PEDIATRIC REVIEW

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Late Effects in Childhood Cancer Survivors: Considerations for the Pediatrician

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This issue of *Pediatric Review* is intended for pediatricians, family physicians and all other interested medical professionals. For CME purposes, the author has no relevant financial relationships to disclose.

Objectives

At the end of this activity the participant should be able to:

1. Describe the potential late effects that childhood cancer survivors are at risk for
2. Discus how pediatricians and primary care physicians can take care of childhood cancer survivors

Introduction

During the past 50 years, there have been significant advances made in childhood cancer therapy; 80% of childhood cancer patients will be cured of their disease. These advances have resulted in a growing population of cancer survivors; in 2010 every 1 in 250 young adults between the ages of 20 – 29 years old were childhood cancer survivors. Cancer and its treatment can lead to a number of long term sequelae such as impairment in growth and development, neurocognitive dysfunction, cardiopulmonary dysfunction, endocrine dysfunction, and the risk of secondary malignancies. Previous studies have examined childhood cancer survivors and have demonstrated that childhood cancer survivors have an increased rate of morbidity and have chronic health conditions. In many of these survivors, conditions can be severe or life threatening. Late effects from cancer treatment are described as effects that happen after cancer therapy has been completed. Many potential late effects do not occur until 10 – 15 years post therapy, thus posing the question: who will take care of these patients? For many years, pediatric oncologists have provided oncology as well as primary care to childhood cancer survivors. However, as the numbers of childhood survivors grow and as these survivors transition to adolescence and young adulthood, it is imperative that primary care physicians become aware of issues and problems that survivors of cancer may face.

Knowledge about Past Diagnosis and Treatment

Studies have shown that cancer survivors have a deficit in knowledge about their cancer diagnosis and the potential late effects they are potentially at risk for; when asked to report chemotherapy and radiation, less than 50% of patients could accurately report exposure to anthracyclines and only 70% exposed to radiation could accurately describe location of radiation.

Recommendations for Follow-up of Childhood Cancer Survivors

The Children's Oncology Group (COG) has developed risk based, exposure-related guidelines specifically designed to direct follow-up care for patients who have been treated for childhood cancers. These guidelines are available on www.survivorshipguidelines.org and give comprehensive screening recommendations that can be used to direct the care of childhood cancer survivors. The recommendations are broken down by chemotherapy, radiation therapy and stem cell transplant. The guidelines also have patient education materials, known as "Health Links" that can be handed out to survivors and used as teaching tools.

We will briefly examine an overview of late effects by organ system as well as risk factors and screening guidelines for potential late effects, recommendations for patient follow-up and referral.

Cardiovascular Effects

Cardiovascular disease affects many adults in the United States. Unfortunately, childhood cancer survivors are at an increased risk for cardiovascular disease secondary to treatment with chemotherapy and/or radiation. The anthracyclines (e.g. Doxorubicin, Daunomcyin and Idrarubicin) are well known to cause cardiomyopathies. The incidence of cardiomyopathy is dose dependant and age dependant. Thus, children who were younger at the time they received anthracyclines are at greater risk for cardiac dysfunction. Factors associated with

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General guidelines for radiation and chemotherapy late effects on body systems

System	Potential effects
Cardiac	Cardiomyopathy Pericarditis Coronary artery disease Valvular disease
Pulmonary	Pulmonary fibrosis
Thyroid	Hypothyroidism Thyroid nodules, cancer Hyperthyroidism
Gonadal(F)	Delayed/arrested puberty Early menopause Ovarian failure
Gonadal(M)	Germ cell failure Infertility/azoospermia Leydig cell dysfunction Hypogonadism Delayed/arrested puberty
Bone	Osteopenia Bone mineral density ≥ 2.5 SD below mean Oseoporosis Osteonecrosis
SMN	Sarcomas CNS tumors Breast cancer Melanoma Non-melanoma skin cancer Thyroid cancer Other solid tumors

highest risk for cardiotoxicity include those who were younger than age five years at time of treatment, female and African-American ethnicity. Radiation therapy to the chest or left upper abdomen increased the risk. Radiation damages the myocardium by injuring capillary endothelial cells which can lead to the obstruction of the capillary lumen and the formation of fibrin and platelet thrombi which can then lead to ischemia, myocardial cell death and fibrosis. The higher the total dose of radiation, the higher the risk of cardiotoxicity.
Cardiotoxicity, much like other effects of chemotherapy and radiation, may not be develop for many years post-therapy. For some survivors of childhood cancer, treatment related late effects may not occur until growth and pubertal development have been completed. For example, coronary artery disease as a result of premature fibrosis has been reported following radiation to the mediastinum, with an increased risk 20 years after radiation was completed. Studies have also shown that childhood cancer survivors may have adverse cardiac function during times of pregnancy.

Screening and Recommendations

Childhood cancer survivors who have received cardiotoxic cancer treatment should have medical follow-up that includes regular cardiac monitoring. The frequency of evaluation is based on total cumulative dose of anthracycline, radiation to the chest and abdomen and age at time of therapy. Echocardiograms are recommended at entry into long term follow-up and then subsequently at intervals based on risk factors. A fasting lipid panel is recommended every two years for survivors who received radiation to their chest. Heart healthy habits should be discussed with survivors including not smoking, eating a healthy low fat diet and exercising. More frequent cardiac monitoring during pregnancy is also indicated with echocardiograms before and periodically during pregnancy (especially in the third trimester) and cardiac function monitoring during labor and delivery.

Pulmonary effects

Chemotherapy and radiation are risk factors for pulmonary complications for childhood cancers survivors. Pulmonary symptoms initially can be subtle and difficult to detect, though they can greatly impact a survivor's quality of life. Radiation to the lungs can lead to pulmonary fibrosis and pneumonitis. Symptoms of cough, fever, dyspnea, wheezing, shortness of breath and frequent lung infections can occur in up to 15% of patients who have received greater than 30 Gy of radiation to 50% of the lung. Survivors of hematopoietic stem cell transplant have been shown to have both obstructive and restrictive lung disease that includes bronchiolitis obliterans.

Chemotherapy agents such as bleomycin, carmustine and lomustine are known to cause pulmonary toxicity. Interstitial pneumonitis and pulmonary fibrosis have been reported in childhood cancer survivors that have been exposed to bleomycin doses greater than 400 IU/m2. These problems are exacerbated even further if a child received radiation to the lungs.

Additional risk factors contributing to chronic pulmonary toxicity include a history of asthma and cigarette smoking.

Screening and Recommendations

All patients who are at risk for pulmonary complications need to have an annual medical screening with a history and physical. Recommendations for obtaining a chest X-ray or pulmonary function tests are based on the previous treatment the patients received but should be obtained as a baseline upon entry into a long term follow-up clinic for patients at risk. COG guidelines do recommend that risk of smoking and second hand smoke exposure be discussed with all patients and that at risk patients be counseled about pneumococcal and annual influenza vaccination. Scuba diving is discouraged for patients who received pulmonary radiation and chemotherapy agents such as bleomycin.

Endocrine and Fertility Issues

Childhood cancer survivors who received chemotherapy, radiation, and or surgical treatment during a time of growth and development may be at risk for endocrine and fertility issues. Those at highest risk for growth and endocrine abnormalities are patients who received radiation to their head and neck at a young age. Patients at highest risk for fertility issues are those who received radiation to their abdomen, high doses of alkylating agents and or bone marrow transplant conditioning regimens. Other common endocrine abnormalities that are seen include hypothyroidism in survivors who received direct radiotherapy to their thyroid gland, total body irradiation used for bone marrow transplant conditioning regimens, or cranial radiation. There is also a high risk of obesity in acute lymphoblastic leukemia survivors who are female, treated at a young age and have received cranial radiation.

Chemotherapy and Potential Late Effects	
Class of Chemotherapy	**Potential Late Effects**
Anthracyclines	Cardiac dysfunction Secondary cancers (leukemias)
Alkylating agents	Bladder cancer Hemorrhagic Cystitis Infertility Secondary cancers (leukemia) Hearing Loss Kidney Dysfunction
Topoisomerase II Inhibitors	Secondary Leukemias Infertility or gonadal dysfunction
Bleomycin	Scarring of lungs Pulmonary fibrosis
Anti-metabolites	Neurocognitive changes Hepatic fibrosis
Vinca alkaloids	Sensation Loss Raynaud's phenomenon
Corticosteroids	Avascular necrosis Metabolic syndrome Osteopenia

Screening and Recommendations

Childhood cancer survivors, especially those treated at a young age should be monitored closely for growth and pubertal development. Close monitoring of growth charts, Tanner staging, and thyroid function, gonadotropins (FSH, LH, Estradiol and testosterone) should be monitored for patients at risk. Currently, COG guidelines indicate that serum gonadotropin levels should be obtained at baseline for both females and males starting at age 14 years and then as clinically indicated. An annual thyroid function test should be drawn for anyone at risk. If abnormalities are detected, patients should be referred to an endocrinologist.

Patients with obesity should be counseled regarding weight control. Counseling regarding regular exercise and healthy eating is important for survivors to decrease their risk of health concerns. If there is a family history of hypercholesteremia a fasting lipid panel should be performed at entry into a long term follow up clinic.

It is important to remember that even if survivors of childhood cancer grow and develop normally, they have an increased risk of gonadal dysfunction. Females who receive high doses of alkylating agents can be at increased risk for premature ovarian failure and should be seen by a gynecologist starting at age 18 years. Males may be at risk for decreased spermatogenesis after receiving high doses of alkylating agents; thus males at risk for infertility may benefit from semen analysis. Discussions of fertility should be a part of follow-up visits for childhood cancer survivors.

Neurocognitive and Psychosocial Late Effects

Survivors of childhood cancer are at increased risk for development of cognitive late effects; these sequelae occur as a consequence of whole brain irradiation, high dose systemic methotrexate, and high dose cytarabine or intrathecal methotrexate. Risk factors include higher radiation dose, young age at time of therapy, treatment with both cranial radiation and systemic or intrathecal chemotherapy and being female. Neurocognitive deficits are usually seen within 1 to 2 years following radiation therapy and are progressive in nature. Survivors most often experience academic difficulties in the areas of reading comprehension, language and mathematics.

Some survivors can also experience psychosocial difficulties such as depression, anxiety and social problems. Risk factors associate with poor psychosocial outcomes include diagnosis, type and length of treatment, severity of disease, age at diagnosis and time from diagnosis.

Screening and Recommendations

Patients who received therapy that may potentially impact neurocognitive function should undergo a baseline neuropsychological evaluation that should be repeated at key transition points (e.g. when transitioning from middle-junior high school to high school and high school to college), as well as an annual assessment of their educational progress.

Survivors with psychosocial problems such as adjustment or health related quality of life difficulties, therapy provided by a mental health professional is important.

Secondary Cancers

Childhood cancer survivors with a history of cancer and hematopoietic stem cell transplant are at increased risk for secondary cancers; they have a six fold higher risk of developing a second cancer when compared with the general population. Potential risk factors for developing a secondary malignancy include exposure to radiation, exposure to specific chemotherapeutic agents (alkylating agents and topoisomerase II inhibitors), genetic predisposition and bone marrow transplant patients with a history of chronic graft vs. host disease.

Screening and Recommendations

Survivors with a history of cancer or bone marrow transplant may need additional screening for secondary cancers depending on the type of cancer and treatment they received. It is important for pediatricians and primary care physicians to be aware of any previous treatment and risk factors for the development of a secondary cancer. Patients with a history of radiation should have inspection and palpation of the skin and tissues in the radiated fields. Examples of radiation associated tumors include breast, lung and thyroid, brain tumors and osteosarcomas.

Survivors exposed to alkylating agents and topoisomerase II inhibitors have been shown to have an increased risk of myelodysplasia and acute myeloid leukemia. The incidence of developing a secondary leukemia peaks 4 – 6 years after exposure. Patients who have been exposed to these agents should have a complete blood count checked annually for at least 10 years after completion of therapy.

Conclusion

Childhood cancer survivors are seen in a variety of settings after completing therapy including but not limited to primary care clinics, oncology clinics and specialized long term follow-up clinics. At Children's Hospital in New Orleans, the Treatment after Cancer and Late Effects Center has been established to help take care of these survivors. The Late Effects Center at Children's of New Orleans is a multi-disciplinary clinic that hopes to decrease the burden of morbidity for childhood cancer survivors. The goal is to educate the survivors and to start educating healthcare professionals who may be less familiar with the magnitude of cancer-related health risks and screenings that these survivors face.

Anesthesiology at Children's Hospital

In pediatrics, we know that children are not just small adults. Many times they cannot tell us what is hurting them or answer questions to help us determine a proper course of action for their treatment. This potential breakdown in communication is one of the adversities we face, especially in an emergent situation when a child requires surgery or is suffering pain.

To ensure that our children get the most appropriate care possible, Children's Hospital has the only exclusive pediatric anesthesia department in the state of Louisiana, with a team who specializes in taking care of children of all ages from newborn to 21 during surgery and other procedures. Services are available 24 hours a day for care during emergency surgery, for technical assistance in the Intensive Care Unit and during emergency situations such as cardiopulmonary arrest anywhere in the hospital or clinics, and are proficient and actively participate in taking care of patients with congenital heart disease.

Experts in Working with Kids

When a child has an illness, injury, or disease that requires surgery or a specialized procedure, a pediatric anesthesiologist has the qualifications and experience to best assist in the treatment and to help ensure a successful outcome for the child. Children's Hospital's pediatric anesthesiologists are responsible for the general anesthesia, sedation, and alleviation of pain in infants and children.

Each of our pediatric anesthesiologists has attended at least four years of medical school plus one year of internship and three years of residency in anesthesiology. Each is also certified by the American Board of Anesthesiologists and receives additional specialty training. Our nurse anesthetists are advanced practice registered nurses, who have acquired graduate-level education and board certification.

Children's Hospital Pediatric Anesthesiology

Appointments
(504) 896-9456

Physicians
John Heaton, M.D., *Director*
Brandon Black, M.D.
Christopher Broussard, M.D.
Lorena Dumas-Guntner, M.D.
Stanley Hall, M.D.
George Koclanes, M.D.
Sheryl Sawatsky, M.D.
Louis Shenk, M.D.
Donald Smith, M.D.

Different Ages & Stages

The goal of our pediatric anesthesiologists is to make the hospital experience as pleasant as they can, to help manage a child's anxiety before surgery and their pain after surgery. They are experienced in treating the special needs of children at different ages and stages of development and know how to examine and treat them in a way that makes them relaxed and cooperative. The anesthesiologist will talk to the child's care giver(s) about the various types of anesthesia that may be used and the risks and benefits of each type of medicine.

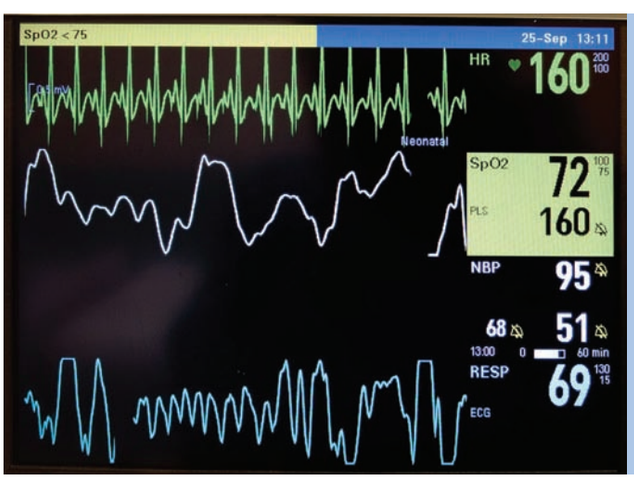
Children's Hospital's anesthesiology areas are arranged and decorated with children in mind. Examination rooms and waiting rooms have aquariums, toys and reading materials for kids. The hospital also tries to allay any anxieties by allowing children to bring with them a familiar item from home such as a stuffed toy, blanket, portable gaming device, which may be comforting, distracting, and help the process.

Anesthesia, Sedation & Pain Management

While anesthesiologists are most often associated with work in the operating room, they may be involved in sedating or anesthetizing a child for many different procedures outside of the OR. For instance, some children need sedation because they get anxious and cannot lie still enough to have a CT Scan or MRI. For cancer patients who must endure bone marrow biopsies and lumbar punctures, the right kind of anesthesia can make these procedures much more bearable.

Pediatric anesthesiologists may also be involved with the pain service and are experienced in different techniques and therapies to best manage the child's pain. This includes consultations with surgeons and appropriate medical subspecialists; pre-anesthetic evaluation and preparation; intraoperative anesthesia; monitoring; and life support and post-anesthetic care, including airway management, respiratory care, and other forms of physiologic support.

Anesthesia aims to take away the pain and discomfort of surgery and make it easier for a procedure to be accomplished optimally. Most children who undergo anesthesia will be quite comfortable and have no complications. They will often be able to go home the same day as the procedure, if the surgery is not too extensive or there are no complications.



Vital signs of a patient with an uncorrected congenital heart defect, just before induction of anesthesia

Pediatric anesthesiologists generally provide the following services

- Evaluation and management of complex medical problems in infants and children when surgery is needed
- Planning and care before, during & after surgery
- A nonthreatening environment for children
- Pain management, if needed
- Anesthesia & sedation for procedures outside of the OR— endoscopies, MRI, CT scan & radiation therapy
- Expert assistance for patients with difficult IV access

Children's Hospital Specialty Clinics & Therapies

CLINICS IN NEW ORLEANS, METAIRIE, BATON ROUGE AND LAFAYETTE

Allergy/Immunology
Dimitriades, Victoria [M, BR] ..... (504) 896-9589
Ochoa, Augusto [M] ..... (504) 896-9589
Paris, Ken [M, L] ..... (504) 896-9589
Sorensen, Ricardo [M] ..... (504) 896-9589

Amputee Clinic
Gonzales, Tony ..... (504) 896-9569

Cardiology
Ascuitto, Robert ..... (504) 896-9751
Gajewski, Kelly ..... (504) 896-9751
Lilje, Christian ..... (504) 896-9751
Ross-Ascuitto, Nancy ..... (504) 896-9751
Sernich, Steffan ..... (504) 896-9751
Siwik, Ernest ..... (504) 896-9571
Stopa, Aluizio ..... (504) 896-9571

Cardiothoracic Surgery
Caspi, Joseph ..... (504) 896-3928
Dorotan, Jaime ..... (504) 896-3928
Pettitt, Timothy ..... (504) 896-3928

Children at Risk Evaluation (CARE) Center
Jackson, Jamie ..... (504) 896-9237
Wetsman, Ellie ..... (504) 896-9237

Cleft/Craniofacial
McBride, Lori ..... (504) 896-9568
Moses, Michael ..... (504) 896-9857
St. Hilaire, Hugo ..... (504) 896-9857

Clinical Trials ..... (504) 894-5377

Cochlear Implants
Arriaga, Moises ..... (504) 896-2141
Marks, Herbert ..... (504) 896-2141

Craniofacial/Genetics
Lacassie, Yves [M] ..... (504) 896-9857
Marble, Michael ..... (504) 896-9857
Zambrano, Regina ..... (504) 896-9857

Cystic Fibrosis
Levine, Stephen ..... (504) 896-9436
Pepiak, Derek ..... (504) 896-9436

Dental
Mobile Dental Program 34-BRUSH
Ritwik, Priyanshi ..... (504) 896-9580

Dermatology
Poole, Jeffrey ..... (504) 896-2888

Developmental/High Risk
Wong, Joaquin ..... (504) 896-9458

Diabetes
Chalew, Stuart ..... (504) 896-9441
Genet, Michelle [BR] ..... (504) 896-9441
Gomez, Ricardo ..... (504) 896-9441
Stender, Sara ..... (504) 896-9441
Vargas, Alfonso ..... (504) 896-9441

Down Syndrome
Lacassie, Yves [M] ..... (504) 896-9254
Marble, Michael ..... (504) 896-9254
Zambrano, Regina ..... (504) 896-9254

Endocrinology
Chalew, Stuart ..... (504) 896-2888
Felipe, Dania ..... (504) 896-2888
Genet, Michelle [BR] ..... (504) 896-2888
Gomez, Ricardo [M, BR] ..... (504) 896-2888
Stender, Sara ..... (504) 896-2888
Vargas, Alonso [M, BR] ..... (504) 896-2888

Epilepsy Surgery
McGuire, Shannon ..... (504) 896-9458

Feeding Clinic
Hyman, Paul ..... (504) 896-9534

Gastroenterology
Brown, Raynorda [M, BR] ..... (504) 896-2888
Hyman, Paul ..... (504) 896-2888
Keith, Brent ..... (504) 896-2888
Monagas, Javier [M] ..... (504) 896-2888
Noel, Adam [M] ..... (504) 896-2888
Rosenberg, Allan [M, BR] ..... (504) 896-2888

Genetics
Lacassie, Yves [M] ..... (504) 896-9254
Marble, Michael [BR, L] ..... (504) 896-9254
Zambrano, Regina [M, BR] ..... (504) 896-9254

Gynecology
Holman, Stacey ..... (504) 896-2888
Wells, Lindsay ..... (504) 896-2888

Hematology/Oncology
Gardner, Renee ..... (504) 896-9740
Morales, Jaime [BR, L] ..... (504) 896-9740
Morrison, Cori ..... (504) 896-9740
Prasad, Pinki [L] ..... (504) 896-9740
Ramos, Ofelia ..... (504) 896-9740
Velez, Maria [BR] ..... (504) 896-9740
Yu, Lolie [L] ..... (504) 896-9740

Hemophilia Clinic ..... (504) 896-9740

HIV Clinic/FACES
Wilcox, Ronald ..... (504) 896-9583

Hospitalists
Referrals ..... (504) 896-3924
English, Robin ..... (504) 896-3924
Hescock, Jay ..... (504) 896-3924
Roy, Melissa ..... (504) 896-3924
Sulton-Villavasso, Carmen ..... (504) 896-3924

Infectious Disease
Bégué, Rodolfo ..... (504) 896-9583
Seybolt, Lorna ..... (504) 896-9583
Wilcox, Ronald ..... (504) 896-9583

International Adoption Clinic
Bégué, Rodolfo ..... (504) 896-9583

Kidney Transplant
Buell, Joseph ..... (504) 896-9238
Killackey, Mary ..... (504) 896-9238
Paramesh, Anil ..... (504) 896-9238
Slakey, Douglas ..... (504) 896-9238

Kidney Transplant Clinic
Vehaskari, Matti ..... (504) 896-9238

Metabolic
Zambrano, Regina ..... (504) 896-9254
Marble, Michael ..... (504) 896-9254

Muscular Dystrophy
Tilton, Ann ..... (504) 896-9283
Weimer, Maria ..... (504) 896-9283
Wong, Joaquin ..... (504) 896-9283

Nephrology
Aviles, Diego [BR] ..... (504) 896-9238
Bamgbola, Oluwatoyin [L] ..... (504) 896-9238
Iorember, Franca ..... (504) 896-9238
Straatman, Caroline [L] ..... (504) 896-9238
Vehaskari, Matti [BR, L] ..... (504) 896-9238

Neurofibromatosis
Lacassie, Yves ..... (504) 896-9254
Marble, Michael ..... (504) 896-9254
Zambrano, Regina ..... (504) 896-9254

Neurology
Conravey, Allison [M] ..... (504) 896-2888
Gautreaux, Jessica [M] ..... (504) 896-2888
Deputy, Stephen ..... (504) 896-2888
McGuire, Shannon ..... (504) 896-2888
Tilton, Ann ..... (504) 896-2888
Weimer, Maria ..... (504) 896-2888
Wong, Joaquin ..... (504) 896-2888

Neuromuscular
Gonzales, Tony ..... (504) 896-9569
Levine, Stephen ..... (504) 896-9436
Tilton, Ann ..... (504) 896-9319
Weimer, Maria ..... (504) 896-9859
Wong, Joaquin ..... (504) 896-9283

Neurosurgery
Greene, Clarence [L] ..... (504) 896-9568
McBride, Lori ..... (504) 896-9568
Nadell, Joseph [L] ..... (504) 896-9568

Occupational Therapy ..... (504) 896-9540

Ophthalmology
Ellis, George, Jr. [M] ..... (504) 896-9426
Eustis, Sprague ..... (504) 896-9426
Leon, Alejandro [M] ..... (504) 896-9426
Vives, Tere [M] ..... (504) 896-2134

Orthopaedics
Accousti, William [M, L] ..... (504) 896-9569
Chavez, Manuel, PA ..... (504) 896-9569
Faust, Donald ..... (504) 896-2888
Gonzales, Tony [BR] ..... (504) 896-9569
Heinrich, Stephen ..... (504) 896-9569
King, Andrew ..... (504) 896-9569
Lago, Theresa, PA ..... (504) 896-9569
Lee, Raven, PA ..... (504) 896-9569
Nguyen, Jessica, PA ..... (504) 896-9569
Patel, Prerana ..... (504) 896-9569
Southern, Edward ..... (504) 896-9569

Otolaryngology (ENT)
Arriaga, Moises ..... (504) 896-9254
Hagmann, Michael [M] ..... (504) 896-9254
Jeyakumar, Anita ..... (504) 896-9254
Marks, Herbert ..... (504) 896-9254
Simon, Lawrence ..... (504) 896-9254

Physical Therapy ..... (504) 896-9557

Plastic Surgery
Moses, Michael ..... (504) 895-7200
St. Hilaire, Hugo ..... (504) 412-1240

Psychology
Clendaniel, Lindsay ..... (504) 896-9484
Courtney, John ..... (504) 896-9484
Franz, Diane ..... (504) 896-9484
Gentile, Steven ..... (504) 896-7272
Henke, Amy ..... (504) 896-7272
Heslet, Lynette ..... (504) 896-7272
Jackson, David ..... (504) 896-7272
Kamps, Jodi ..... (504) 896-7272
Kiracofe, Catherine ..... (504) 896-7272
Rathboum, Rebecca ..... (504) 896-7272

Pulmonology
Edell, Dean ..... (504) 896-9436
Levine, Stephen ..... (504) 896-9438
Pepiak, Derek ..... (504) 896-9438

Rheumatology
Brown, Amanda [BR, L] ..... (504) 896-9385
Dimitriades, Victoria ..... (504) 896-9385
Gedalia, Abraham [M, BR, L] ..... (504) 896-9385

Scoliosis/Pediatric Spine
Accousti, William [M, L] ..... (504) 896-9569
Gonzales, Tony [BR] ..... (504) 896-9569
King, Andrew ..... (504) 896-9569
Patel, Prerana ..... (504) 896-9569

Spasticity
Nadell, Joseph ..... (504) 896-9568
Tilton, Ann ..... (504) 896-9283
Wong, Joaquin ..... (504) 896-9283

Speech & Hearing ..... (504) 896-9551

Surgery
Hill, Charles ..... (504) 896-3977
Steiner, Rodney ..... (504) 896-9756
Valerie, Evans ..... (504) 896-9756

Travel Clinic
Bégué, Rodolfo ..... (504) 896-9583
Seybolt, Lorna ..... (504) 896-9583
Wilcox, Ronald ..... (504) 896-9583

Treatment After Cancer & Late Effects Center
Prasad, Pinki ..... (504) 896-9740

Urology
Langston, Sherry, CNP ..... (504) 896-2888
Ortenberg, Joseph [BR, L] ..... (504) 896-2888
Roth, Christopher ..... (504) 896-2888

Vascular Anomalies
Poole, Jeffrey ..... (504) 896-9857
Simon, Lawrence ..... (504) 896-9857

Wound Clinic
Valerie, Evans ..... (504) 896-3977

TRANSPORT/TRANSFER
1-855-CHNOLA1

200 Henry Clay Ave., New Orleans, LA 70118
(504) 899-9511• www.chnola.org

In addition to Children's Hospital Main Campus, some physicians also hold clinics at other centers.

Children's Hospital	**(504) 899-9511**
Ambulatory Care Center	**(504) 896-9532**
Metairie Center [M]	**(504) 832-4033**
Baton Rouge Center [BR]	**(225) 216-3047**
Lafayette Center [L]	**(337) 289-8289**

Updated 11/12

ARTICLE EVALUATION

You must complete the following evaluation in order to receive your CME credit.

I enhanced my knowledge of the topic:

Very much				Very little
5	4	3	2	1

The author met the stated objectives:

Greatly				Not at all
5	4	3	2	1

The overall evaluation of the article:

Excellent				Poor
5	4	3	2	1

Did you receive any commercial bias in the material presented in this activity?

☐ Yes ☐ No

How long did it take to read the issue and complete the quiz:

30 minutes 1 hour

Continuing Medical Education

CHILDREN'S HOSPITAL

LSMS Louisiana State Medical Society

Children's Hospital is accredited by the Louisiana State Medical Society to provide continuing medical education for physicians. Children's Hospital designates this enduring material educational activity for a maximum of **1.0 AMA PRA Category 1 Credit.™** Physicians should only claim credit commensurate with the extent of their participation in the activity. Please PRINT your personal information.

Name: _____

Physician ID number or last four SSN digits: _____

Mailing address: _____

_____

Topics that you would like to see in future issues: _____

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CME Offerings

Pediatric Grand Rounds
1st, 3rd and 5th Wednesday
of each month, 8 – 9 a.m.
Children's Hospital Auditorium

Child Neurology Case Conference
1st, 2nd and 4th Wednesday
of each month, 2 – 3 p.m.
ACC Room 3302

Tumor Board
Wednesdays, 4 – 5 p.m.
Children's Hospital Auditorium

Weekly Pathology Conference
Thursdays, 8 – 9 a.m.
Research Center, Room 4222

Neonatology Conference
Thursdays, 12:30 – 1:30 p.m.
NICU Conference Room

Cath Conference
Fridays, 8 – 9 a.m.
ACC Room 3302

Please call the CME office
at (504) 896-9264
for more information.

Please record your responses to the questions on the form below. Please circle the best possible answer. CME offer is good through January 31, 2013.

1. What risk factors are associated with development of cardiomyopathy in childhood cancer survivors?
   a. Age at time of chemotherapy
   b. Total dose of chemotherapy
   c. Male
   d. Diet

2. Childhood cancer survivors are at increased risk for secondary cancers?
   a. Yes
   b. No

3. A female childhood cancer survivor received alkylating agents and radiation to her abdomen. She is growing and developing normally; what should you educate her about?
   a. Nothing, she is doing great
   b. Increased risk of premature ovarian failure
   c. Discussion of possible infertility

3. Receiving cranial radiation puts a cancer survivor at increased risk for neurocognitive deficits?
   a. Yes
   b. No

To receive CME credit, participants must score 100%.

To receive CME credit, mail, e-mail or fax your completed form to:
CME Office • Children's Hospital • 200 Henry Clay Avenue • New Orleans, LA 70118
E-mail: cmooney@chnola.org • Fax: (504) 896-3932

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