPHOPROLIFERATIVE DISORDER (PTLD)**
Joanna Weinstein, MD, leads a comprehensive and multidisciplinary treatment team for patients with PTLD. Recipients of solid organ transplants or patients who undergo a hematopoietic stem cell transplant may be diagnosed with this disorder, which requires a team of expert dedicated physicians to provide optimal care to prevent loss of the graft.

**RETINOBLASTOMA**
Retinoblastoma patients are treated by a multidisciplinary team of oncologists, ophthalmologists, a social worker, a genetics counselor, nurses and an oculist. Using chemotherapy and other innovative techniques including laser therapy, oncology care is led by Dr. Weinstein, who works closely with pediatric ophthalmologists Janice Lasky Zeid, MD; Marilyn Mets, MD; Bahram Rahmani, MD; and Hawke Yoon, MD. A social worker and genetics counselor are also deeply involved.

**SOLID TUMORS**
A comprehensive approach offering extensive surgical expertise, minimally invasive techniques, and reduced toxicity can benefit children diagnosed with solid tumors. Surgeon-in-Chief Marleta Reynolds, MD, work closely with oncologists and other pediatric specialists, often combining a multidisciplinary approach of surgery, radiation therapy and chemotherapy. Meeting as part of the hospital’s Tumor Board enables the surgeons to actively discuss the best possible approach to each patient’s condition.
STAYING HEALTHY AFTER TREATMENT: The STAR Program

As cancer cure rates rise, more pediatric patients grow up to become long-term survivors. Children's Memorial collaborates with the Lurie Cancer Center at Northwestern Memorial Hospital to provide follow-up for life, in part through the Survivors Taking Action and Responsibility (STAR) Program, which detects and provides early intervention to minimize late effects of treatment.

Leading the pediatric arm of this unique program that actively transitions survivors to an adult care setting is Kimberley Dilley, MD. As director of the pediatric STAR Program at Children's Memorial, she offers clinical expertise in obesity and low-bone density and is conducting research that explores overlap between these two conditions. Nurse practitioners Barbara Lockart and Karina Danner-Koptik, social worker Meg Crum and clinical research associate Tricia Salicete work with Dr. Dilley to address the physical and psychological issues patients may experience post-treatment. Additional faculty who contribute actively to the STAR Program's clinical and research activities include Nobuko Hijiya, MD, and Morris Kletzel, MD.

Research surrounding survivors' late effects helps teach clinicians how to decrease toxicity for new patients. In addition to an active research program involving local patients, Children's Memorial is a member of a 30-plus institution national Childhood Cancer Survivor Study, which serves as the source of much of what we know about late effects for survivors who are already reaching their 30s and 40s.
Family Services

The Family Services staff works to help children and their families adjust emotionally, socially, spiritually and developmentally to life with cancer. The multidisciplinary team consists of four licensed clinical social workers, a resource specialist, two certified child life specialists, one chaplain, one parent volunteer coordinator, a Beads of Courage program coordinator, one music therapist and one art therapist.

A Wide Variety of Support Services

The families and children within the oncology population are given access to a variety of services designed to complement each unique family situation. Patients receive developmentally appropriate preparation for procedures from child life professionals, which may include medical play targeted to a child's treatment protocol and interests. Patients are also offered activities and coping techniques geared toward helping them manage the stress of illness. Various expressive arts are used in play areas and inpatient settings to facilitate coping. Siblings are encouraged and welcome to participate in activities and may receive individualized intervention from various team members.

Educational assistance is coordinated through the school services coordinators and their volunteers who provide tutoring and homework help for children during their hospital stay and beyond.

Parents receive a broad range of supportive services including proactive referrals for concrete resources and financial assistance. An ever-increasing number of families live far from Children's Memorial and need alternate housing during treatment. They may also have significant income changes due to one or both parents leaving work to remain at the bedside or attend clinic appointments. Many families stay at the Ronald McDonald House®, located within walking distance of the hospital. Kohl's House, a home-away-from home for transplant patients and their families, is operated by Children's Memorial and houses families for extended periods of time at a very modest fee. Within the hospital’s Janice and Kimberly Brown Family Life Center, inpatient families have access to books, games, computers, organized events and more. Parents have access to a business center with computers and Internet access, books and games, “tune up” massages and haircuts.

Emotional and Spiritual Support

Emotional and spiritual support can take many forms and are crucial to the ultimate success of each child’s treatment regimen. Many parents find comfort through the ParentWISE™ Program, which connects individual families with parent volunteers who have also experienced pediatric cancer. These highly trained, supervised volunteers provide opportunities for peer support in clinics and inpatient hospital areas. Ongoing counseling is available for families in conjunction with both social workers and pastoral care staff.

The search for meaning in the face of a health crisis is explored through discussion, journaling, expressive arts and other parent groups and educational sessions. Special events targeting the emotional needs of our adolescent patients are also held several times during the year. The Family Services team celebrates with families at every opportunity. Birthdays, school accomplishments, developmental achievements, holidays and milestones in cancer treatment are all given the attention they deserve with special projects, staff recognition, parties and theme days.

What is a Child Life Specialist?

Certified child life specialists are trained professionals who promote effective coping through play, preparation, education, and self-expression activities. They provide emotional support for patients, siblings and parents, and encourage optimum development of children facing a broad range of challenges related to healthcare and hospitalization.

Child life specialists use a family-centered care model that views the child's coping within the framework of a larger family system – so there is focus on providing support and guidance to parents, siblings, and other family members.

Each day, they provide preparation and distraction prior to painful procedures, and engage patients in age-appropriate teaching sessions and medical play to help children understand and cope with a new diagnosis and treatments.

By facilitating therapeutic activities that promote open expression, child life specialists help children with chronic and life-threatening illness, often introducing non-pharmacological techniques to help with pain management. They use strategies to help with non-compliance/behavioral modification, and provide support related to end-of-life issues.

Children's Memorial has child life specialists, as well as art and music therapists, dedicated to hematology/oncology patients in both inpatient and outpatient settings. In 2009, these professionals provided about 3,000 contact hours.
**CANCER REGISTRY**

**THE CANCER REGISTRY** is a data collection system that analyzes and stores information on diagnosis, site, treatment, extent of disease and follow-up information for all cancer cases seen at Children’s Memorial. Cases are separated into two categories: analytic and non-analytic.

**Analytic cases** are patients who are diagnosed and/or received any of their first part of treatment at Children’s Memorial.

**Non-analytic cases** are patients who already have been diagnosed, with all first course of treatment completed elsewhere. They have since received subsequent treatment here and are patients diagnosed prior to our reference date of January 1, 1991, or those diagnosed at autopsy.

The registry maintains a lifetime followup on the management and progress of each analytic case. Data helps track treatment trends, and can be compared with state and national data.

For patients diagnosed within the last five years, the hospital’s follow-up rate is 93 percent. For all eligible analytic patients from the cancer registry reference date of January 1, 1991, the hospital’s follow-up rate is 80 percent.

Since our reference date, 3,631 cases have been accessioned into the database.

**For Children’s Memorial, in 2009:**
- 214 analytic and 33 non-analytic cases were abstracted
- Gender distribution for analytic cases was about the same with 109 males and 105 females
- Major sites of analytic cases were tumors of the central nervous system (inclusion of benign tumors), bone marrow (leukemia), lymph nodes, sarcomas, endocrine tumors and kidney tumors.

**When compared to state and national figures:**
- More CNS tumors were seen at Children’s Memorial
- Leukemia, lymphoma, Wilms and soft tissue incidence at Children’s Memorial fell between state and national averages
- Fewer incidence of neuroblastomas were seen at Children’s Memorial

Electronic Registry Systems (ERS) software continues to provide the registry with support and compliance with the National Cancer Data Base submission and the ever-changing Illinois State Cancer Registry and American College of Surgeons Guidelines. The Cancer Program was awarded in December 2007 with a three-year approval with accommodations by the American College of Surgeons accreditation as a Pediatric Teaching Hospital Cancer Program.

- Bonnie Okamura, BS, CTR
  Cancer Registrar,
  Hematology/Oncology Services

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**BEREAVEMENT SERVICES**
For families that experience the loss of a child due to cancer, there are bereavement services for both siblings and parents. These services are provided through the hospital’s Heartlight program. Families may participate in support groups and also receive materials that offer anticipatory guidance about issues of loss and grief. Staff and families may participate in our annual hospital-wide memorial service in the spring and “Remembrance Week” activities in the fall.

**FAMILY SERVICES GOAL**
The goal of the Family Services team is to provide comprehensive support for our patients and their families throughout treatment. We endeavor to alleviate stress, teach new coping and communication skills, and facilitate thoughtful communication between our patients, their families, their medical team and the community at large.

- Jean E. Schwab, LCSW
  Pediatric Oncology Social Worker
  Children’s Memorial Hospital
INPATIENT AND OUTPATIENT SERVICES

CHILDREN WHO REQUIRE an inpatient stay for cancer and blood disorders are admitted to the main hospital’s 4-West Unit. This specialty unit is designed, staffed and equipped to deliver the most sophisticated level of treatment to children of all ages. To assist with infection control, the unit maintains its own water and air filtration system.

Of the 22 beds, six are devoted to stem cell transplants and feature positive pressure rooms, which provide protection for children who are significantly immunosuppressed related to the transplantation process. Hemodynamic monitoring is available to accommodate critical care needs as necessary.

A comprehensive, primary care team approach is used to coordinate the treatment of patients and their families. Inpatient care is planned by the attending and resident physicians, advanced practice nurses, staff nurses, case managers, pharmacists and dieticians. All team members specialize in childhood cancers, diseases of the blood, and patients undergoing stem cell transplantation. In addition, social workers, child life specialists and chaplains are involved in the child’s care daily, providing patients and families with extensive psychosocial support. A dedicated 4-West playroom is staffed by child life specialists and volunteers who coordinate playroom activity, individualized visits and interactive television.

Comprehensive ambulatory services are essential to meet the holistic care requirements for our patients. Within the main hospital, Children’s Memorial provides primary areas for acute outpatient therapy. To facilitate the best continuity of care, these areas are located close to the inpatient unit.

The Ambulatory Care Center features a family-friendly atmosphere designed so families may receive assessment and treatment by a multidisciplinary team in one location. Services are provided by a dedicated group of attending physicians, fellows, advanced practice nurses, nurse clinicians, child life specialists and social workers who provide consistent, comprehensive medical follow-up for children and families. The center’s playroom is staffed by trained child life specialists, volunteers and a ParentWISE™ coordinator, who supervise activities while children wait for test results. This area continued to experience a modest 4 percent increase in volume related to growth in our oncology and neuro-oncology population.

The Day Hospital and Ambulatory Stem Cell Unit (both adjacent to the Ambulatory Care Center) provide acute infusion treatments such as chemotherapy, transfusions, intravenous fluid, antibiotics, other medications and monitoring thus reducing the need for children to be hospitalized for these therapies.

In 2009, space planning began for Ann & Robert H. Lurie Children’s Hospital of Chicago. A team representing all program disciplines was excited to begin work that will ultimately improve the patient/family experience, and the way all teams deliver care.

Jane Kilian, RN, MS
Director of Clinical Operations, Hematology, Oncology and Stem Cell Transplantation


Asymptomatic kidney stones in long-term survivors of childhood acute lymphoblastic leukemia. Kaste SC et al. Craig Langman with Kimberley Dilley: Faculty of 1000 Medicine, 15 Dec 200 Evaluation


Functional capacity in children and young adults with sickle cell disease undergoing evaluation for cardiopulmonary disease. Liem, Rl; Nevin, MA; Prestridge, A.; Young, LT; Thompson, AA. Am J Hematol (2009) 84:645-649.


(continued next page)


Positive regulation of adult bone formation by osteoblast-specific transcription factor osterix” by Baek WY et al. Craig Langman with Kimberley J Dilley: Faculty of 1000 Medicine, 17 August 2009. Evaluation

Prolonged QTc interval in children and young adults with sickle cell disease at steady state. Liem RJ, Young LT, Thompson AA. Pediatr Blood Cancer, 2009; 52:842-6


Tricuspid regurgitant jet velocity elevation and its relationship to lung function in pediatric sickle cell disease. Liem, RI, Nevin, MA; Prestridge, AL; Young, LT; Thompson, AA. Pediatr Pulmonol (2009) 44:281-289.
CANCER PROGRAM DONORS

The patients, families physicians and staff of Children’s Memorial Hospital are grateful to our many friends supporting cancer care and research through their generous gifts during fiscal year 2009.

Anonymous (4)
Alberto Culver
All for Hope Cancer Foundation
John W. Anderson Foundation
The Barney Family Foundation
Bear Necessities Pediatric Cancer Foundation, Inc.
Benny's World
Walter J. and Edith E. Best Foundation
Mr. Olav L. Bradley
Julie Meyers Brock
Alfred and Pamella Capitanini / The Italian Village Restaurant
Chicago Baseball Cancer Charities
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Donors who establish endowments help secure a future of care for children and families. Because the interest earned on these endowed funds is available over time, our patient families benefit long after the initial gift is made. We are grateful to the donors who established the endowed funds listed below that support cancer care and research.

Howard Abraham Fellowship Award in Hematology, Oncology, and Stem Cell Transplant
A. Watson and Sarah Armour Professorship in Childhood Cancer and Blood Diseases
George B. Casseday Hematology/Oncology Endowed Fellowship Fund
Caremark Therapeutic Fund
ChiSox Day Hospital Endowed Fund
Coleman Foundation Endowment Fund
Rory David Deutsch Malignant Brain Tumor Research Project
Rachelle and Mark Gordon Endowed Professorship in Cancer Biology and Epigenomics
Gus Foundation Chair in Neuro-Oncology
Bruce & Vicki Heyman Family Endowment for Cancer Research
Sharon B. Murphy and Steven T. Rosen Endowed Chair in Cancer Biology Research
Harry & Allene R. Pearson Hematology Research Fund
Richard A. Perritt, MD Professorship in Stem Cell Transplantation
Fredrick Henry Prince Memorial Fund
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Mark Staehely Fellowship Award in Oncology and Stem Cell Transplant
Meryl Suzanne Weiss Fund

Heroes for Life
Campaign for Ann & Robert H. Lurie Children's Hospital of Chicago™

BE A HERO
You can be a hero for children. Help us build our new home by joining Heroes for Life: Campaign for Ann & Robert H. Lurie Children's Hospital of Chicago. Together, heroic possibilities are within reach. To learn more, call 773.880.4237 or visit heroesforlife.org

OUR NEW FACILITY
Children's Memorial is building a new hospital, Ann & Robert H. Lurie Children's Hospital of Chicago, that will open in 2012. The 23-story, state-of-the-art hospital is located in the heart of Chicago on the campus of our academic partner, Northwestern University Feinberg School of Medicine, and will offer the latest benefits and innovations in medical technology, research and family friendly design. Our future site and facility are necessary elements that will support our greater purpose – to provide children with access to the most advanced cures, treatments and technologies performed by the best minds in pediatric medicine and research in a family-centered environment. Learn more about childrensmemorial.org/newhospital
### OUR TEAM

**THE CENTER FOR CANCER AND BLOOD DISORDERS** at Children’s Memorial Hospital delivers comprehensive patient care. As part of our multidisciplinary approach, we team with pediatric specialists from the following hospital divisions to care for children with cancer: General Pediatric Surgery, Neurosurgery, Medical Imaging, ENT (Otalaryngology), Ophthalmology, Orthopaedic Surgery, Anesthesiology, Dentistry, Child & Adolescent Psychiatry, Radiology, Cardiology, Pulmonary, Endocrinology and Family Services. We value all our partnerships with faculty, staff and nursing, as well as our relationships with Children’s Memorial Research Center’s physician-scientists and pediatric radiation oncologists at Northwestern Memorial Hospital.

*Please note: physicians listed here are faculty members of Northwestern University Feinberg School of Medicine, unless noted.*

#### LEADERSHIP

- **Morris Kletzel, MD, MBA**
  Division Head and Meryl Suzanne Weiss Endowed Professor of Hematology, Oncology and Stem Cell Transplant; Director, Stem Cell Laboratory and Pheresis Program
- **Seth Corey, MD, MPH**
  Director of Oncology Research; Co-director of the Hematology/Oncology Fellowship Program; Sharon B. Murphy, MD, and Steven T. Rosen, MD, Research Professor in Cancer Biology and Chemotherapy
- **Reggie Duerst, MD**
  Clinical Director, Stem Cell Transplant Program
- **Stewart Goldman, MD**
  Medical Director, Neuro-oncology; Gus Foundation; Chair of Neuro-oncology; Clinical Practice Director; Director, Clinical Trials Center, CMRC
- **Nobuko Hijiya, MD**
  Section Head, Oncology
- **Alexis Thompson, MD, MPH**
  Director of Hematology Services; A. Watson and Sarah Armour Chair of Childhood Cancer and Blood Diseases; Section Head, Hematology
- **Joanna Weinstein, MD**
  Co-director, Fellowship Program

#### ATTENDING PHYSICIANS

- **Rudy Allen, MD**
  Hematology/oncology/neuro-oncology
- **Rukhmi Bhat, MD**
  Hemophilia and Thrombophilia
- **Sonali Chaudhury, MD**
  Stem cell transplant
- **Kimberley Dillely, MD, MPH**
  Director, STAR Program
- **Jason Fangusaro, MD**
  Director, Neuro-oncology Fellowship Program
- **Yasmin Gosiengfiao, MD**
  Solid tumors, fertility preservation
- **Robert Liem, MD**
  Hereditary spherocytosis, thalassemia
- **A. Kyle Mack, MD**
  Sickle cell disease, idiopathic thrombocytopenic purpura (ITP)
- **Elaine Morgan, MD**
  Associate Director, The Bridges Program - Pediatric Palliative and End-of-Life Care
- **Sudha Rao, MD**
  Director, Day Hospital
- **Jennifer Reichek, MD, MS**
  Adolescent & Young Adult Oncology Program
- **Jennifer Schneideman, MD, MS**
  Director, Pheresis Program
- **Anjali Sharathkumar, MD**
  Director, Hemophilia and Thrombophilia Program
- **Horace Smith II, MD**
  Director, Comprehensive Sickle Cell Program
- **William Tse, MD, PhD**
  Director, Immunodeficiency Program
- **David Walterhouse, MD**
  George M. Eisenberg Research Scholar in Developmental Systems Biology, Solid tumors

#### PEDIATRIC SURGEONS / NEUROSURGEONS

- **Marleta Reynolds, MD**
  Surgeon-in-Chief, Division Head, Pediatric Surgery; Director, Extracorporeal Membrane Oxygenation; Co-medical director, Institute for Fetal Health
- **Tadanori Tomita, MD**
  Yeager Professor and Chairman, Division of Pediatric Neurosurgery, Director, Falk Brain Tumor Center; Professor and Vice-Chair, Department of Neurosurgery
- **Mary Beth Madonna, MD**
  American College of Surgeons STAR Member, Children’s Hospital of Chicago
- **Tord Alden, MD**
  Katherine Bartsness, MD
- **Marybeth Browne, MD**
  American College of Surgeons STAR Member, Children’s Hospital of Chicago
- **Anthony Chin, MD**
  American College of Surgeons STAR Member, Children’s Hospital of Chicago
- **David Rothstein, MD**
  American College of Surgeons STAR Member, Children’s Hospital of Chicago
- **Robin Bowman, MD**
  American College of Surgeons STAR Member, Children’s Hospital of Chicago

#### RADIATION ONCOLOGY AT NORTHWESTERN MEMORIAL HOSPITAL

- **MaryAnne Marymont, MD**
- **John Kalapurakal, MD**

#### MEMBERS, CHILDREN’S COMMUNITY PHYSICIAN ASSOCIATION AND HEMATOLOGIST/ONCOLOGISTS, CHILDREN’S MEMORIAL AT CENTRAL DUPAGE HOSPITAL*

- **Jason A. Canner, DO**
- **Rebecca McFall, MD**
- **Ammar Hayani, MD**
- **Sharad Salvi, MD**

*Not faculty members of Northwestern University Feinberg School of Medicine*

#### ADVANCED PRACTICE NURSES

- **Pediatric Oncology**
  Sheri D’Agostino, RN, MSN, APN, CPON
  Maureen Haugen, RN, MSN, APN, CPNP, CPON
  Amy Kaplan, RN, APN, MSN
  Barbara Lockart, RN, MSN, CPNP, CPON
  Stephanie O’Brien, RN, ND, MSN, APN, CPNP, CPON
  Jacqueline Toia, RN, ND, MSN, APN, CPNP
  Patricia Wirth, BSN, MSN, PNP
  Kerry Zebold, RN, APN, MSN, CPNP
- **Pediatric Hematology**
  Diane Calamars, RN, MSN, APN, CPNP
  Susan Gamerman, RN, MS, APN, PNP-BC
  Pam Gambpetro, APN
  Krista Ray, APN
- **Pediatric Stem Cell Transplant**
  Alexis Baby, RN, MSN, CPNP
  Karina Danner-Koptik, RN, MSN, APN, CPON
  Jessica Ward, RN, MSN, MPH, CPNP
  Rebekah Maloney, RN, MSN, APN, PCNS-BS, CPON
  Mary Stoelinga, RN, MSN, CPNP
  Kimberly Thormann, RN, MA, CPNP
- **Pediatric Neuro-oncology**
  Megan Urban, APN
  Kristi Wadell, APN
  **STAR**
  Barbara Lockart, RN, MSN, CPNP, CPON
  Karina Danner-Koptik, RN, MSN, APN, CPON

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