



Duke Cancer Report 2009

GLOBAL IMPACT, PERSONALIZED CARE



ADVANCES



ACCELERATING THE PROGRESS TOWARD A WORLD WITHOUT CANCER



Every year, thousands of patients turn to Duke for their cancer treatment—and we do not take that trust for granted. From the care we provide in our clinics and hospitals to the advances generated in our research labs, the entire cancer team at Duke is committed to providing each patient with the best possible outcome—and the best possible experience. Our overarching goal, and our daily focus, is to bring hope and compassion to those who need it most.

Because of the depth of subspecialization at Duke, all patients—even those with rare cancers such as sarcomas or pediatric brain tumors—will find a full complement of dedicated physicians, from surgeons to medical and radiation oncologists, who make managing and reducing the incidence and impact of these cancers their life's work. This depth of expertise is complemented by the experience and commitment of our nurses, social workers, genetic counselors, and other clinicians and staff who provide support every step of the way—caring for each patient as a whole person.

Continually ranked among the leading cancer programs in the nation by *U.S. News & World Report*, Duke also takes an active role in developing and offering new technologies and innovative therapies to advance care and relieve the burdens of cancer. Patients benefit from state-of-the-art treatments, many of them available through our large portfolio of clinical trials.

At the forefront of these efforts is the Duke Comprehensive Cancer Center, one of only 40 National Cancer Institute-designated comprehensive cancer centers

in the United States and one of the largest and most active cancer research enterprises in the world. In areas such as breast cancer, brain tumors, bone marrow and stem cell transplantation, gastrointestinal cancers, prostate cancer, and many others, our physician-scientists lead the world in translating research innovations into breakthroughs that change how patients are cared for and improve their quality of life.

Today, Duke is working to improve care for patients in our local, regional, and global communities. We offer services at the Duke Raleigh Cancer Center and at Durham

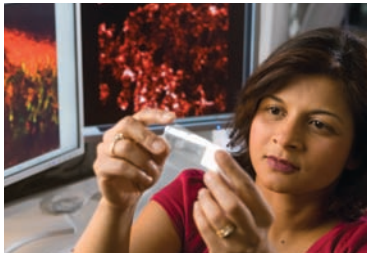
CONTINUALLY RANKED AMONG THE LEADING CANCER PROGRAMS IN THE NATION BY *U.S. NEWS & WORLD REPORT*, DUKE TAKES AN ACTIVE ROLE IN DEVELOPING AND OFFERING NEW TECHNOLOGIES AND INNOVATIVE THERAPIES TO ADVANCE CARE AND RELIEVE THE BURDENS OF CANCER.

Regional Hospital. In addition, the Duke Oncology Network facilitates interaction between Duke oncologists and community practices by providing assistance with clinical trial development and access at nine sites in the Southeast, and by partnering with eight clinical affiliates in North Carolina and Virginia. And as one of 21 National Comprehensive Cancer Network institutions, we lead and contribute to expert panels that define clinical guidelines for cancer care worldwide.

As we accelerate the progress toward a world without cancer, we are pleased to share the lessons we have learned. We dedicate this journey to the patients and families who have helped us gain insights and expand the possibilities and care available to those battling cancer.

Duke cancer clinical leadership team, front row, from left: Nelson Chao, MD, Joseph Moore, MD, Carolyn Carpenter. Back row, from left: Jeffrey Crawford, MD, Christopher Willett, MD, Douglas Tyler, MD, and Thomas D'Amico, MD.

HOT TOPICS



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DUKE CANCER SERVICES AT A GLANCE

Duke provides specialized, compassionate care for cancer patients, treating virtually all cancers. Here are some of the reasons that each year approximately 40,000 patients with cancer seek care at Duke.

Leading indicators

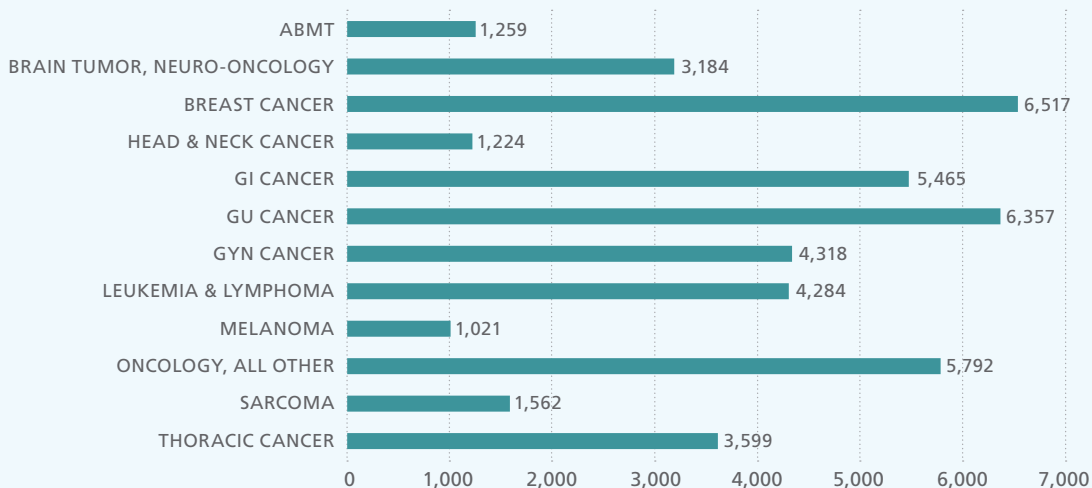
- Duke University Medical Center is ranked as the **top hospital in the South** for cancer services and one of the best in the nation by *U.S. News & World Report* (2009).
- Duke University Medical Center is ranked **#4 in the nation in gynecology** by *U.S. News & World Report* (2009).
- Duke University Medical Center is ranked **#6 in the nation in urology** by *U.S. News & World Report* (2009).
- Duke's **melanoma program** is one of the most comprehensive melanoma treatment and research programs in the world.
- Duke's **Long-Term Cancer Survivor Clinic** is a multidisciplinary clinic that follows childhood cancer survivors into adulthood.
- The Duke **Thoracic Oncology Program** is one of eight U.S. programs involved with the largest quality-improvement project in lung cancer in the country—the NCCN lung cancer outcomes database project.
- Duke is a member site of and houses the statistical center for **Cancer and Leukemia Group B**, a national clinical research group that brings together clinical oncologists and laboratory investigators to develop better treatments for cancer.
- One of the original eight comprehensive cancer centers recognized by the National Cancer Institute (NCI), the Duke Comprehensive Cancer Center today is one of only 40 **NCI-recognized Comprehensive Cancer Centers** nationwide.
- Duke provides leadership to the **National Comprehensive Cancer Network**, a not-for-profit alliance of 21 of the world's leading cancer centers dedicated to improving the quality and effectiveness of care provided to patients with cancer. (NCCN Board of Directors: Thomas D'Amico, MD, vice chair; Carolyn Carpenter, MHA, member).
- Duke University Hospital is one of only three hospitals honored with a **2009 American Hospital Association-McKesson Quest for Quality Prize**, receiving the Citation of Merit.
- Duke University Hospital, Duke Raleigh Hospital, and Durham Regional Hospital **have all achieved the Magnet designation** by the American Nurses Association. Earned by only 5 percent of hospitals in the nation, the honor recognizes hospitals which provide the highest level of nursing care.



Duke Cancer Report



DUKE UNIVERSITY HOSPITAL CANCER PATIENTS BY PROGRAM 2008



Cutting-edge research

One of the largest and most active cancer research enterprises in the world, Duke conducts research that leads to more hope for cancer patients. Duke excels in basic research to discover the genetic and cellular mechanisms of cancer; translational research that uses those discoveries to develop new therapies; and clinical research that leads to approval of new therapies and new combinations of therapies.

- Duke currently receives **over \$332 million annually in research funding** from a variety of sources.
- \$78 million (23 percent) of that funding comes from the National Cancer Institute, the American Cancer Society, and the Department of Defense.
- In 2008, **more than 4,400 patients** participated in more than 700 cancer-related clinical trials at Duke.

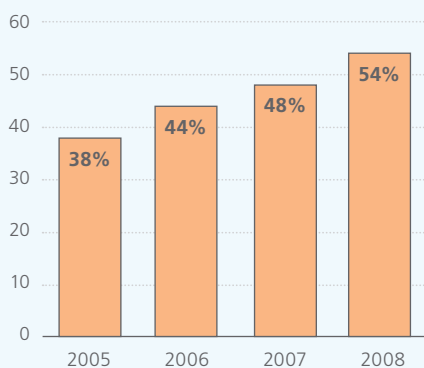
Education and training

Duke is dedicated to preparing tomorrow's leaders in clinical care, research, and education. Our residency and fellowship training programs provide comprehensive, innovative training programs in specialties including:

- Gynecologic Oncology
- Hematology/Medical Oncology
- Neuro-Oncology
- Pediatric Hematology/Medical Oncology
- Radiation Oncology
- Surgical Oncology

For more information, go to www.gme.duke.edu.

DUKE INVESTIGATOR-INITIATED CLINICAL TRIALS



54 percent of Duke cancer patients who enrolled in clinical trials in 2008 were on Duke investigator-initiated trials.



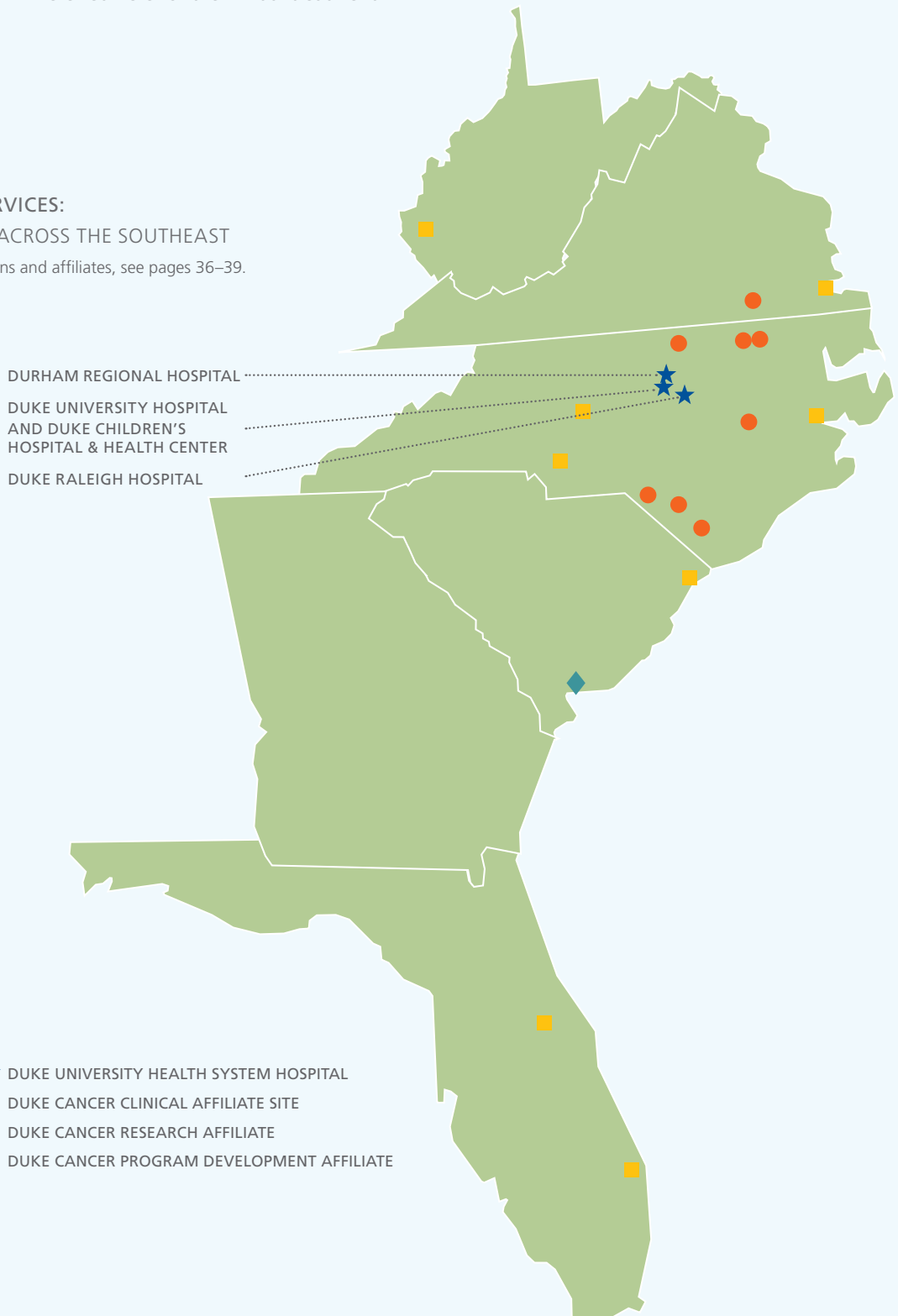
DUKE CANCER SERVICES AT A GLANCE

Patients we serve

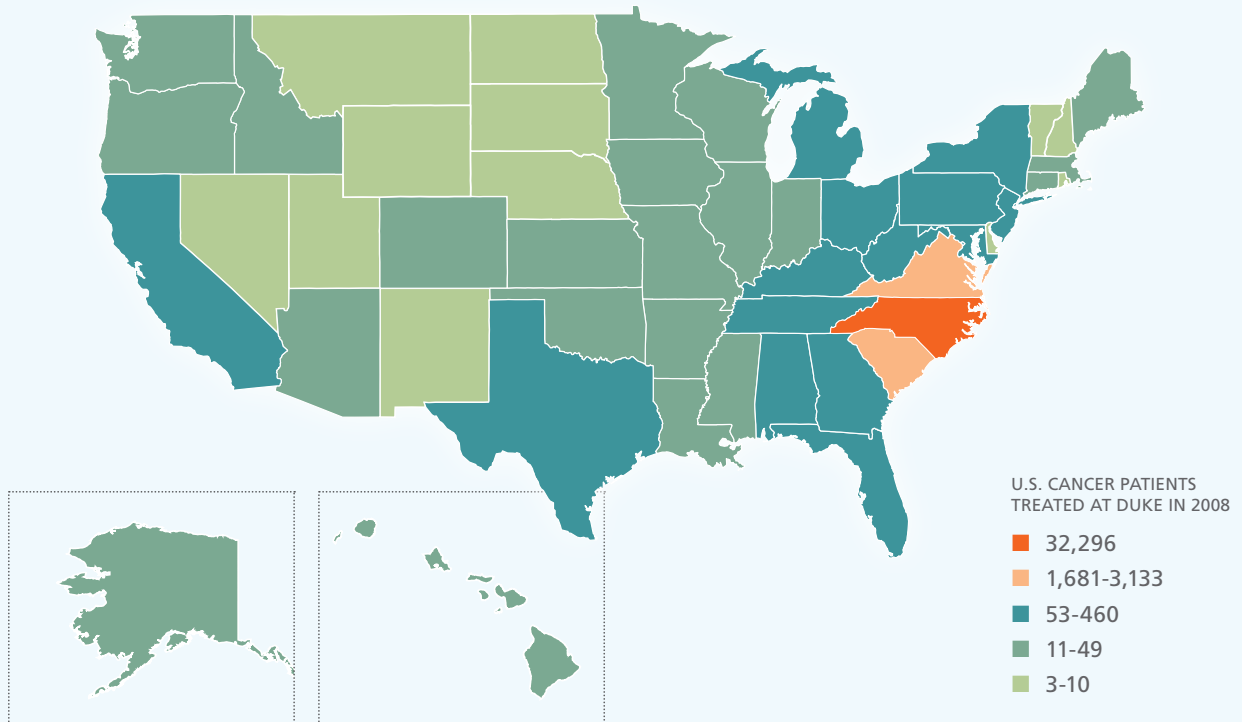
Patients with cancer from every county in North Carolina and most states in the nation trust Duke for their care. Patients with cancer accounted for approximately 9,000 inpatient discharges and more than 200,000 outpatient encounters at Duke in 2008 (data from most recent year available). This includes approximately 100 patients who receive chemotherapy each day.

- 5,678 new cancer patients were seen at Duke University Hospital and clinics in 2008
- More than 55 percent of new Duke cancer patients were referred here for their initial treatment

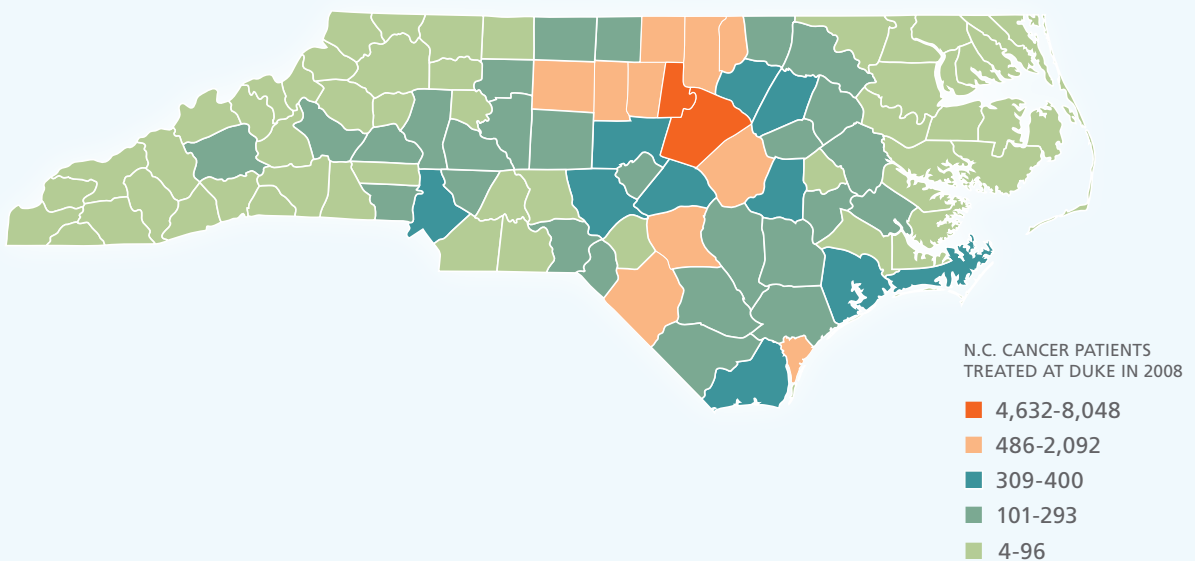
DUKE CANCER SERVICES:
SERVING PATIENTS ACROSS THE SOUTHEAST
For detailed list of locations and affiliates, see pages 36–39.



25 PERCENT OF OUR CANCER PATIENTS LIVED OUTSIDE NORTH CAROLINA AT THE TIME OF THEIR FIRST VISIT TO DUKE. THE TOP FIVE STATES FOR OUT-OF-STATE PATIENTS IN 2008 WERE VIRGINIA, SOUTH CAROLINA, GEORGIA, FLORIDA, AND WEST VIRGINIA.



75 PERCENT OF OUR CANCER PATIENTS LIVED IN NORTH CAROLINA AT THE TIME OF THEIR FIRST VISIT TO DUKE. THE TOP COUNTIES REPRESENTED WERE DURHAM, WAKE, ORANGE, CUMBERLAND, ROBESON, AND GRANVILLE.



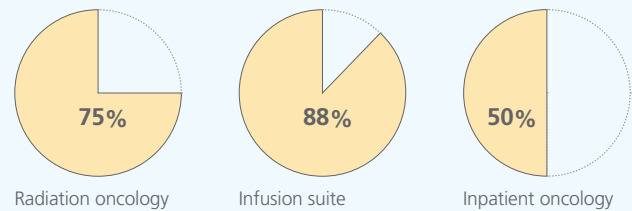
DUKE CANCER SERVICES AT A GLANCE



Faculty and staff

- More than 100 physicians, 200 faculty researchers, and 500 dedicated clinical staff
- Our faculty and staff include more than 100 faculty physicians who are board-certified as well as nurses, social workers, nutritionists, and other staff who focus on oncology
- At Duke University Hospital 75 percent of nurses in radiation oncology, 88 percent of nurses in the infusion suite, and half of our inpatient oncology nurses are certified in oncology. In comparison, about 34 percent of oncology nurses in the U.S. are certified in oncology

DUKE NURSES CERTIFIED IN ONCOLOGY



Recent major oncology faculty honors and awards

Andrew Berchuck, MD, selected as the **first recipient of the American Cancer Society's Barbara Thomason Ovarian Cancer Professorship**; also elected **president of the Society of Gynecologic Oncologists**

Darell Bigner, MD, PhD, the **Zulch Prize, Germany's most prestigious award for basic neurological research**

Thomas A. D'Amico, MD, elected **vice chairman of the board of the National Comprehensive Cancer Network**

Mark Dewhirst, DVM, PhD, the **Failla Award from the Radiation Research Society, the highest award given by the Society** based on meritorious scientific contributions to the field of radiation research

Chay Kuo, MD, PhD, **National Institutes of Health's Director's New Innovator Award**, also a **Distinguished Scientist Award** from the Sontag Foundation

Robert J. Lefkowitz, MD, the **National Medal of Science**, for contributions to the biological sciences

H. Kim Lyerly, MD, appointed by President Bush to the **National Cancer Advisory Board**

Anthony Means, PhD, the **American Society for Pharmacology and Experimental Therapeutics Goodman and Gilman Award in Receptor Pharmacology**, given in recognition of lifetime achievement in receptor research

Judd W. Moul, MD, **National Physician of the Year Award** from Castle-Connelly Medical Ltd.

Tannishtha Reya, PhD, **Presidential Early Career Award for Scientists and Engineers**, the highest honor that the U.S. government bestows on young scientists and engineers

2009 recipients of Oncology Nursing Society (ONS) awards

Caryl Fulcher, RN, MSN, CNS-BC, the **Susan Baird Award for Excellence in Clinical Writing**

Jennifer Gentry, RN, MSN, ANP, GNP, APRN, BC-PCM, the **Pat McCue/New Orleans Chapter End-of-Life Care Nursing Career Development Award**

Kevin Sowers, RN, MSN, the **Friends of the Foundation Award**

Rita Steinbauer, RN, BSN, OCN, the **ONS Pearl Moore Career Development Award**

Jennifer Tenhover, RN, MSN, APRN, BC, AOCN, the **Excellence in Medical Oncology Award**

Number of RNs who have received national recognition or American Cancer Society scholarships in the past three years:

15



In response to fast-growing demand for cancer services, Duke Medicine broke ground this fall on the new 267,000-square-foot Duke Medicine Cancer Center, designed to promote multidisciplinary care, support the integration of clinical research and treatment, and greatly enhance the patient and visitor experience. The project also calls for the renovation of over 14,000 square feet of the current Morris Cancer Clinic.

BUILDING FOR THE FUTURE

Duke plans a new cancer center designed to create the optimal patient experience

Duke is looking to the future of cancer treatment by building upon its foundation of excellence—literally. This fall, Duke Medicine began construction of a state-of-the-art building devoted entirely to cancer care and research. The Duke Medicine Cancer Center will open in 2012.

The building will bring science into the clinic more effectively by providing space where patients can learn about and participate in cancer clinical trials. More than 700 such studies are ongoing at Duke, including major trials of experimental therapeutics and novel cancer vaccine trials.

The space will provide the ideal platform for collaboration between researchers, physicians, and patients; offer state-of-the-art training facilities for Duke's top-ranked educational programs; and enable providers from many specialties to work together more efficiently in delivering care—thus furthering the multidisciplinary team approach to treatment that Duke is famous for.

Experts predict that more than 1.5 million new cancer cases will be diagnosed in the United States in 2010; in North Carolina, new cases are projected to rise by 14 percent between 2006 and 2011. The building will allow Duke to meet this ever-increasing need for cancer care, providing new spaces for every outpatient program, including radiation therapy and infusion.

At the heart of the vision for this space is to provide the best possible patient outcomes and the most positive patient and family experiences. Care will be given in a convenient, easily accessible, and healing environment. Large windows will let in sunlight, and areas for privacy and meditation will be available. Cutting-edge information



technology, including computer kiosks in registration areas, will enable patients to access educational materials and play a more active role in their own care. Infusion patients will be able to take comfort in the outdoors—on the building's rooftop terrace—during therapy.

Further supporting Duke's cancer program, Duke Medicine Pavilion, a major addition to Duke University Hospital adjacent to the new cancer center, will include 160 new ICU and intermediate care beds, greatly expanding the capacity for intensive care. Sixteen new operating rooms and an expanded diagnostics platform will also be included. A concourse will connect the two buildings, promoting easy transfer for patients. Duke Medicine Pavilion is slated to open in 2013. The new cancer facilities and hospital addition will add around 850,000 square feet to the Duke medical campus; total project costs are estimated to be more than \$700 million.

Together, these landmark buildings will help further our goal of transforming cancer care.





CANCER CLINICAL SERVICES AT DUKE

Duke's nationally and internationally recognized faculty and staff combine evidence-based medicine and state-of-the-art technology with compassionate care. By treating the whole person and presenting a vast array of prevention and treatment trial opportunities, Duke works to extend and improve the life of each and every cancer patient.

We offer comprehensive oncology services in inpatient and outpatient settings across Duke University Health System and at locations throughout the Southeast—bringing world-class cancer care to communities far beyond Duke.



David Rizzieri, MD, director of Duke's hematologic malignancies program, works to link Duke's large patient population to its prolific bench research.

Adult Bone Marrow and Stem Cell Transplants

Overview

Duke's Adult Bone Marrow and Stem Cell Transplantation Program is internationally recognized for its novel approaches to treating leukemia, lymphoma, and myeloma through bone marrow and peripheral blood progenitor cell transplantation. Novel indications such as autoimmune disease and hemoglobinopathies are also treated. More than 3,000 patients from all over the world have received transplants at Duke. The program's comprehensive team designs individualized treatment plans for each patient. Our board-certified physicians include intensivists in bone marrow transplantation, hematology-oncology, medical oncology, and related specialties. A support team that includes physical therapists, clinical social workers, dietitians, financial counselors, and pharmacists help guide each patient to recovery.

Duke's leadership in bone marrow and stem cell transplantation research enables patients to receive treatment with the very latest approaches, of special importance to patients with refractory or recurrent malignancies. Studies with partially matched cord blood or haploidentical related donors make transplantation an option for patients without a sibling with a matching immune system. Duke also works to improve transplantation outcomes and reduce complications such as graft versus host disease. Duke researchers have received acclaim for their extensive studies of combining transplantation with other therapies including immunotherapy, anti-angiogenesis therapy, and the latest drug therapies.

HIGHLIGHTS

Unmatched donors

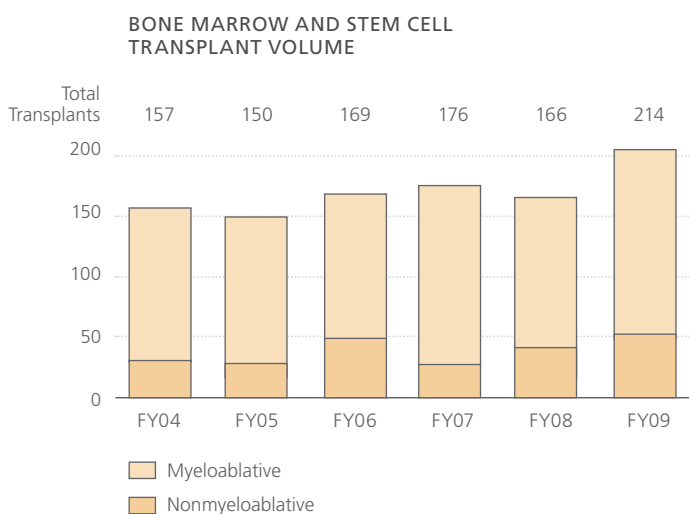
Duke researchers conducted the first large successful study of transplanting stem cells from donors who are not fully matched while using chemotherapy that is less aggressive than standard practice. (*J Clin Oncol*, Feb 2007)

Reducing relapse

Duke is making progress in reducing the rate of patient relapse by combining transplants with vaccines made from a patient's own dendritic cells that are "trained" to recognize cancer cells.

Immunotherapy

Duke is leading the national study to investigate the value of stem cell transplant combined with high-dose immunotherapy in those with autoimmune diseases such as severe systemic sclerosis. (DAIT SCSSc-01)



Bone and Soft Tissue Cancers

Overview

Duke is one of only a handful of hospitals with a multidisciplinary sarcoma clinic where patients can see in one visit a surgeon, medical oncologist, and radiation oncologist who make sarcomas their clinical and clinical research focus. Our physicians see approximately 200 new patients with sarcomas per year, many of whom travel from across the country to benefit from Duke's unique approach.

Duke surgeons perform a high volume of resections for sarcomas and offer options to increase function such as:

- **Rotationplasty**, an alternative to traditional amputation that provides greater range of motion with a prosthesis
- **Vascularized fibular reconstruction**, a procedure offered in cooperation with plastic surgeons in which the fibula is transplanted to replace large areas of bone resection

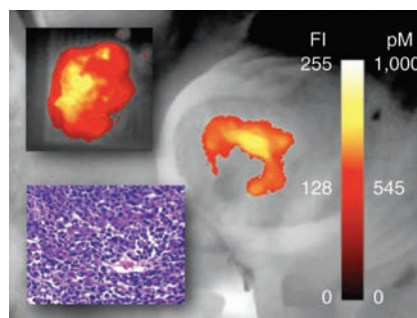
Duke physician-scientists continually work to improve treatment. Duke physicians designed and are helping to lead a national study of image-guided preoperative radiation therapy for soft tissue sarcomas (RTOG 0630). Researchers also study sarcomas in children, adolescents, and young adults. Areas of focus include investigation of new agents for rhabdomyosarcoma patients who have the lowest chance of long-term survival.

Other Duke researchers are using novel approaches to understand how sarcomas develop and metastasize. Duke scientists genetically engineered a mouse model of sarcoma with mutations in the same genes that cause sarcomas in humans. Duke uses the model to identify mechanisms associated with metastases and resistance to chemotherapy, to learn how current therapies work, and to develop new ones. Sarcoma mechanisms identified in the mouse model are then analyzed in samples from Duke's sarcoma tissue repository, which contains tumor tissue donated by patients for genomic analysis. As tumor characteristics associated with clinical outcomes are identified, this knowledge can be used to develop personalized therapies specific to a patient's individual tumor.

HIGHLIGHTS

Intraoperative imaging

Duke scientists have shown that intraoperative imaging can successfully be used to detect residual sarcoma not removed during surgery in a mouse model developed by a Duke physician-scientist. Future application of this technology in the operating room could ensure eradication of residual cancer cells that if left unchecked could cause recurrence. (Nature Medicine. Aug 2007)



High-volume reconstructions

Duke's latest series of vascularized fibular reconstructions (31) is among the largest reported in the literature to date. (Clin Orthop Relat Res. Aug 2009)

For more information about the sarcoma program, please call toll-free 1-877-SARC-DUKE (7272-3853), or 919-613-5550 (local).





Internationally recognized Duke neurosurgeons John Sampson, MD, PhD, and Allan Friedman, MD, perform an awake craniotomy.

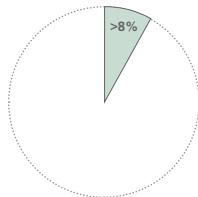
Brain Tumors

Overview

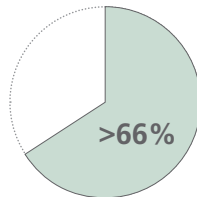
The Preston Robert Tisch Brain Tumor Center at Duke, established in 1937, is one of the longest-standing and largest brain tumor research and clinical programs in the United States. At Duke, more than 250 neurosurgeons, neuro-oncologists, radiation oncologists, scientists, nurses, social workers, and other staff are dedicated solely to investigating and treating brain tumors. Duke currently follows more than

2,200 adult and pediatric patients with brain tumors from all over the world and is committed to improving and extending their survival. Duke was awarded one of only four Specialized Program of Research Excellence (SPOR) awards in brain cancer in the nation from the National Cancer Institute; the award recognizes the center's researchers for their commitment to finding innovative ways to treat brain tumors.

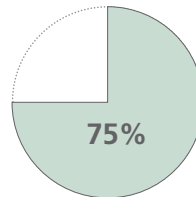
INNOVATIVE THERAPIES



Adult brain tumor patients nationwide enrolled in clinical trials



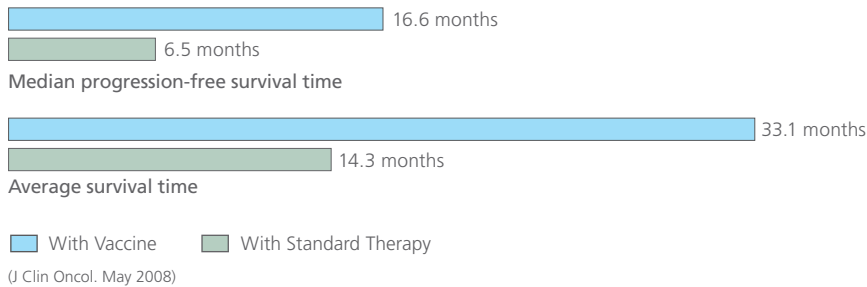
Adult brain tumor patients at Duke who access novel treatments by participating in a clinical trial



Duke pediatric brain tumor patients enrolled in clinical trials

HIGHLIGHTS

Vaccine extends survival



A vaccine co-invented by a Duke physician-scientist nearly doubled survival time in patients with a subtype of glioblastoma (EGFR^{III} positive) in phase 2 trials. Now the vaccine is in multi-institutional late-stage clinical trials. (NCT00458601)

Landmark trials

Duke conducted the first clinical trials that showed that the anti-angiogenesis drug bevacizumab shrinks the majority of recurrent malignant gliomas, the most common and deadly form of brain cancer. (Clin Cancer Res. 2007 Feb 15) Currently Duke is enrolling patients in stage 2 trials of bevacizumab plus bortezomib for recurrent glioblastoma multiforme. (NCT00611325)

Novel vaccine target

Duke is conducting early-stage trials of a vaccine that targets human cytomegalovirus (CMV), which is present in more than 80 percent of patients newly diagnosed with glioblastoma. (NCT00639639, NCT00639639) Targeting the virus may empower the immune system to fight infected tumor cells and help destroy the cancer.

Malignant glioma mutations

In a collaboration of physician-scientists at Duke and Johns Hopkins, mutations in two genes (IDH1 and IDH2) in gliomas were discovered. In a large study of brain tumors removed at Duke, mutations in these genes were found to identify patients with better prognoses. These gene mutations could become therapeutic targets in the future. (NEJM. 2009 Feb 19)



CLINICAL INNOVATIONS



Fang Fang Yin, PhD; John Kirkpatrick, MD, PhD; and Chris Willett, MD, in front of the Novalis Tx. Kirkpatrick holds the mask worn by patients.

Novalis Tx™ System

Duke Radiation Oncology was the first clinic in the world to use the Novalis Tx™ System, which is used to deliver high-energy radiation beams with unprecedented accuracy and precision for patients with brain tumors, base of skull lesions, spine tumors, and a variety of other lesions. The system's superior conformality (shaping of the radiation beam to fit the target) enables precise delivery of high radiation doses while minimizing damage to nearby healthy tissue, even for irregularly shaped tumors seated deeply in the brain. Image guidance enables quick verification and adjustment of the patient's position to within one millimeter of the planned position, for each and every daily treatment.

Duke radiation oncologists, neurosurgeons, and neuro-oncologists work closely together, often combining this state-of-the-art radiation treatment with surgery and chemotherapy for the best tumor control.

The system also provides greater ease and comfort for the patient. Most patients are treated in a semi-rigid plastic mask custom-molded to fit the head, rather than the metal frame attached to the skull used previously. Some patients with a few small brain lesions can be treated in a single day.

To date, Duke radiation oncologists have treated over 500 patients with this state-of-the-art technology.

Breast Cancer

Overview

Duke's Breast Oncology Program is one of the largest clinical breast cancer programs in the nation. At Duke, patients see medical oncologists, surgical oncologists, and radiation oncologists who focus exclusively on breast cancer in one setting. Radiologists with specialized training in breast imaging use the most advanced techniques to detect and diagnose breast cancer and are skilled in all forms of minimally invasive biopsy techniques, including needle core biopsies using stereotactic and ultrasound guidance, and pre-surgical wire localizations. Duke offers clinical trials for all stages of breast cancer. Duke also offers breast cancer patients fertility-preserving services such as embryo banking before chemotherapy.

HIGHLIGHTS

A landmark trial

Duke investigators were leaders in the development and clinical testing of the drug lapatinib, a targeted therapy approved by the Federal Drug Administration in 2007 for breast cancer patients with the overexpressed HER2 gene.

One of only 10 SPOREs

The Breast Cancer Research Program is one of only 10 programs in the country to have a SPORE (Specialized Programs of Research Excellence) grant from the National Cancer Institute. The grant recognizes Duke researchers for their commitment to finding innovative ways to treat and prevent breast cancer.

Complete tumor removal

Duke is developing an optical assay device that may be used in the operating room to assess tumor margins and ensure complete removal. Trials of this device are ongoing. (NCT00734955)

Endocrine therapy

Duke is defining the role of endocrine therapy (non-toxic regimens to shrink tumors) to facilitate breast-conserving surgery. Duke co-leads a national phase 3 trial of three agents. (NCT00265759)

Real-time tracking of tumor response

Duke leads a multi-site trial of dasatinib for patients with advanced stage breast cancer in which tumor response is measured mid-trial, and results are used to adjust dose. It is one of the first trials using tissue sampling and pharmacodynamics to modify drug dosing. (NCT00546104)

Improving anesthesia

Duke offers anesthesia for breast surgery via paravertebral block, which results in less nausea and improved pain control.

Vaccine trials

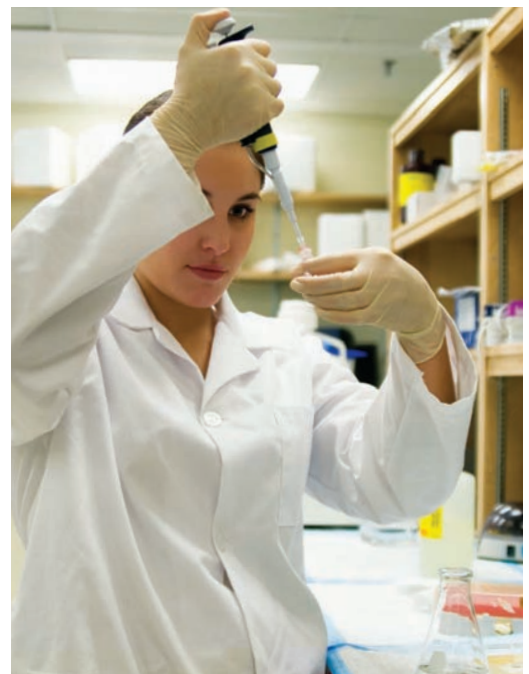
Duke offers clinical trials of vaccines to fight both early stage and metastatic breast cancer as well as triple negative breast cancer, which does not respond to receptor-targeted treatments. (NCT00529984, NCT00674791)

Profiling aggressive cancers

Through a large-scale genomic analysis (784 cases) Duke scientists demonstrated that breast cancer arising in young women is a unique subset driven by particular oncogenic signaling pathways and characterized by less hormone sensitivity and higher expression of the HER-2/EGFR genes. (J Clin Oncol. July 10 2008)

Genomic sampling protocol

Duke physician-scientists have developed a clinically applicable method of sampling breast tumors for genomic analysis and have shown that it can be used to determine estrogen receptor (ER) and HER2 status. (Breast Cancer Res Treat. 2009 Feb 18. Epub ahead of print)





Nurse practitioner Kathy Trotter spends some one-on-one time with Odessa Thorpe, 73, of Virginia, after the Duke Breast Cancer Survivors Clinic's group meeting. The action-packed clinic may be the first of its kind in the nation to combine both group and individual support, assessment, and education within a single visit.

CLINICAL INNOVATIONS

Screening high-risk women

At Duke's High-Risk Breast Clinic, women with a familial history of breast cancer or other risk factors receive breast cancer screening and individualized prevention plans that may include agents such as tamoxifen or dietary changes such as fish oil supplementation. Patients can enroll in trials in which the success of these prevention methods is tracked through breast MRI or a novel breast cell sampling technique. This technique—random periareolar fine needle aspiration—allows scientists to obtain breast cells to test for atypical, precancerous changes. In a multi-institutional CALGB trial, Duke scientists showed the reproducibility of this technique for obtaining cells to assess short-term breast cancer risk. (Cancer Epidemiol Biomarkers Prev. 2009 May)

The clinic also conducts breast cancer education and outreach to surrounding communities, targeting African American women at high risk, who are typically underrepresented in breast cancer prevention trials. African American enrollment in Duke's MRI breast screening research program is 50 percent.

Duke has also begun testing cells from high-risk women for changes in protein expression in response to prevention agents. This work is funded by a \$7.5-million Promise Grant from Susan G. Komen for the Cure. It will begin to identify pathways that become abnormal at the very beginnings of familial breast cancer and will track exactly how preventive therapy changes those pathways.

For trial information, visit cancer.duke.edu/CTrials.

For High-Risk Breast Clinic scheduling, call 919-684-2471.



P. Kelly Marcom, MD, and colleagues provide personalized breast cancer risk assessment.

Stem cell research


James White was in his 60s when he was diagnosed with myelodysplasia, which progressed to leukemia. The traditional treatment for patients like White is standard chemotherapy, which brings a median survival time of about a year. But Duke oncologist David A. Rizzieri, MD, offered White a regimen developed at Duke that includes less-intense chemotherapy and a stem cell transplant of half-matched donor cells. More than two years later, White is still in remission and doing well.

Traditionally, older, more infirm patients have not been candidates for treatment with stem cell transplants and the accompanying intense preparative chemotherapy. “The combination of this less-toxic preparation with a mismatched immune system donor opens up transplant to the overwhelming majority of patients who don’t have a matched donor,” Rizzieri says.

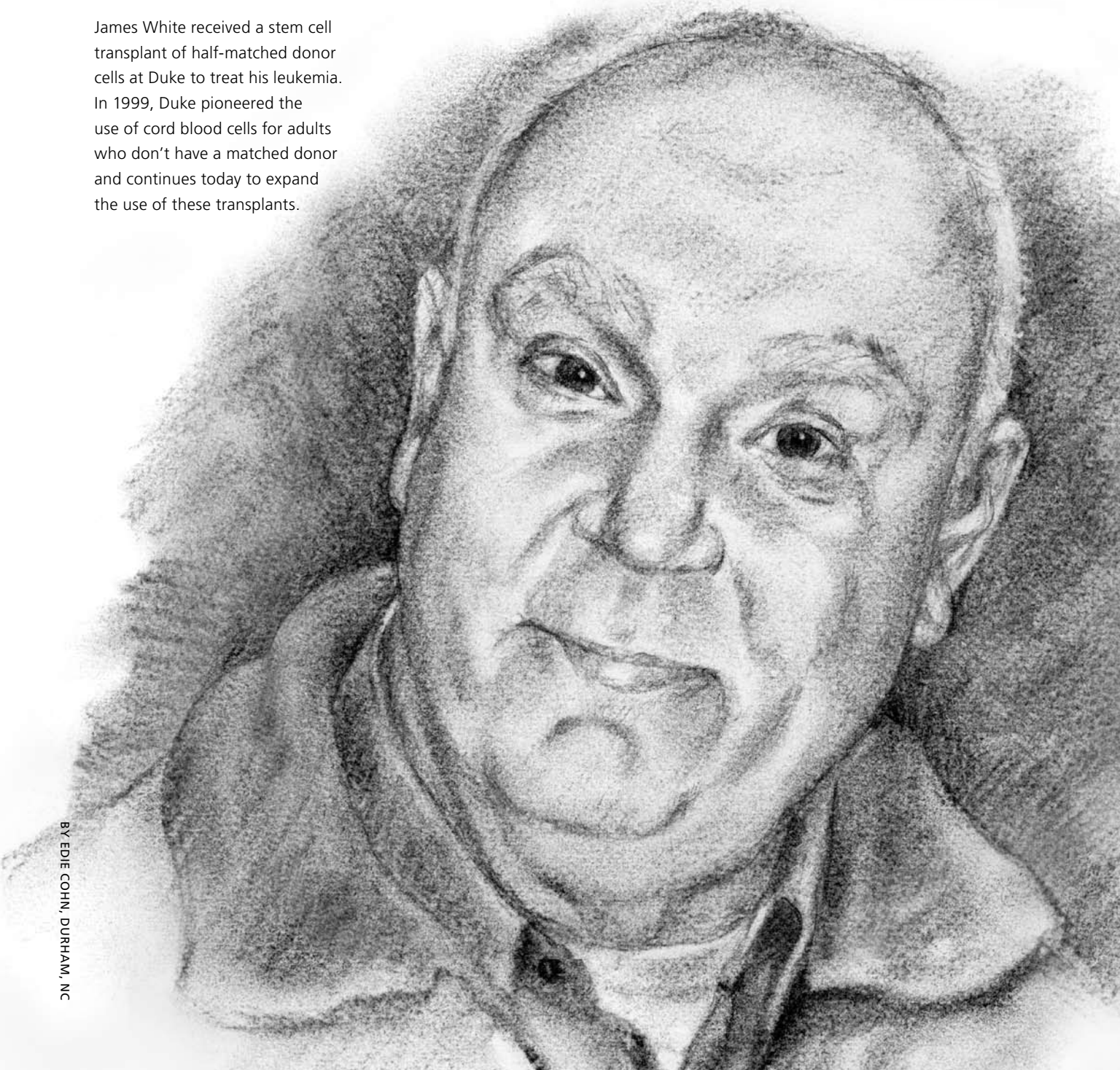
In 1999, Duke pioneered the use of cord blood cells for adults who don’t have a matched donor. Today, under the leadership of Nelson Chao, MD, professor of medicine

and cellular therapy, Duke physician-scientists have continued to expand the use of cord blood transplants. For instance, Duke has developed a regimen that combines cord blood units from two different donors to perform transplants in adults. “Very few other places in the country attempt to perform cord blood transplants in adults,” Rizzieri says.

New innovations under way include novel approaches to improve immune-system function after transplant. Duke is conducting clinical studies of these immune-system boosting protocols, including vaccine therapies and selected lymphocyte boosts from donors.

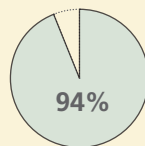
Duke is also expanding the use of cellular therapy to other diseases, including autoimmune diseases such as sclerosis. Keith Sullivan, MD, leads a trial of stem cell transplant as a treatment for severe systemic sclerosis. “It is very exciting and rewarding to see patients return to an almost normal life following a very debilitating and life-threatening illness,” says Sullivan. (DAIT SCSSc-01) 

James White received a stem cell transplant of half-matched donor cells at Duke to treat his leukemia. In 1999, Duke pioneered the use of cord blood cells for adults who don't have a matched donor and continues today to expand the use of these transplants.

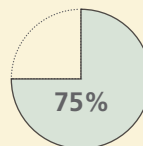


Duke physician-scientists published results from the largest series of transplants to date using half-matched donor cells and a less-intense preparation regimen.

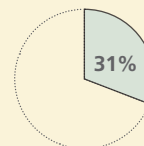
HALF-MATCHED, NON-MYELOABLATIVE TRANSPLANTS



Successful engraftment



Complete remission



1-year survival rate

Total number of patients: 49

(J Clin Oncol. Feb 2007)

Duke has developed a regimen that combines
cord blood units from **two different donors**
to perform transplants in adults.



Esophageal Cancer

Overview

Duke is one of the few medical institutions in which surgical oncologists, medical oncologists, and radiation oncologists who focus on esophageal cancer offer coordinated, multidisciplinary care in one appointment at one site. The Duke Esophageal Cancer Clinic sees up to 200 patients with esophageal cancer each year—significantly more than other hospitals. Duke physicians lead the way in defining the role of chemotherapy and radiation treatment to treat tumors of the esophagus. New chemotherapy agents, antibody therapies, and molecularly targeted treatments are often available through our robust clinical trials program.

HIGHLIGHTS

Novel treatment trial

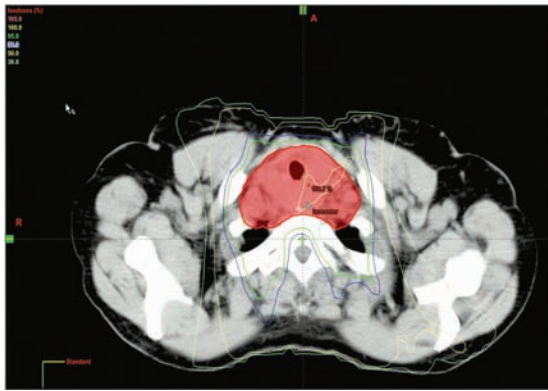
A phase 2 trial of a three-drug combination (capecitabine, oxaliplatin, and panitumumab) in combination with radiation therapy is available only at Duke to patients with esophageal cancer. The combination, which has never been used before to treat this disease, may be given as primary treatment or administered before evaluation for surgery. **For enrollment information,** visit cancer.duke.edu/CTrials.

Experienced surgeons

Duke's thoracic surgeons perform approximately 100 esophageal resections per year; 20 such procedures per year is considered high volume. Outcomes for this procedure are directly associated with the experience of the surgeon and the medical center.

Image-guided radiation therapy

Duke's radiation oncology specialists use state-of-the-art methods such as PET-based treatment planning and intensity modulated radiation therapy to deliver a radiation plan tailored to each patient.



Radiation therapy

Isodose curves (colored lines indicating relative doses of radiation therapy) of a patient with an upper esophageal cancer (target volume shaded red) treated with intensity modulated radiation therapy. Note the 'bending' of the radiation dose around the tumor and avoidance of normal structures including the spinal cord.





Gastrointestinal Cancer

Overview

The Duke Gastrointestinal Oncology Program offers patients the expertise of medical oncologists, surgeons, radiation oncologists, pathologists, epidemiologists, and geneticists combined with exciting research advances. Duke is a major referral center for patients with cancers of the esophagus (see previous chapter), stomach, pancreas, liver, biliary system, small intestine, colon, anus, and rectum, including uncommon tumors such as carcinoids and neuroendocrine tumors, and gastrointestinal stromal tumors. Patients from around the world choose the individualized care, state-of-the-art treatments, surgical experience, and access to cutting-edge clinical trials that Duke offers.

The program's surgeons are fellowship-trained and offer expertise in a variety of complex hepatopancreaticobiliary procedures. Duke is among the country's top ten institutions in terms of volume of liver resections and performs one of the highest volumes of pancreatectomies in the Southeast. This unique combination of expertise and experience is associated with better outcomes. Duke physicians have been leaders in developing procedures such as laparoscopic surgery for colon cancer, radiofrequency ablation, cryotherapy, embolization of liver masses, radiosurgery of liver tumors, and radiolabeled MIBG for neuroendocrine and carcinoid tumors.

HIGHLIGHTS

Intra-operative radiotherapy

Duke offers an intra-operative radiation facility that enables physicians in the operating room to deliver a highly specialized form of radiation directly to the tumor without interfering with sensitive organs.

Landmark colon cancer trial

Duke was the lead center for a national clinical trial for bevacizumab, the first anti-angiogenesis drug proven to shrink tumors and extend survival in patients with metastatic colorectal cancer. Bevacizumab has been approved by the FDA and is now considered the standard-of-care first-line treatment for colon cancer. Our oncologists are pursuing a number of innovative trials with targeted agents attacking the biologic pathway of cancer to provide our patients with cutting-edge care.

Preoperative chemoradiotherapy

Duke physicians are leading the way in defining the role of pre-operative simultaneous chemotherapy and radiation therapy in the treatment of tumors of the esophagus, stomach, pancreas, rectum, and anus. (*Annals of Surg Oncol.* 2006 Jan)

Multi-modality therapy trials

Duke is helping to define the role of anti-angiogenesis drugs such as bevacizumab and other targeted agents in combination with radiation and chemotherapy in the treatment of gastrointestinal cancer. Current trials are enrolling patients with cancers of the pancreas (NCT00735306) and colon. (NCT00290615)

Genomic predictors

Duke scientists have predicted with 90 percent accuracy which colon cancer patients will have recurrence after resection and which will not. (*Proc Nat Acad Sci* December 9, 2008)

A HIGH-VOLUME REFERRAL CENTER

Duke's skilled hepatopancreaticobiliary surgeons have the experience that leads to better outcomes for these often complex cases.

Pancreatectomies	125
Liver resections	100
Rectal cancer procedures	75

Procedures performed at Duke per year



Minimally invasive laparoscopic and robotic procedures mean less pain and a quicker recovery for women treated for gynecologic cancer.

CLINICAL INNOVATIONS

Advanced minimally invasive surgical program

Minimally invasive procedures provide cancer outcomes equal to open surgery while giving patients the benefits of hospital stays as short as one day, less postoperative pain, faster recovery, and only tiny scars. The faster recovery times also mean patients can potentially begin the second phase of cancer treatment sooner.

All five gynecologic oncologists at Duke perform advanced laparoscopic surgery, including total laparoscopic hysterectomies, resection of pelvic masses, and complete surgical staging for endometrial, cervical, and early ovarian cancers.

In 2006 Duke gynecologic oncologists began incorporating the robotic platform, especially for the treatment of cervical cancer with radical hysterectomies. Duke adopted the robotic technology early, soon after it was FDA-approved for use in gynecologic procedures. Duke physicians train other experienced surgeons to obtain robotic credentialing and teach physicians-in-training through our residency and fellowship programs. Since 2007, all of Duke's gynecologic oncology fellows have graduated with complete competency in performing advanced procedures laparoscopically and robotically.

Gynecologic Cancer

Overview

Duke University Medical Center is rated #4 in the nation in gynecology by *U.S. News & World Report*. The Duke Gynecologic Oncology Program is one of the most comprehensive cancer treatment and research programs of its kind in the country. A multidisciplinary team provides the latest approaches in surgery, chemotherapy, radiation, brachytherapy, and supportive care in a patient-centered environment that emphasizes emotional support for patients and families. Duke physicians are leaders in adapting laparoscopic and robotic surgical approaches to the treatment of gynecologic cancers. About two-thirds of our major surgeries, including surgeries for cervical cancers and endometrial cancers, are performed laparoscopically or robotically. Our services, including laparoscopy and robotics, are offered both at Duke University Medical Center and at Duke Raleigh Hospital.

HIGHLIGHTS

Landmark discoveries

Duke researchers helped discover BRCA1 and BRCA2 (the breast and ovarian cancer susceptibility genes) and showed that ovulation suppression using birth control pills or other methods may be useful in protecting against a subset of ovarian cancer. Duke's research continues to enhance clinical care by discovering new risk factors for ovarian cancer and by making progress toward personalized medicine—targeting treatment or screening based on tumor subtypes identified using microarray analysis of gene-expression profiles.

North Carolina Ovarian Cancer Study

In 1999, Duke researchers started the North Carolina Ovarian Cancer Study (NCO), a population-based study in central and eastern North Carolina that aims to determine genetic and lifestyle factors that increase ovarian cancer risk. Some findings:

- Use of oral contraceptives with higher progestin concentrations is associated with a greater reduction in risk of ovarian cancer than use of those with low-progestin potency.
- A polymorphism in a progestin receptor promoter that is carried in about one in nine Caucasian women may reduce risk of ovarian cancer. (*Cancer Epidemiol Biomarkers Prev.* 2004) If multiple polymorphisms are identified that either increase or decrease the risk of various histologic types of ovarian cancer, this could be used in the future for risk stratification that would facilitate screening and prevention strategies.

Genomics to advance screening, prevention, and treatment of ovarian cancer

- Analysis of genes expressed in ovarian cancer tissues can identify at initial diagnosis patients with tumors that resist primary platinum-based therapy. Now Duke is developing a biological therapy that targets the molecular pathway activated in many of these resistant cancers—an important step toward truly personalized treatment. (*J Clin Oncol.* 2007)
- New Duke research shows that tumors of patients with early-stage cases share an underlying biology with tumors of long-term survivors with advanced disease. That is, their favorable clinical outcomes can be attributed to a shared, less virulent tumor type. This suggests that the majority of ovarian cancers that are detected at an advanced stage and have worse survival share a more virulent biology. (*Clinical Cancer Res.* 2009)

Head and Neck Cancer

Overview

Duke is a high-volume major referral center for treatment of cancers of the mouth, salivary and thyroid glands, nasal cavity, paranasal sinuses, pharynx, larynx, and lymph nodes. The Duke Head and Neck Cancer Clinic's team of specialists in head and neck oncologic surgery, plastic and reconstructive surgery, radiation oncology, medical oncology, radiology, and pathology ensures that each patient receives state-of-the-art treatment—supported by the most advanced medical equipment and imaging devices available anywhere—while maintaining the highest quality of life throughout treatment and recovery. Our head and neck surgeons, radiation oncologists, and medical oncologists are internationally recognized senior experts in the field who make head and neck cancer care their primary career focus.

Duke physician-researchers were at the forefront of developing innovations that are now the standard of care for treatment of head and neck cancer, such as:

- A combination of intensive radiation therapy and simultaneous chemotherapy for advanced stage head and neck cancer
- Operations that result in better function and less disfigurement

Duke continues to advance the field, most recently beginning a research program in tumor immunology—an emerging research area with potential applications in the development of vaccines for head and neck cancer.

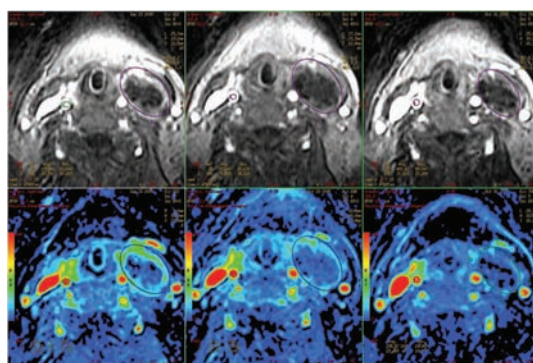


HIGHLIGHTS

Functional imaging

Duke conducted the first and only United States trial exploring the benefits of adding two molecularly targeted drugs to simultaneous radiation and chemotherapy in the treatment of head and neck cancer. This trial used functional metabolic imaging to evaluate the effects of treatment. A specialized type of MRI scanning—dynamic contrast enhanced MRI (DCE-MRI)—measured changes in blood flow and blood vessel function inside the tumor at multiple times during treatment. A new trial that will use both serial DCE-MRI and PET/CT scans is now enrolling patients.

For information, contact the Clinical Trials Office at 919-668-3726. (NCT00901732)



Gene expression profiling

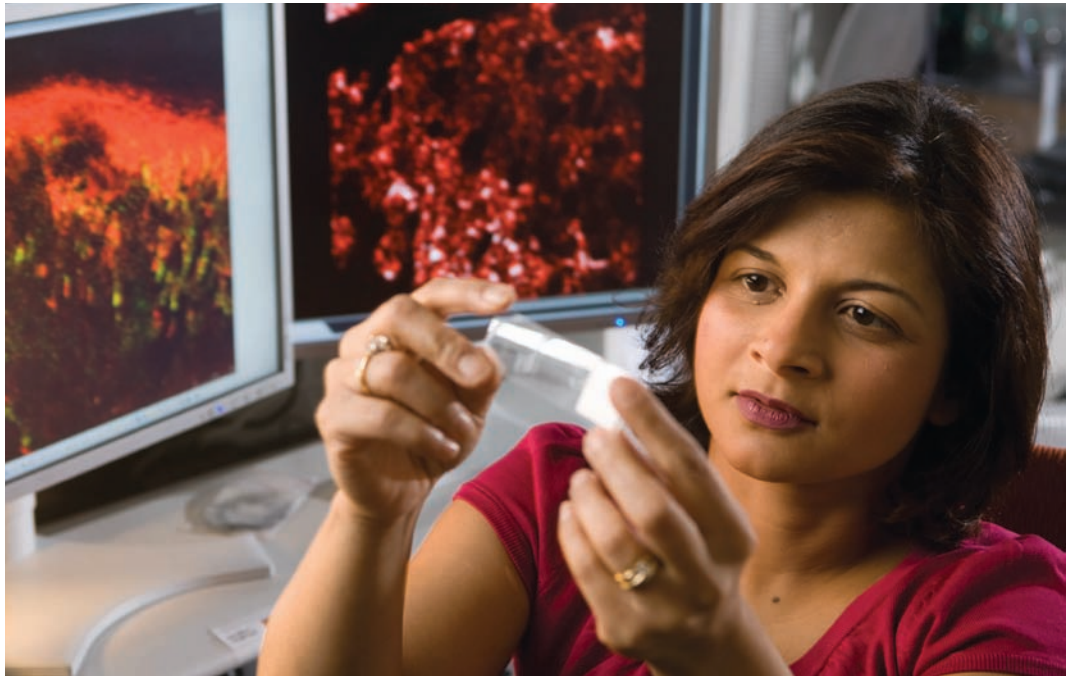
A clinical trial under development will test an antibody therapy approved for use in colon cancer (panitumumab) in head and neck cancer patients, using gene expression profiling to better understand how the therapy works and which patients may benefit most.

Clinical trial for recurrent disease

A trial developed at Duke will test a combination of an antibody therapy (cetuximab) and a molecular therapy (sorafenib) in patients with recurrent and/or metastatic disease. (NCT00815295) **For more information**, visit clinicaltrials.gov or contact Carolyn Andrews, RN, andre037@mc.duke.edu.

Reduction of side effects

Duke is conducting a clinical trial using Caphosol oral rinse that studies the incidence of mucositis in head and neck cancer patients undergoing radiation therapy with or without chemotherapy. **For information**, contact the Clinical Trials Office at 919-668-3726. (NCT00901732)



Cancer biologist Tannishtha Reya, PhD, and colleagues work to enhance stem-cell therapies for hematologic malignancies.

Hematologic Malignancies

Overview

The Duke Hematologic Malignancies Program is a leading national center for hematologic cancers that combines state-of-the-art, compassionate medical care with innovative science to improve outcomes for patients battling acute and chronic leukemias, lymphomas, multiple myeloma, and other blood- and lymphoid-related cancers, including many rare cancers. Duke's team of medical oncologists, surgeons, radiation oncologists, nurses, and other caregivers have vast experience in care of patients with hematologic malignancies and provide individualized, hands-on medical care to hundreds of patients each year at Duke University Medical Center and Duke Raleigh Cancer Center.

Many of the therapies offered for leukemias and lymphomas have been developed and refined at Duke, and patients can access novel treatments through an extensive array of clinical trials. Duke hematopathologists can go beyond standard diagnostics to monitor leukemia and lymphoma patients at the molecular level using fluorescent in situ hybridization (FISH), polymerase chain reaction (PCR), and genomic techniques. For patients who have treatment-resistant or recurrent cancers, Duke provides a seamless transition to our world-renowned adult and pediatric bone marrow and stem cell transplant teams.

HIGHLIGHTS

Improving CML outcomes

Duke participated in groundbreaking international studies demonstrating that chronic myeloid leukemia (CML) patients who take imatinib as a first-line therapy can expect to live an average of seven years longer than those who take more traditional interferon-alpha therapy. These studies have changed the paradigm of treatment from near-immediate stem cell transplant to prolonged treatment with tyrosine kinase inhibitors.

Genetics of CLL

Duke is part of a national collaboration—the Genetic Epidemiology of CLL Consortium—that is gathering data from families with high incidence of chronic lymphocytic leukemia to determine what groups of genes cause the cancer and how the disease changes genetically over time. This research will help physicians choose therapies wisely for these patients and understand oncogenesis in other cancers.

Lymphoma genomics

Duke physician-scientists have discovered genetic patterns that differentiate lymphomas and are developing clinical trials to determine whether these patterns can be used to predict response to different types of therapy. Physician-scientists have been recruited to Duke for the purpose of this and other genomic research.

Hereditary Cancer Clinic

Overview

The Duke Hereditary Cancer Clinic offers testing and counseling from board-certified genetic counselors who focus exclusively on cancer risks. Our counselors work closely with medical oncologists to provide each patient with information about their risk of inherited cancers, ways to reduce the chance of developing cancer, and ways to increase the chance of early detection. Since the clinic opened in 1999, more than 3,000 patient evaluations have been conducted.

Duke works to make genetic counseling for cancer risks part of the standard of oncologic care. Duke offers genetic testing for any cancer for which there is a concern about risks due to family history. The clinic monitors new developments in cancer genetics and continuously evaluates new testing procedures. Most frequently, the clinic tests for predisposition to breast, colon, and ovarian cancer, although testing related to rarer forms of cancer is also performed. These services are offered at Duke University Medical Center and Duke Raleigh Hospital. A study is under way that extends counseling to rural areas of North Carolina.

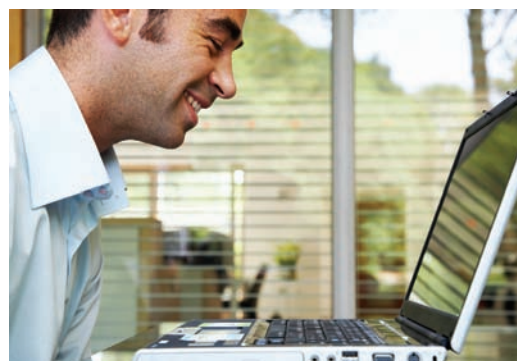
HIGHLIGHTS

Landmark discovery

Duke scientists were members of the team that discovered the BRCA1 and BRCA2 genes, which cause inherited breast and ovarian cancers.

The Cancer Genetics Network

Duke is a member of The Cancer Genetics Network (CGN), a national effort funded by the National Cancer Institute. Researchers at the eight sites in the CGN have created a registry of individuals at increased risk for cancer and are looking at clinical implications of inherited cancer syndromes. Duke's principal investigator is Joellen Schildkraut, PhD. **For information contact** Sydnee Crankshaw, sydnee.crankshaw@duke.edu.



Counseling via telemedicine

Duke is testing the use of telemedicine (videoconferencing) to make genetic counseling more available to underserved areas. The study is conducted in four North Carolina oncology clinics (in Lumberton, Smithfield, Laurinburg, and Henderson), and patients may self-refer. **For enrollment information**, visit clinicaltrials.gov. (NCT00609505)



Outside influences

Examining environmental cancer causes



Cross-campus colleagues: H. Kim Lyerly, MD, director of the Duke Comprehensive Cancer Center (left), and William Chameides, PhD, dean of Duke's Nicholas School of the Environment, are among the Duke researchers proving that two disciplines are better than one.

It's a hazard of modern life—from the water we drink to the air we breathe, the world around us constantly deposits chemicals and contaminants into our lungs, our skin, our cells. Duke cancer and environmental scientists are learning more about how these environmental insults may give rise to cancer.

The partnership is one-of-a-kind: No other institution in the country has such a level of collaboration between environmental and cancer researchers. The effort began in 2005 and has brought scientists together to explore questions that once ended where another discipline's lab began.

"You can find the big answers if you have the culture and the willingness to work together," says William Chameides, PhD, dean of Duke's Nicholas School of the Environment.

H. Kim Lyerly, MD, director of the Duke Comprehensive Cancer Center, acknowledges that while pinpointing our environmental enemies can be alarming, the goal is not to "panic about the things we find; it's to discover what kind of impact they have. If something is harmful, we want to know why. We want to link actual biology with detection in the environment."

Mapping cancer risk

New tools such as geospatial mapping are making these collaborations efficient for both sides. Marie Lynn Miranda, PhD, who leads the Nicholas School's Children's Environmental Health Initiative, has helped advance this mapping technique—which uses a range of spatial data layers—through her work on environmental contributors to maternal and child health. Now, geospatial mapping is being expanded to other fields, including cancer.

The mapping tools herald an age of "personalized environmental health," paving the road to a better grasp on where cancers occur and why, says Amy Abernethy, MD, associate director for IT and informatics at the cancer center, who often works with Miranda. Using a database of Duke cancer patients, Abernethy says, researchers are compiling where patients with different kinds of tumors live and then correlating their information with maps of heavy metals or other kinds of exposures considered potential carcinogens—arsenic, radon, and even the sun itself. As more and more information is gathered and other databases are folded in, the maps could eventually be clinical tools, says Abernethy, with physicians using maps that detail their patients' risk based on geography.



How safe is the water we drink? The air we breathe? The communities we live in? Duke researchers are teaming up to explore these questions and more through a great diversity of studies on environmental causes of cancer.

Chemical exposures

From the naturally occurring to the man-made, carcinogens are seemingly everywhere. Recent media attention to bisphenol A (BPA), a chemical found in many plastics, had mothers across the country throwing out baby bottles.

In a recent study, Duke epigenetics expert Randy Jirtle, PhD, showed that feeding mice a prenatal diet including folic acid counteracted the negative effects of BPA in offspring.

BPA is only one of several known endocrine disruptors. Jirtle's colleague, Duke molecular cancer biologist Donald McDonnell, PhD, discovered startling information regarding endocrine disruptors and pharmaceuticals that should give pause to doctors prescribing medications with hormonal components.

His team tested a cleaning agent known as ethylene glycol methyl ether (EGME) that's used in varnishes, paints, dyes, fuel additives, and the semiconductor industry; and valproic acid (Depakote), a drug with a similar chemical makeup that is prescribed for migraines, seizures, and attention deficit and bipolar disorders.

They discovered that EGME, when metabolized, and valproic acid both enhance progesterone and estrogen activity inside cells. When that activity is accelerated in a person who is already taking a drug containing synthetic hormones (such as oral contraceptives or hormone replacement therapy), the extended, double exposure to hormones is likely to increase cancer risk.



Clinical cautions: Donald McDonnell discovered that certain environmental agents—including the common cleaning agent EGME and the drug valproic acid (Depakote)—enhance progesterone and estrogen activity in cells. This discovery may have significant clinical implications for certain populations, such as women taking tamoxifen.

McDonnell suggests taking particular caution with tamoxifen—widely used in the treatment and prevention of breast cancer but chemically altered in the presence of EGME and valproic acid. While he has received some feedback from oncologists who do check with their patients about valproic acid use, for the most part, he says, “the message hasn’t yet hit home” in the medical community.

McDonnell adds that there’s no doubt in his mind that the environment contributes in a very significant manner to cancer susceptibility. “Endocrine disruptors have received a lot of attention of late but there are likely to be hundreds of other types of agents in the environment that impact cancer risk.”

What's in the water

Duke professor Avner Vengosh, PhD, is known internationally for his expertise in water contaminants. He has collected samples of the coal-ash waste that spilled from the Tennessee Valley Authority's Kingston coal-burning plant in December 2008, covering 300 acres with sludge and damming a tributary of the Emory River. Long-term exposure to the radium and/or arsenic in coal ash has been deemed a cancer risk by the EPA. Vengosh and fellow investigators worked with Julia Kravchenko, MD, PhD, of Duke's cancer center on a paper (May 2009, *Environmental Science and Technology*) that examines the link between environmental contaminants found in the Kingston coal ash, contaminated water, and health risks—the first of several planned studies of the biomedical implications of environmental disasters.



Maps as medical tools: Marie Lynn Miranda and Amy Abernethy are using Miranda's mapping techniques to track cancer incidence in North Carolina—and potentially uncover associations with environmental carcinogens. Abernethy says the maps could become clinical tools to educate patients about their risk for certain cancers, and to guide clinicians' recommendations in preventive measures such as screening.

Lung Cancer

Overview

Duke Thoracic Oncology Program's specialists in medical oncology, radiation oncology, thoracic surgery, and pulmonary medicine work together to deliver state-of-the-art treatment plans to patients at Duke University Medical Center and Duke Raleigh Hospital. Duke is home to seven surgeons who focus exclusively on thoracic oncology surgery and perform a high volume of procedures for chest malignancies each year. Also offered are interventional pulmonary bronchoscopic techniques such as photodynamic therapy, laser therapy, and stents. The program's radiation oncologists focus on lung cancer and have access to specialized techniques such as stereotactic radiation therapy for early stage lung cancer as well as radiation treatment planning aided by 4D CT technology, which tracks tumor motion caused by breathing. A group of nationally renowned medical oncologists have developed a portfolio of genomic therapies, novel agents, and immune approaches that are integrated in multidisciplinary protocols with surgery and radiation. Duke physicians work to improve patient outcomes by integrating the most advanced surgical techniques, chemotherapy regimens, and targeted therapies with methods to ameliorate side effects.

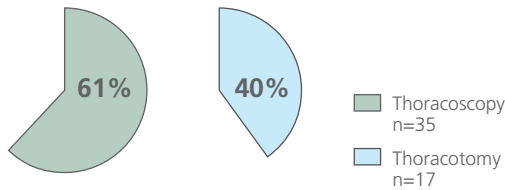
Through leadership roles in the National Comprehensive Cancer Network (NCCN), Duke lung cancer physicians are integral to the creation of evidence-based treatment guidelines that are used nationally and internationally. Also a member site of national clinical research group Cancer and Leukemia Group B (CALGB), Duke has consistently been one of the top institutions in the group in terms of overall patient accrual for lung cancer trials.





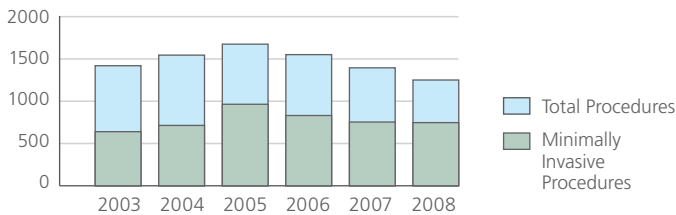
Thomas D'Amico, MD, performs a thoracoscopic lobectomy. Duke researchers have found that patients who undergo this minimally invasive lung cancer surgery may derive more benefit from the chemotherapy that follows.

ADJUVANT CHEMOTHERAPY COMPLIANCE AFTER LOBECTOMY BY SURGICAL APPROACH



Percentage of patients undergoing >75% of total planned regimen (no delay or dose reduction)
(Annals of Thoracic Surgery 2007;83:1245-1250)

THORACIC PROCEDURES AT DUKE UNIVERSITY MEDICAL CENTER



Source: Duke Heart Center

HIGHLIGHTS

**Minimally invasive procedures:
Thoracoscopic lobectomy**

Duke physicians published one of the two largest series of thoracoscopic lobectomies in the world, demonstrating that the procedure provides survival rates comparable to those for open lobectomy. (Annals of Surgery. 2006) Duke has also demonstrated that the faster recovery times gained with this procedure are associated with a lower rate of postoperative complications and fewer delays or interruptions in chemotherapy treatment plans.

Quality improvement

The Duke Thoracic Oncology Program is one of eight programs in the country involved with the largest quality-improvement project in lung cancer in the country—the NCCN lung cancer outcomes database project.

Pediatric Blood and Marrow Transplants

Overview

The largest of its kind in the world, Duke's Pediatric Blood and Marrow Transplant (PBMT) Program has provided outstanding care and support to more than 1,600 children and their families since 1990. Children from almost every state in the United States and from around the world have had transplants at Duke. Transplantation is used to treat infants and children with refractory malignancies, immunodeficiency diseases, bone marrow failure syndromes, hemoglobinopathies and inherited metabolic diseases. Patients are usually seen within one to two weeks of their referral, despite a lengthy wait list, if it is determined that such speed is necessary. If transplantation is determined to be the patient's best option, donors can be identified within a week or two in most cases. Patients are hospitalized in an inpatient special care unit for approximately 55 days and receive subsequent outpatient treatment in the Pediatric PBMT Clinic and Valvano Day Hospital, continuing follow-up for an additional four to six months. An extensive volunteer-based family support program provides additional services.

Because 75 percent of children lack a matched traditional bone marrow donor, umbilical cord blood transplants are becoming the best way to treat patients with life-threatening genetic diseases and cancers. As the first medical center to use cord blood from unrelated donors to treat life-threatening cancer and other diseases, Duke leads in this field. Duke is one of only a few U.S. medical centers also equipped to harvest and bank cord blood, through the Carolinas Cord Blood Bank at Duke.

OUTCOMES OF UNRELATED DONOR CORD BLOOD TRANSPLANTATION IN 191 CHILDREN WITH HEMATOLOGIC MALIGNANCIES

6-month survivals: **67.4%**

2-year (24-month) survivals: **49.5%**

Source: *Blood*. 15 November 2008

HIGHLIGHTS

Success with unrelated donors

Duke clinical trials show that unrelated-donor cord blood transplantation can cure many children with leukemias.

Inherited metabolic diseases

Duke clinical trials show that umbilical cord blood transplantation can arrest progression and produce clinical improvements in children with inherited metabolic diseases. (*Blood*, 1 October 2008)

Transplants for sickle cell disease

Duke is translating its expertise in cord blood transplants to other diseases such as sickle cell disease. In a new Duke clinical study, children with sickle cell receive cord blood transplants, and young adults receive a half-matched bone marrow or blood transplant, reducing the intensity of chemotherapy required. This procedure is offered only by Duke and its research collaborator, the University of Louisville. (NCT00777231)

Duke researchers Nelson Chao, MD, and Joanne Kurtzberg, MD, (shown here) are among those who have made transplantation a feasible therapy for an ever-growing number of cancer patients in an ever-widening age range.





Dan Wechsler, MD, PhD, is a pediatric hematologist-oncologist at Duke.

Pediatric Cancers

Overview

The Duke Pediatric Oncology Program offers children, adolescents, and young adults with cancer individualized therapeutic plans, many of which were developed through the National Cancer Institute-supported Children's Oncology Group. Duke's team of renowned oncologists, surgeons, radiologists, radiation oncologists, pathologists, psychologists, child life workers, and other caregivers work in close consultation with families. The program sees 80 to 100 newly diagnosed patients per year.

Physicians in the Pediatric Oncology Program have special expertise in neuroblastoma, rhabdomyosarcoma, leukemia, and brain tumors. Specific cancers treated include acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML), Hodgkin and non-Hodgkin lymphoma, neuroblastoma, Wilms' tumor, retinoblastoma, Ewing sarcoma, osteosarcoma, rhabdomyosarcoma, other soft tissue sarcomas, hepatoblastoma, brain and spinal cord tumors, Langerhans' cell histiocytosis, and germ cell tumors.

Duke's Long-Term Cancer Survivor Clinic serves patients under the age of 25 who have been off treatment for five years or more, and is a truly multidisciplinary clinic for long-term survivors of cancer. Duke also offers fertility-preserving strategies for children, a support group for adolescents with cancer and their families, and a Quality of Life program that provides palliative care and support services from the time of diagnosis onward.

HIGHLIGHTS

Children's Oncology Group

Through its membership in the National Cancer Institute-supported Children's Oncology Group (COG), Duke offers enrollment in more than 60 trials of novel therapeutic protocols for pediatric cancer. **For enrollment information**, call 919-684-3401.

Novel trials for brain tumors

Duke leads a large phase 2 study of bevacizumab plus irinotecan in children with recurrent malignant glioma, diffuse brain stem glioma, medulloblastoma, ependymoma, and low grade gliomas, managed through the National Cancer Institute's Pediatric Brain Tumor Consortium. (NCT00381797)

Mechanisms of rhabdomyosarcoma

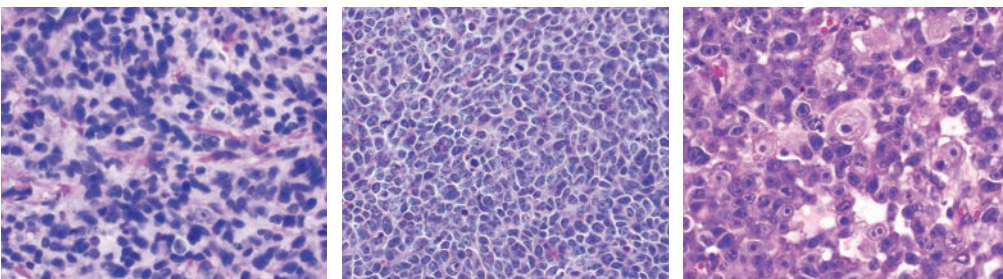
Duke physician-scientists are helping to define the early genetic changes that lead to rhabdomyosarcoma (RMS), the most common soft tissue sarcoma of childhood and adolescence. (Cancer Research. 2008 Dec 1)

Mouse models of AML

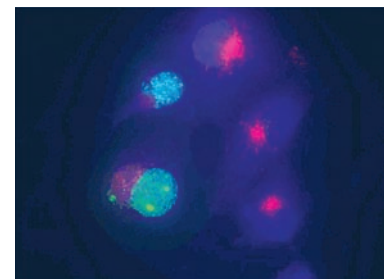
Duke physician-scientists are developing mouse models of acute myeloid leukemia (AML) to investigate novel mechanisms by which AML develops in infants. Interfering with endocytosis, one mechanism by which growth factor signaling is turned off, may lead to new approaches for this difficult-to-treat pediatric cancer.

Pediatric neuroblastoma

Duke offers treatment options for neuroblastoma not found at many other institutions, including our experienced bone marrow transplant program and a new treatment program using MIBG, a compound that selectively concentrates in neuroblastoma tumor cells, to selectively deliver tumor-killing radioactive iodine.



Light microscopy of RMS tumor cells derived from human embryonal (left) and alveolar (middle) RMS cell lines, and RMS tumor cells created by making genetic changes to normal human skeletal muscle myoblasts (right).



Photomicrograph showing reduced endocytosis (the process by which cells internalize growth factors) in cells engineered to express MLL-CALM (shown in green), a protein that is expressed in some leukemia cells. Impaired endocytosis may be a mechanism that contributes to the development of acute myeloid leukemia.

Prostate Cancer

Overview

Duke offers one of the country's premier comprehensive treatment, training, and research programs for prostate cancer and other genitourinary cancers, including bladder, renal, and testicular cancers. The Duke Prostate Cancer Program offers a multidisciplinary clinic where urologists, medical oncologists, and radiation oncologists see newly diagnosed patients in one setting as well as a separate clinic that facilitates seamless referral of newly diagnosed patients with recurrent disease from urologists to medical oncologists. Duke is a major referral center for prostate cancer; the program's surgical volume for radical prostatectomy is in the top 10 nationwide. Duke University Medical Center is ranked #6 in the nation in urology by *U.S. News & World Report*.

Duke offers the latest radiation techniques and is one of the few centers in the Southeast to offer the Calypso 4D Localization System to track movement of the prostate in real time to provide safer, more accurate radiation therapy. Both a minimally invasive, open, nerve-sparing technique and a robotically assisted technique are offered for prostatectomy, and Duke's surgeons can help patients identify the approach that best fits their needs.

Prostate cancer patients can also access the latest novel therapies through enrollment in clinical trials. Duke is one of only 13 institutions nationwide selected to participate in the Department of Defense Prostate Cancer Clinical Trials Consortium, which facilitates enrollment in phase 1 and phase 2 clinical trials and improves drug development for prostate cancer.



A HIGH-VOLUME REFERRAL CENTER FOR PROSTATE CANCER

200 patients treated in 2008 by radiation oncologists in Duke's Prostate Cancer Program

600 radical prostatectomies performed in 2008 by the five surgeons in the program

HIGHLIGHTS

Novel radiation regimens for prostate cancer

Duke physicians have opened a novel study of stereotactic body radiotherapy (SBRT) to determine the efficacy of a very short radiation regimen for prostate cancer. The study treats men with five radiation treatments over two weeks (instead of daily treatments for eight weeks). Duke offers this trial to selected patients with early stage disease.

Function-preserving treatment for bladder cancer

In May 2009 Duke began enrolling patients in a Radiation Therapy Oncology Group (RTOG) study of a combination of radiation and chemotherapy as a bladder-preserving treatment for bladder cancer.

Reducing health disparities

In our prostate cancer clinical trials, Duke places a priority on recruiting African American patients, who have a higher risk of developing prostate cancer yet are underrepresented in such trials. Duke has the top minority accrual to date in the Department of Defense cooperative group.

Tracking prostate cancer outcomes

The Duke Prostate Center Research Outcomes Database enables Duke physicians to analyze long-term survival and quality-of-life outcomes and develop decision-making tools to optimize clinical interventions. Over 800 new patients were enrolled in this project in the past year.

Trials of mTOR inhibitors

For patients with prostate cancer, Duke offers enrollment in three clinical trials investigating the benefit of a new class of drug called mTOR inhibitors.

For enrollment information, visit clinicaltrials.gov. (NCT00887640, NCT00636090, NCT00629525)

PSA and obesity

Duke scientists are the first to show that the generally lower levels of prostate specific antigen (PSA) found among obese men are due to hemodilution (larger blood volume). The finding has implications for interpreting PSA scores to take body weight into account to ensure accurate detection of prostate cancer. (*JAMA*. Nov 21 2007)

Pre-operative trial

Duke researchers are investigating the use of lower doses of radiation to eliminate prostate cancer cells that may be outside of the prostate prior to undergoing radical prostatectomy. **For information visit** cancer.duke.edu.

Rising PSA after surgery trial

This phase 2 study is investigating the use of a combination of salvage radiation therapy and aggressive systemic chemotherapy and anti-angiogenic therapy for men who have experienced a PSA recurrence within three years of radical prostatectomy. **For information visit** cancer.duke.edu.



Skin Cancer (Melanoma)

Overview

Duke operates one of the most comprehensive melanoma treatment and research programs in the world. A primary referral center in the Southeast, Duke's Melanoma Program is one of the leading specialty clinics in the United States. Duke's fellowship-trained dermatologists, surgeons, medical oncologists, radiation oncologists, and pathologists work together to provide patients comprehensive care. Our surgeons perform hundreds of procedures each year and use new surgical techniques, including intraoperative lymphatic mapping and sentinel lymph node biopsy, which allows surgeons to remove a single lymph node to determine whether melanoma has spread from its primary site. Duke's Pigmented Lesion Clinic and Melanoma Surveillance Program pioneered the use of CD-ROM technology to preserve a clear record of skin.

HIGHLIGHTS

Regional therapy for extremity melanoma

Duke offers one of the largest regional therapy programs in the country for advanced extremity melanoma. Duke is the leading center nationally for novel clinical trials of regional therapy delivered to an isolated limb. Protocols include high-dose chemotherapy combined with hyperthermia and/or new targeted drugs to enhance regionally delivered chemotherapy. These trials may also provide knowledge that improves use of these targeted agents in systemic therapy.

The Duke Melanoma Database

Duke has prospectively maintained a database of melanoma patients for over three decades—the largest melanoma registry in the world, enabling researchers to perform retrospective analyses of recurrence patterns and other outcomes.

NUMBER OF PATIENTS IN
THE DUKE MELANOMA DATABASE: **>14,000**

Novel vaccines

Duke is exploring novel vaccine strategies involving dendritic cells to boost the immunity of patients with advanced melanoma. A phase 1 trial is ongoing. (NCT00672542) Visit clinicaltrials.gov to learn more.

HIGH SURGICAL VOLUME

Duke's surgeons have
the experience that leads
to better outcomes

203

surgical procedures for
melanoma in 2008

64

surgical procedures for
melanoma in the first 3
months of 2009

256 projected total
for 2009

Experimental therapeutics

Duke researchers are developing smarter drug therapies

At the 2009 American Society of Clinical Oncology Annual Meeting, researchers from various institutions presented results from a clinical trial based largely on the work of Neil Spector, MD, co-director of Duke's Experimental Therapeutics Program. The trial showed that a combination therapy of lapatinib plus an aromatase inhibitor (letrozole) resulted in better outcomes for women with HER2-positive breast cancer.

Spector had helped develop lapatinib, a targeted therapy for breast cancer, during his nine years of work with GlaxoSmithKline. In his three years at Duke, he has studied breast cancer cell lines to find out why some women quickly develop resistance to lapatinib, then translated those findings straight to the clinic.

Spector showed that when breast cancer cell lines were treated with lapatinib, which blocks HER2 receptors, the cells simply found an alternative way to support their growth. "When you treat with lapatinib, you actually increase the dependence of the cancer cells on the

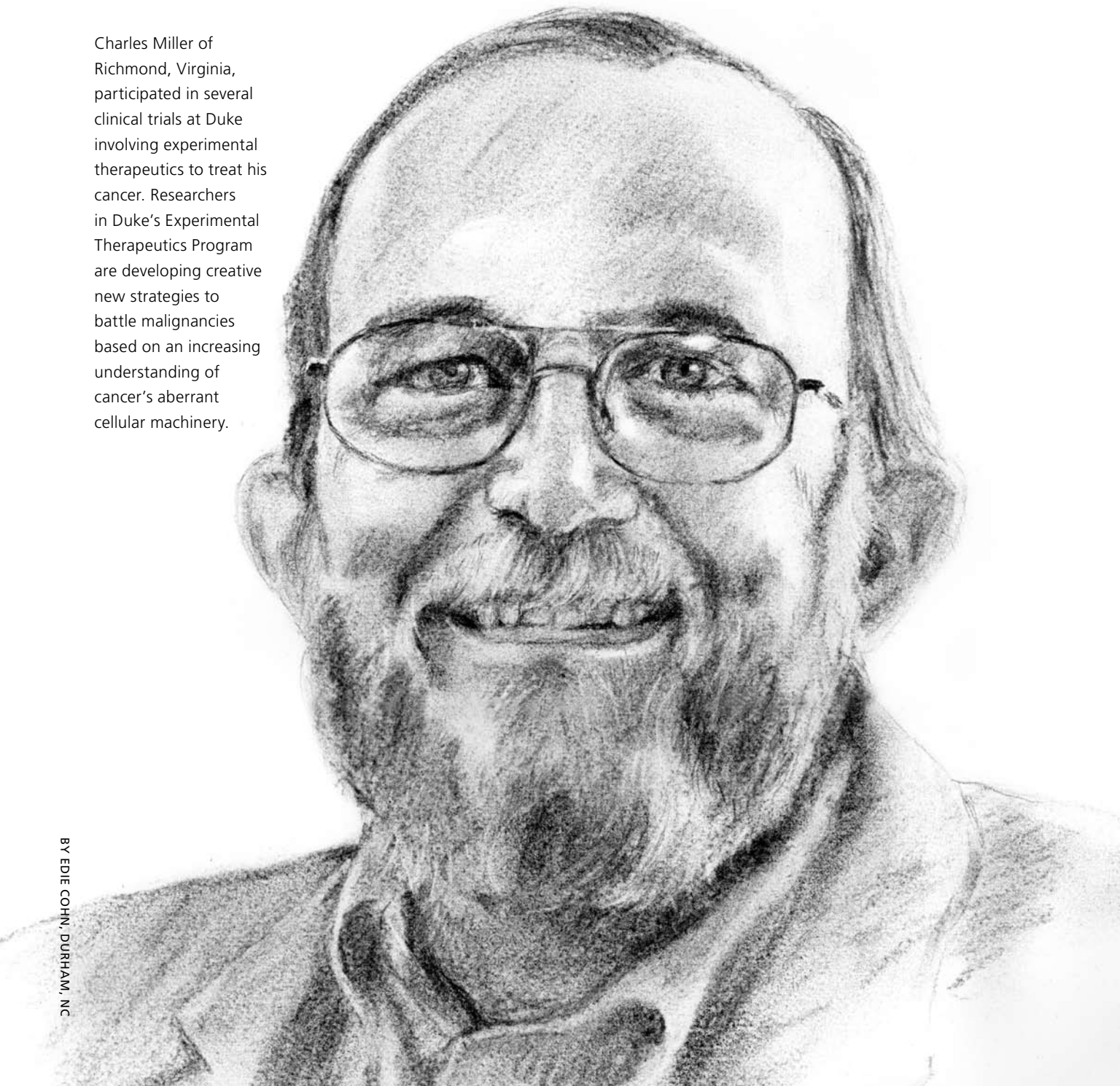
estrogen receptor," Spector says. "Breast cancer cells are designed to survive; they essentially seek out a new pathway for their survival."

Then Spector found that he could prevent the new outgrowth of estrogen receptors in the cell lines by treating them with both lapatinib and a drug that blocks estrogen receptors (an aromatase inhibitor).

That work led to the development of several phase 3 national clinical trials, including the one presented by GlaxoSmithKline in 2008, which enrolled patients from around the country, including at Duke. "It was very exciting to find that those models were relevant and could dictate what sort of treatment certain women with breast cancer should get," Spector says. Some of the trials will help determine which estrogen inhibitors are best at delaying treatment resistance in combination with lapatinib.

It's an example of how researchers in Duke's Experimental Therapeutics Program are translating their work into new therapies for patients. "We focus on trying to understand the mechanisms of action of cancer therapies

Charles Miller of Richmond, Virginia, participated in several clinical trials at Duke involving experimental therapeutics to treat his cancer. Researchers in Duke's Experimental Therapeutics Program are developing creative new strategies to battle malignancies based on an increasing understanding of cancer's aberrant cellular machinery.



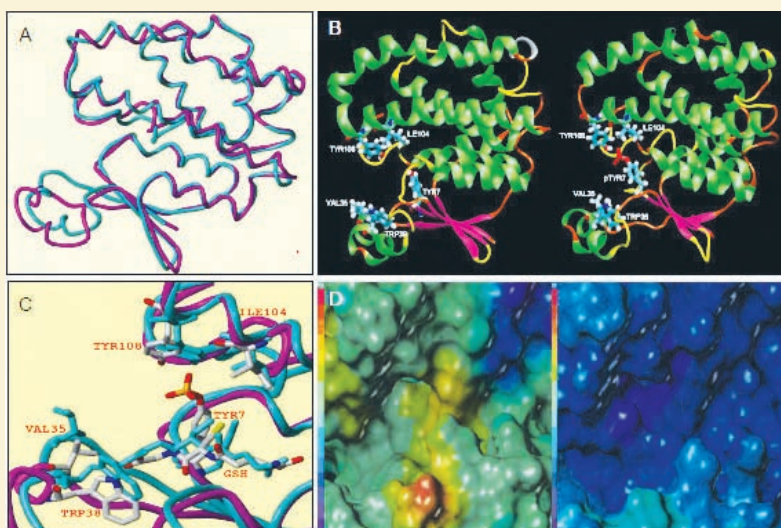
MEDIAN PROGRESSION-FREE SURVIVAL

3.0 months Letrozole alone
8.2 months Lapatinib plus letrozole

HIGHLIGHTS

Improved outcomes for breast cancer

Women with HER2-positive breast cancer treated with a combination of the targeted therapy lapatinib plus an aromatase inhibitor (letrozole) experienced a 5.2-month increase in median progression-free survival compared to women treated with letrozole alone. (2009 ASCO Annual Meeting and 2008 San Antonio Breast Cancer Symposium)



Computer modeling of the mechanisms behind treatment resistance in glioblastoma cells. (Computer modeling of the effect of tyrosine phosphorylation on GSTP1 protein structure.)

Treatment resistance in brain tumors

Duke's Francis Ali-Osman is discovering more about how two proteins—GSTP1 and EGFR—interact to contribute to treatment resistance in glioblastoma, one of the deadliest types of brain tumors. (*J Biol Chem.* Mar 2, 2009) The findings point toward a potential glioblastoma therapy that would combine a GSTP1 inhibitor and a EGFR inhibitor. EGFRs are already approved for treatment of lung cancer, and GSTP1 inhibitors are under clinical development.

and the mechanisms behind drug resistance,” Spector says. “We can take what we’re learning to figure out how to use and develop therapies in a more rational manner.”

The program, which includes 27 members from eight basic and clinical science departments at Duke, focuses on understanding mechanisms behind cancer, with the ultimate goal of using that knowledge to conduct early-phase drug development. “There’s a great deal of science involved in the early stages of such drug discovery. And science is what we do best,” says Francis Ali-Osman, DSc, co-director of the program. “We can identify the molecular defects underlying cancers, generate first-generation

drugs, screen and optimize them, and then work with industry to bring them to clinical trials. Presently, several lead compounds that target a variety of deregulated cellular pathways are undergoing various stages of preclinical, in vivo evaluation. The pathways targeted include those involving the activated Ras oncogene, the sonic hedgehog pathway negative regulator smoothed, and the phase 2 metabolism and stress signaling protein GSTP1.”

Spector sees opportunities to develop drugs for rare tumors in particular. “Companies may not see a big profit in developing drugs for more unusual types of tumors, but people are still suffering and need new therapies,” he says. 🐾

PATIENT SUPPORT

Duke is dedicated to offering patients the best experience possible through outstanding nursing care, extensive support services, and multiple survivorship resources. Through the Duke Center for Cancer Survivorship, trained specialists and compassionate volunteers offer psychosocial and educational support to patients and their families. Lodging assistance, nutritional counseling, financial counseling, psychological services, and in-home care are also among the many services offered to assist patients and family members.

Duke Cancer Care Research Program

The Duke Cancer Care Research Program (DCCRP) collects data about trends in well-being for cancer patients over time and systematically develops new models of care to enhance patients' quality of life and better manage commonly experienced symptoms. Duke researchers are now leading a pilot project in which quantitative symptom concerns and quality-of-life data are collected from patients using a Patient Care Monitor, a handheld computer. Duke is the only academic medical center in the country to offer this technology to its patients.

Improving well-being

A DCCRP pilot study found that Pathfinders, a national comprehensive psychosocial support program offered at Duke, improves quality of life, psychological measures, and fatigue in metastatic breast cancer patients. After three months of support from Pathfinders, quality-of-life scores increased while scores that indicate distress decreased. (American Society of Clinical Oncology Breast Cancer Symposium, Sept. 2008, Abstract 251) Duke's Pathfinders program is one of only two in the country. It is available to all cancer patients.

Pediatric cancers

Duke offers a support group for teens and adolescents with cancer as well as a Quality of Life program that in conjunction with Duke Divinity School provides palliative care and other services to pediatric patients with life-threatening diseases.

Survivors of childhood cancer

Duke's Long-Term Cancer Survivor Clinic is one of the nation's truly multidisciplinary clinics that follows childhood cancer survivors into adulthood.

Surviving brain cancer

At The Preston Robert Tisch Brain Tumor Center at Duke, clinicians and patients begin creating a survivorship plan from the start of treatment. Both medical and psychosocial resources are offered throughout treatment to help patients adapt to memory loss or other cognitive deficits, vision and hearing problems, changes in relationships, earning status, or independence. Patients can use hands-on learning tools for all ages at the nationally acclaimed Brain Tumor Learning Center to help understand diagnosis, treatment, and related issues.

Breast Cancer Survivorship Clinic

This specialized clinic for survivors, the first offered in North Carolina, combines both group and individual support, assessment, and education within a single visit. The clinic features a multidisciplinary team of health care providers who address long-term and late effects that may include and/or impact bone health, post-mastectomy lymphedema, sexuality, coping, healthy eating, exercise, and more. The primary goal is to empower patients to make healthy lifestyle choices that contribute to improved quality of life and minimize the risks of secondary cancers and other illnesses.

Preserving fertility

The Duke Fertility Center offers fertility-preserving services such as sperm and embryo banking for cancer patients undergoing treatment that may affect their reproductive abilities, working closely with oncologists to ensure these procedures are appropriate for the patient and coordinated with treatment.

Patient navigators

Duke Comprehensive Cancer Center and Duke Raleigh Cancer Center provide a valuable service to cancer patients through patient navigators. The navigators provide a vital connection to the resources available to patients and their families. While their primary role is to coordinate the many tests, appointments, and procedures needed for cancer care, patient navigators also provide educational and emotional support and encouragement. The navigators can improve outcomes and a patient's quality of life, and their services also benefit physicians and family members.

Amy Abernethy, MD, left, directs the Duke Cancer Care Research Program, which generates evidence-based solutions for common problems in supportive oncology.



LOCATIONS



Outpatient clinics

Adult Bone Marrow Transplant Outpatient Clinic

2400 Pratt Street
Durham, NC 27705
919-668-1002

The clinic provides convenient drop-off access and extensive outpatient services for transplant patients, including apheresis, chemotherapy, and daily supportive care. Amenities include a separate family and patient lounge with television, VCR, refrigerator, microwave, and telephone.

Duke Prostate Center

Duke Clinic, 2L
200 Trent Drive
Durham, NC 27710
919-668-8108

The center features a multidisciplinary team of physicians, research scientists, and health care providers who seek to improve the care of men with prostate cancer.

The Preston Robert Tisch Brain Tumor Center

200 Trent Drive
047 Baker House
Durham, NC 27710
Adults: 919-684-5301;
Pediatrics: 919-668-6288

The center offers full services for patients for brain tumors, including the nationally acclaimed Brain Tumor Learning Center where patients can use hands-on learning tools for all ages to help understand diagnosis, treatment, and related issues.

Morris Cancer Clinic

Morris Building
200 Trent Drive
Durham, NC 27710
888-ASK-DUKE (888-275-3853)

For patients with many types of cancer this clinic provides outpatient services including radiation oncology, imaging, lab services, genetic counseling, and patient support services. Here you will find:

- Breast Oncology Multidisciplinary Clinic
- Gastrointestinal Oncology Multidisciplinary Clinic
- Thoracic Oncology Multidisciplinary Clinic
- Sarcoma Oncology Multidisciplinary Clinic
- Melanoma Oncology Multidisciplinary Clinic
- Leukemia and Lymphoma Clinics
- Head and Neck Oncology Multidisciplinary Clinic
- Gynecologic Oncology Multidisciplinary Clinic

Duke Raleigh Cancer Center

3400 Wake Forest Road
Raleigh, NC 27609
919-862-5400

The center's team of oncologists provides radiation and medical oncology treatments for nearly every type of cancer. Duke Raleigh Cancer Center features multidisciplinary clinics and offers access to the latest Duke clinical trials.

Duke Children's Hospital and Health Center

See following page

Inpatient locations

Duke University Hospital

2301 Erwin Road

Durham, NC 27710

Appointments: 888-ASK-DUKE

A full-service tertiary and quaternary care hospital, Duke University Hospital offers patients with all types of cancer, even rare cancers, a degree of physician subspecialization that is rare and state-of-the-art techniques in imaging, radiology, and surgery (including minimally invasive and robotic surgery), as well as access to many novel therapeutic agents through enrollment in clinical trials.

Duke Children's Hospital and Health Center

2301 Erwin Road

Durham, NC 27710

919-668-4000

Duke Children's Hospital and Health Center offers clinical services to pediatric oncology patients in a child- and family-friendly environment. The Valvano Day Hospital on the fourth floor offers outpatient follow-up care.

Duke Raleigh Hospital

3400 Wake Forest Road

Raleigh, NC 27609-7373

919-954-3000

Since 1998, this 186-bed hospital has been an important part of Duke University Health System. This hospital has a dedicated inpatient unit with 13 beds for oncology patients. Patients are cared for by oncology certified nurses. A team of Duke oncologists provide radiation and medical oncology treatments for nearly every type of cancer and use the most current technologies available for diagnosing and treating cancer.

Durham Regional Hospital

3643 Roxboro Road

Durham, NC 27704

919-470-4000

Comprehensive diagnostic, surgical, radiation, and chemotherapy treatment options are offered in this 359-bed hospital. Part of the Duke University Health System, Durham Regional Hospital has served the Durham, Orange, and surrounding communities for more than 30 years.



AFFILIATIONS

The Duke Oncology Network (DON) brings Duke's strengths in oncology into community practices across the Southeast. Duke provides an array of services to a regional network of community cancer programs sharing a commitment toward excellence in cancer care. In addition to eight clinical affiliates, the DON includes eight research affiliates and one program development affiliate.

Clinical affiliates

The DON and various hospitals within close geographic proximity to Duke University Medical Center partner to develop and manage clinical oncology programs, whether medical oncology, radiation oncology, or both. Clinics are staffed by Duke medical oncologists, physician extenders, and fellows.

Research affiliates

A research affiliation with the DON offers oncology program assistance with the development and ongoing management of a quality clinical trials program, as well as access to in-house Duke studies, national cooperative group trials such as CALGB (Cancer and Leukemia Group B) studies, pharmaceutical industry studies, and collaborative research.

Program development affiliates

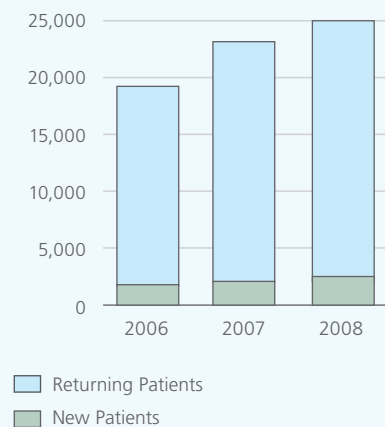
In response to development, growth, and expansion needs of hospitals not in close geographic proximity to Duke University Medical Center, the DON offers a Program Development Affiliation. This affiliation combines consultative management and administrative functions, clinical relationships between community-based providers and faculty/staff at Duke, and clinical trials development and management. This relationship offers the opportunity for customization depending on the capabilities, needs, and interests of the affiliate organization. Programmatic development can be comprehensive, or can center on a specific subspecialty program, such as bone marrow transplantation.

HIGHLIGHTS

Duke Oncology Network clinical volumes

In 2008, more than 2,200 new patients were seen by Duke oncologists in their home communities.

DUKE ONCOLOGY NETWORK VOLUME GROWTH



For more information on the Duke Oncology Network, please contact us.

Duke Oncology Network
3100 Tower Blvd., Suite 600, Box 80
Durham, NC 27707
Phone: 919-419-5500
Fax: 919-493-3234
Renee.Muellenbach@duke.edu

AFFILIATIONS

Clinical affiliates

Duke hematology and oncology physicians see and treat patients at each of these locations. All clinics offer chemotherapy, infusions, and other supportive treatment services on a Monday through Friday schedule. All patients also have access to a variety of clinical trials.

Columbus Regional Healthcare System Donayre Cancer Care Center

711 North Franklin Street
Whiteville, NC 28472
910-641-8220

This outpatient cancer clinic offers diagnostic and treatment resources in a convenient setting, including chemotherapy, an in-clinic pharmacy, access to clinical trials, as well as a nurse navigator to support patient social service and supportive care needs.

Community Memorial Healthcenter CMH Cancer and Specialty Care Center

750 Lombardy Street
South Hill, VA 23970
434-774-2417

Comprehensive cancer services include advanced cancer treatments such as chemotherapy, clinical trials, laboratory, pharmacy, diagnostic x-ray, nutritional support, counseling, social services, and supportive services. A fitness center and physical therapy services are also housed within the same facility.

Granville Medical Center

1010 College Street, Suite 1030
Oxford, NC 27565
919-690-3000

Hematology and medical oncology consultation services are offered by Duke physicians at this center. Clinical trial enrollment and chemotherapy are also available onsite.

Johnston Health—Smithfield Johnston Cancer Center

514 North Brightleaf Boulevard, Suite 1100
Smithfield, NC 27577
919-989-2192 or 989-5891

The cancer center offers quality cancer care and management of oncology and hematologic problems, including anemia and coagulation disorders, coordinated by a Duke medical oncologist. Full infusion services are available in addition to an in-clinic pharmacy, access to clinical trials, a dedicated social worker, and coordinated home health program. Currently a genetic counseling study is open at this site.

Maria Parham Hospital Maria Parham Oncology Center

566 Ruin Creek Road
Henderson, NC 27536
252-436-1880

Duke physicians provide medical and radiation oncology services, chemotherapy, and clinical trials. Education is available through an on-site cancer resource center supported by the American Cancer Society and Maria Parham Healthcare. Maria Parham also offers frequent "lunch and learn" programs to patients and family and frequently participates in many Duke supportive care research activities. Currently a genetic counseling study is open at this site.





Person Memorial Hospital

615 Ridge Road
 Roxboro, NC 27573
 336-503-5776

This clinic offers consultation with Duke physicians for medical oncology services in addition to on-site chemotherapy, clinic trial services, and supportive services including cancer education.

**Scotland Memorial Hospital
 Scotland Cancer Treatment Center**

500 Lauchwood Drive
 Laurinburg, NC 28352
 910-291-7630; 877-762-2735 (toll-free)

This cancer center offers quality cancer care and management of oncology and hematologic problems by Duke physicians. The newly renovated center includes multiple examination rooms, an aesthetically pleasing chemotherapy suite, and a new radiation therapy linear accelerator and simulator. A new breast cancer multidisciplinary clinic is available, and a full-time social worker is available to assist patients and families with their financial and support needs.

**Southeastern Regional Medical Center
 Gibson Cancer Center**

1200 Pine Run Drive
 Lumberton, NC 28359
 910-671-5730

Gibson Cancer Center is the largest of the DON clinics and provides medical oncology and hematology services. Chemotherapy, infusions, and access to clinical research studies are offered. The center also provides image-guided radiation therapy (IGRT) and intensity modulated radiation therapy (IMRT). Support services include an on-site pharmacy and laboratory, an information resource library, a full-time oncology therapist, and an on-site dietitian. Support groups and educational programs are offered in cooperation with the American Cancer Society. Currently a genetic counseling study is open at this site.

Research affiliates

**Carolinas Medical Center NorthEast
 George A. Batte Jr. Cancer Center**

100 Medical Park Drive
 Concord, NC 28025
 704-403-1370

Coastal Cancer Center

8121 Rourk Street
 Myrtle Beach, SC 29572
 843-692-5000

**Comprehensive Cancer Care—
 Marion L. Shepard Cancer Center**

1209 Brown Street
 Washington, NC 27889
 252-975-4308

Florida Hospital

2501 North Orange Avenue
 Orlando, FL 32803
 407-303-2000

Palm Beach Cancer Institute

1309 North Flagler Drive
 West Palm Beach, FL 33401
 561-366-4100

Presbyterian Hospital

200 Hawthorne Lane
 Charlotte, NC 28204
 704-384-4000

**St. Mary’s Medical Center
 Regional Cancer Center**

2900 1st Avenue
 Huntington, WV 25702
 304-526-1234

Virginia Oncology Associates

5900 Lake Wright Drive
 Norfolk, VA 23502
 757-466-8683

Program development affiliate

**Beaufort Memorial Hospital
 Keyserling Cancer Center**

1680 Ribaut Road
 Port Royal, SC 29935
 843-522-7925

Two full-time medical oncologists provide a full array of cancer services. Chemotherapy, infusions, and access to clinical research studies are offered, as well as image-guided radiation therapy (IGRT) and intensity modulated radiation therapy (IMRT).

CLINICAL LEADERSHIP



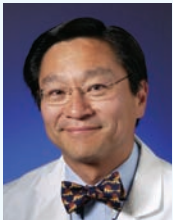
Andrew Berchuck, MD

Chief, Division of Gynecologic Oncology
Training: Case Western Reserve University School of Medicine (Ohio), 1980; OB/GYN, Case Western Reserve University 1984; Gynecologic Oncology, Sloan-Kettering Cancer Center (New York), 1987
Clinical Interests: Gynecologic malignancies, complicated gynecologic surgery, minimally invasive surgery, hereditary ovarian and endometrial cancer
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Carolyn Carpenter, MHA, FACHE

Associate Vice President, Oncology Services
Duke University Health System
carpe018@mc.duke.edu



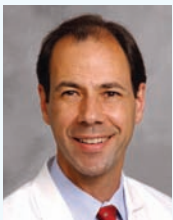
Nelson Chao, MD

Chief, Division of Cellular Therapy and ABMT
Associate Director, Duke Comprehensive Cancer Center
Training: MD, Yale University School of Medicine (Connecticut), 1981; Medicine, Stanford University Medical Center (California), 1984; Oncology, Stanford University Medical Center (California), 1987
Clinical Interests: Hematology, oncology, bone marrow transplantation
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Jeffrey Crawford, MD

Chief, Division of Medical Oncology
George Barth Geller Professor for Research in Cancer
Training: MD, Ohio State University College of Medicine, 1974; Duke University Medical Center, 1977, 1980
Clinical Interests: Lung cancer (small cell and non-small cell), chemotherapy, hematopoietic growth factors
crawf006@mc.duke.edu



Thomas D'Amico, MD

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Professor, Thoracic Surgery
Training: MD, Columbia University College of Physicians and Surgeons (New York), 1987; Thoracic Surgery, Duke University Medical Center, 1996; Thoracic Oncology, Memorial Sloan-Kettering Cancer Center, 1996
Clinical Interests: Lung cancer, esophageal cancer, thoroscopic surgery, thoracic oncology
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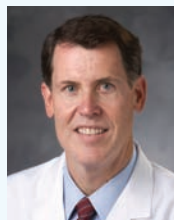
Allan H. Friedman, MD

Chief, Division of Neurosurgery
Co-Director, Neuro-Oncology Program
Training: MD, University of Illinois College of Medicine, 1974, Neurosurgery, Duke University Medical Center, 1980; University of Western Ontario (Canada), 1980
Clinical Interests: Brain tumors, skull base tumors, peripheral nerve surgery, pituitary tumors, cerebrovascular disease
fried010@mc.duke.edu



Joseph Moore, MD

Professor, Medical Oncology
Training: MD, Johns Hopkins University School of Medicine (Maryland) 1970; Internal Medicine, Johns Hopkins Hospital (Maryland) 1971; 1975; Hematology-Oncology, Duke University Medical Center, 1977
Clinical Interests: Myeloid leukemias, soft tissue and bone sarcomas
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Judd W. Moul, MD

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Training: MD, Jefferson Medical College of Thomas Jefferson University (Pennsylvania), 1982; Surgery, Walter Reed Army Medical Center (Washington, DC), 1983; Urology, Walter Reed Army Medical Center (Washington, DC), 1987; Urologic Oncology Fellowship, Duke University Medical Center, 1989; Fellow, American College of Surgeons
Clinical Interests: Minimally invasive nerve-sparing radical prostatectomy, treatment of PSA-only or biochemical recurrence of prostate cancer, early stage testicular cancer
judd.moul@duke.edu



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Medical Director, Duke Oncology Services
Associate Director, Duke Comprehensive Cancer Center
Chairman, Department of Radiation Oncology
Training: MD, Tufts University School of Medicine (Massachusetts), 1981; Surgery, Vanderbilt Medical Center (Tennessee), 1982; Radiation Oncology, Massachusetts General Hospital, 1985, 1986
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Douglas Tyler, MD

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Chief, Surgical Services, Durham VA Medical Center
Training: MD, Dartmouth Medical School (New Hampshire), 1985; Surgery, Duke University Medical Center, 1992; Surgical Oncology, MD Anderson Cancer Center (Texas), 1994
Clinical Interests: Surgical oncology, colon and rectal cancer, specializing in sphincter preserving operations for rectal cancer
tyler002@duke.edu

Learn more about our faculty, their clinical and research interests, and representative publications at dukehealth.org.

FROM THE DUKE COMPREHENSIVE CANCER CENTER: ADVANCING THE FRONTIERS OF CANCER RESEARCH

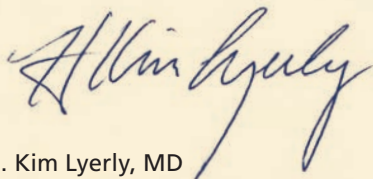
The Duke Comprehensive Cancer Center is distinguished from community hospitals, private clinics, and other cancer centers because of the groundbreaking research of its faculty and the ability to translate research discoveries to greatly benefit patients. As one of only 40 cancer centers designated as “comprehensive” by the National Cancer Institute, Duke has emerged as a leader on many important fronts—stem cell research, high tech imaging, signaling pathways, translational drug development, and more.

As a matrix center within one of the nation’s premier biomedical research institutions, the Cancer Center leverages Duke’s basic and translational research infrastructure to achieve clinical research excellence. Members of the Cancer Center represent more than 20 different departments and schools across Duke University and its medical center including the Institute for Genome Sciences & Policy, Nicholas School of the Environment, and Pratt School of Engineering. This diversity and sharing of knowledge lead to prolific collaborations and exciting progress in cancer research. Thus, the nearly 300 members of the Cancer Center

make a formidable team dedicated to cancer research and care, and our research scientists are recognized nationally and internationally for their breadth of knowledge and outstanding scientific achievements.

Duke investigators and physician-researchers are encouraged to think big and aim high. Members of the Duke Comprehensive Cancer Center are among the most elite in their areas of expertise and include seven members of the National Academy of Sciences, 13 members of the Institute of Medicine, and 10 members of the American Academy of Arts & Sciences. Unconventional thinking, knowledge, and experience have resulted in exciting and groundbreaking discoveries at Duke—yielding many innovative therapies for our patients.

Today at Duke, researchers and clinicians continue to work closely together to understand, prevent, and treat all types of cancer including even the rarest, and our dedication to the patient remains ever strong and passionate. We are proud of the many examples of this commitment shared in this 2009 report and invite you to stay abreast of our progress by visiting our Web site, cancer.duke.edu.



H. Kim Lyerly, MD

Director, Duke Comprehensive Cancer Center

George Barth Geller Professor for Research in Cancer

Training: MD, University of California, Los Angeles, David Geffen School of Medicine, 1983

Surgery, Duke University Medical Center, 1985, 1990

Research, Duke University Medical Center, 1987

Clinical Interests: Surgical treatment of breast cancer, gene and immune based therapy for breast, kidney, lung, colon, and pancreatic cancer

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Anthony R. Means, PhD

Deputy Director, Duke Comprehensive Cancer Center

Nanaline H. Duke Professor and Chair, Department of Pharmacology and Cancer Biology

Professor of Medicine

Training: PhD, University of Texas Austin, 1967

Postdoctoral, University of Melbourne, Australia, 1969

Research Interests: The study of cell signaling pathways that regulate cell proliferation, differentiation or function, and how altering these pathways contributes to the onset of cancer

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Visit Us Online

cancer.duke.edu

Duke Comprehensive Cancer Center Web site

dukehealth.org/cancer

Information on our cancer clinical services



DukeMedicine

RESOURCES FOR CLINICIANS

Consultations and Referrals

Referring physicians who would like to make an appointment, refer a patient, or find out more information about cancer services at Duke may call the Duke Consultation and Referral Center.

Duke Consultation and Referral Center

888-ASK-DUKE (888-275-3853) (toll-free)

800-MED-DUKE (physicians only)

919-416-DUKE (local)

Clinical Trials

To find information on Duke Comprehensive Cancer Center trials currently enrolling patients, **please visit cancer.duke.edu/CTrials**. Many clinical trials mentioned in this report are identified by their clinicaltrials.gov identifier number. To learn more about those trials, including how to enroll, **visit clinicaltrials.gov**.

New Patient Coordinators

Many of our programs (breast, thoracic, gastrointestinal, sarcoma, prostate) use a new patient coordinator to facilitate new patient scheduling and record collection. Our Oncology Scheduling Hub can direct calls to these individuals: 919-668-6688.

Continuing Medical Education

The Duke Comprehensive Cancer Center offers live courses at Duke, Duke-affiliated health centers, and at organized regional and national events. Online and CD-ROM activities are also available. **Visit cme.mc.duke.edu** for details. Duke also offers courses and conferences for health professionals through the Duke Clinical Research Institute's Clinical Medicine Series.

Learn more at www.dcri.duke.edu.

Access the Duke Cancer Report Online

Visit dukemedicine.org/cancerreport for a PDF of this report—plus links to helpful Web sites related to cancer care at Duke. While care was taken to ensure the accuracy of data and information reported in this publication, any necessary updates or corrections will be available via this Web page.



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