THE CANCER INSTITUTE HAS THREE MISSIONS:

PATIENT CARE: PROVIDE THE HIGHEST QUALITY MEDICAL CARE POSSIBLE FOR OUR STATE’S RESIDENTS.

Nora Webster (left) is enjoying a cancer-free lifestyle after surgical removal of a lung cancer. For her, early detection meant she didn’t need other therapies after surgery. Mrs. Webster and other cancer survivors discuss their experiences at University Cancer Care in interviews you can find at www.ummchealth.com/cancer/

RESEARCH: CURE CANCER.

Fluorescent stains on the cover highlight receptors in breast cancer cells. This image, provided by Dr. Ingrid Espinoza, highlights Notch1 receptors in green. Notch receptors help cells communicate. When they are faulty or dysfunctional, that sometimes can lead to cancer. A multi-institutional group led by Cancer Institute Director, Dr. Lucio Miele (center), has just completed the first clinical trial of a drug that inhibits Notch in the most common form of breast cancer. The trial was a success and opened the way for more advanced studies. Researchers here work in many disciplines to detect cancer earlier and to find new ways to stop it.

EDUCATION: TRAIN THE NEXT GENERATION OF MEDICAL CAREGIVERS AND MEDICAL RESEARCHERS.

Dr. Srinivasan “Dr. Vijay” Vijayakumar (right), Cancer Institute deputy director and head of its Department of Radiation Oncology is working to make the University Cancer Care radiation oncology program one of the best in the nation. He and physicians in radiation and medical oncology already treat hundreds of adult and pediatric cancer patients and introduce hundreds of students to their specialties each year. The Department of Radiation Oncology offers four residency positions for physicians entering the field and two for physicists. The Division of Medical Oncology offers seven fellowship positions in hematology/oncology.
I keep a color-coded map of U.S. cancer mortality on my computer screen. The areas of highest mortality are in red. A swath of our country from West Virginia to the Gulf of Mexico is solid red.

Mississippi, the epicenter of this region, has a much higher cancer mortality than most of the rest of the nation. The same picture applies to other chronic conditions such as obesity and diabetes, which are associated with increased cancer risk. The human and financial costs of cancer in our state and our region are staggering, and some groups are disproportionately affected by it.

This is why University of Mississippi Medical Center and the state of Mississippi leaders made a strategic decision to make cancer a top priority, and to create a world-class academic Cancer Institute. I am privileged to lead this creation, the University of Mississippi Medical Center Cancer Institute. As the only academic medical center in our state, UMMC made a strong commitment to achieve national excellence in cancer care, research and education, and to eventually pursue National Cancer Institute (NCI) designation.

An academic Cancer Institute must provide state of the art care for its patients, and much more. It must continually improve its practices to push the limits of quality patient care. It must be a force for innovation by supporting ground-breaking research that moves from the laboratory to treatment and back. It must offer clinical trials with the latest investigational treatments and be the hub of a network of hospitals engaged in clinical cancer research. It must educate the next generations of health-care providers and researchers who will fight cancer.

Furthermore, an academic Cancer Institute must work with the community and with other academic institutions to spread knowledge of cancer risk factors, to increase awareness of the importance of early detection and to prevent the many cancers that are preventable. Documented excellence in all these areas is required to attain NCI designation, and more importantly, to turn the tide of the war on cancer in our state and around the world.

This massive undertaking will require intense and sustained effort from all quarters: UMMC, the state of Mississippi and our community partners. The reward will be turning Mississippi into a beacon of cancer medicine and research, eliminating the disproportionate burden of cancer and cancer health disparities in our state, and boosting our economy.

Much more remains to be done, but we are off to a good start. We have achieved U.S. News and World Report “best hospitals” status in cancer for the past two years. We have recruited world-class cancer scientists from top institutions and partnered with the Ole Miss campus in Oxford to create a state-of-the-art cancer drug discovery core, and much more. This Community Report summarizes our efforts and achievements over the past three years. With your help and support, we can change the colors on that map. Let's get out of the red.

Lucio Miele, M.D., Ph.D.
Cancer Institute Director
Thousands seek treatment at University Cancer Care

The 6,219 people who sought cancer treatment or follow-up screening and care at University Cancer Care in 2011-12 represent every facet of Mississippi’s population.

Physicians here provide care for all, from a toddler with a brain tumor to a grandmother with uterine cancer, from a teenager with bone cancer to a young mother with breast cancer.

“Medical caregivers at UMMC work across clinical specialties and with doctors in Mississippi and beyond our borders to deliver the best care possible to Mississippians with cancer,” said Dr. Lucio Miele, Cancer Institute director.

In the fiscal year that ended June 30, 2012, University Cancer Care physicians saw 1,851 new patients and physicians saw 4,368 cancer survivors. Of those numbers, 70 to 75 new patients came to the Children’s Cancer Center, the state’s only pediatric cancer care clinic. Physicians in the Center’s long-term follow-up clinic see 750 to 800 pediatric cancer survivors annually.

University Cancer Care, a part of the University of Mississippi Medical Center, saw its efforts recognized in U.S. News and World Report’s Best Hospitals as having one of the top cancer centers in the region. The annual publication gave University Cancer Care high marks for survival, technology and patient services. Survival of medically challenging patients was higher than expected, the report noted.

Physicians see patients who choose this center, as well as those referred by physicians in this area and from around the state. In fact, this medical staff see many people with unusual and advanced stage cancers and many patients with complex care needs. The staff uses a team approach to treat each patient and can call on multiple specialists within the academic medical center to better help manage conditions some of their more medically challenged cancer patients battle.

While seeing patients, the medical staff also are training our state’s next generation of caregivers, whether it’s future physicians, nurses, dentists or physical therapists.

UNIVERSITY CANCER CARE IS HOME TO THE STATE’S ONLY:

- Stem cell and/or bone marrow transplant unit for adults and children. About 80 children and adults have such lifesaving transplants annually.

- Marrow donor program. UMMC is home to the Mississippi Marrow Donor Program that helps register bone marrow and stem cell donors throughout the state. The center is part of the Be The Match Registry operated by the National Marrow Donor Program.
Treatment center operated within an academic medical center. Physicians who teach the latest developments in cancer treatments are the ones seeing patients and often are involved in research as well.

University Cancer Care physicians can offer treatment for almost any cancer and have experienced teams to work with cancer patients whether they are battling a little known cancer or one that is most common in Mississippi. Using the latest medical equipment and processes enhances education, research and patient care.

In the past fiscal year, the Cancer Institute, which encompasses cancer education, research and treatment, has worked to provide upgraded equipment, to make treatment easier for patients, to enhance the continuing education of the state’s population and its medical community, and to assemble a cadre of internationally-recognized researchers with complementary research interests.

The Cancer Institute and its members have worked to:

- Acquire a Circulating Tumor Cells Blood Counter to help evaluate cancer treatment and recurrence. This equipment counts the number of tumor cells circulating in a patient’s blood. It is FDA-approved to use to monitor the efficacy of treatment in advanced breast, colorectal and prostate cancer patients and is used in clinical research on additional cancers.
- Find more and more ways to use the daVinci, robotic surgery-instrumentation to precisely remove malignant tissue in the least invasive manner possible. Cancer surgeons like the technique because it offers patients a quicker and less painful recovery.
- Open an infusion center in the Winfred L. Wiser Hospital for Women and Infants for women receiving medical oncology therapy for gynecological cancers. The room, with seven chairs, allows the women to talk to others battling gynecological cancers as they are treated.
- Add a patient navigator to the breast care team. A patient navigator answers questions and helps guide patients through the treatment process.
- Expand the University Biospecimen Repository with a new 80-degree below zero F freezer donated by the Leonard E. Warren Melonoma Foundation. The University Biospecimen Repository will support cancer research at UMMC and other research centers. This also will allow physicians to freeze malignant tissue removed from patients. If their cancer recurs later, the tissue is available for doctors to test new treatments on it.
- Add a linear accelerator on the main campus. The equipment is used to educate the next generation of radiation oncologists and to conduct research into better ways to treat cancer. Many patients who are hospitalized can be treated in this facility instead of traveling to the Jackson Medical Mall for radiation therapy treatments. Physicians also can more easily administer anesthesia to children in a hospital setting. This often is required for many children receiving radiation therapy so they remain still during treatment.
- Expand its pediatric neuro-oncology treatment. In the past year, the number of new patients with brain and spinal tumors exceeded the number of new patients with leukemia.
- Expand certifications and qualifications. For example, Dr. Sharla Gayle Patterson, a breast surgeon, earned certification in breast ultrasound from the American Society of Breast Surgeons. She uses breast ultrasound to plan surgical treatment, to perform biopsies and to provide guidance in the operating room.

UPCOMING YEAR:

In the upcoming year, University Cancer Care clinical staff are attacking cancer from many angles including:

- Starting a liver transplant program. Dr. Christopher Anderson has formed a team that soon will start doing liver transplants. Many such transplants are performed in patients with liver cancers. This means Mississippians who need a liver transplant will not have to go out of state to receive one.
- Expanding its medical oncology staff. The Cancer Institute’s medical oncology department added three new oncologists in July: Dr. Calvin Thigpen, Dr. Natale Sheehan and Dr. Matt Cassell.
- Refining its Clinical Trials Core, headed by Dr. Gail Megason, with a goal of making more early phase clinical trials available to patients.
- Enhancing its Quality Committee. This committee has been asked to identify two to three ways every year to improve the care offered.
- Offering more classes on the latest developments in cancer care which also enable Mississippi physicians to gain continuing medical education credits.
New physicians and faculty have broadened the scope of services offered to Mississippians with cancer. Those who joined the UMMC faculty from July 1, 2011 through June 30, 2012 or who have just completed their first year include:

**Dr. Jennifer Barr**, oncologic orthopedic surgeon, on the adult and pediatric care teams

**Dr. Christopher Anderson**, transplant surgeon, who is starting the medical center’s liver transplant program

**Dr. Andrea Chamczuk**, neurosurgeon

**Dr. Shankar Giri**, radiation oncology, head and neck specialty

**Dr. Kathleen Hardin**, breast radiology

**Dr. Tondre Buck**, hematology/oncology, with a special interest in multiple myeloma

**Dr. Mildred Ridgway**, gynecologic oncology

**Dr. Pierre de Delva**, thoracic surgeon, specializing in esophageal and lung cancers

**Dr. Joe Pressler**, pulmonologist, on the lung care team

**Dr. Trey Abraham**, pulmonologist, on the lung care team

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**RETIRING FACULTY:**

**Dr. Joe Files**, hematology/oncology. Dr. Files helped start the UMMC bone marrow and stem cell transplant unit in 1994. From that grew a hematology/oncology unit that includes the transplant unit and the Mississippi Marrow Donor Program. In the past decade, 70 to 80 adult and pediatric patients a year have come to UMMC for life-saving transplants. Dr. Files continues to work part time, primarily as a consultant and researcher.

**Dr. Ralph Vance**, medical oncology. Dr. Vance, the only Mississippian to have served as national president of the American Cancer Society, began and completed his working career at UMMC. His first job? Orderly. He retired as head of the University Cancer Care lung care team. Now, he is continuing his quest to encourage people to quit using tobacco and is working to strengthen ties between the science communities at the University of Mississippi Oxford and Jackson campuses.

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**University Cancer Care is seeing more new patients each year.**

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University Cancer Care staff followed the progress of 4,368 cancer survivors in 2011-12. Of that number, Children’s Cancer Center followed 750 to 800 pediatric cancer survivors.

*Source: UMMC Cancer Registry*
Doctors in Mississippi’s only cancer clinic for children are serious in their play. Laughing and playing to put many of their patients at ease may be part of the treatment, but their goal is more serious than peek-a-boo: destroy the cancer that has invaded the child and disrupted the family’s life.

To do so, the clinic and its staff continue to grow their program, with an eye toward making treatment as simple as possible for each child and his or her family.

The group of seven pediatric oncologists, with six board-certified and one board-eligible, see 70 to 75 new patients each year and have about 150 receiving active therapy at any point during the year. The department also has two fellows and two nurse practitioners.

These doctors see some 750 to 800 cancer survivors for follow up each year. The survivor clinic for patients off therapy for five years or longer helps monitor pediatric cancer patients for recurrence or late effects of cancer or its treatment. Many of the clinic’s patients are in their early 20s when they hit the five-year mark.

A strong link to the surrounding community is a natural follow up to the clinic’s work.

Pediatric oncologists and staff participated in several outreach projects including giving parent-oriented lectures for the Leukemia and Lymphoma Society, serving as camp staff for the American Cancer Society’s Camp Rainbow and serving on advisory boards for The Leukemia and Lymphoma Society, Children’s Cancer Fund, UMC Candlelighters and Make-A-Wish Foundation.

The Children’s Cancer Center staff work with many volunteers from Candlelighters too, helping provide families facing cancer a link with those who have made that journey.

HIGHLIGHTS OF CHILDREN’S CANCER CENTER INCLUDE:

This clinic is home to a pediatric neuro-oncologist and the state’s only multidisciplinary brain tumor clinic each month where patients may see neurology, neurosurgery, oncology, psychology and endocrinology in one clinic setting.
The division includes a Stem Cell Transplant Program, the only one in the state. It has performed more than 160 transplants to date with 17 in the past year. The Pediatric Stem Cell Program works in the Combined Adult and Pediatric Bone Marrow Transplant Unit in the Wallace Conerly Critical Care Tower.

As their patients grow and leave for college or other employment, the clinic provides a copy of their medical diagnosis, therapy and complications on a USB drive. The type of cancer for which they were treated and the drugs and procedures used to treat them will be important factors in their health care for the rest of their lives.

Pediatric cancer doctors also saw radiation therapy return to the main campus, a move that made radiation treatment more convenient for pediatric patients and enhanced the educational experience of medical students and residents.

Sometimes pediatric patients are anesthetized before they receive radiation therapy so they will stay still during treatment, so installing radiation therapy equipment on campus makes it more convenient for those who require anesthesia support while receiving treatment. Many adults receive radiation therapy at the Cancer Institute offices at Jackson Medical Mall. Most children receive radiation therapy on the main campus.

IN THE COMING YEAR, CHILDREN’S CANCER CENTER STAFF ARE WORKING TO:

Expand the clinical trials program. The clinic already offers about 90 trials on any given day. In 2011, the division had 126 patient enrollments in clinical trials, including some Phase 1 studies. These studies focus on the newest investigational drugs available. This year, staff are working to expand Phase 1 participation by collaborating with pharmaceutical companies.

Refine visits for long-term care. Currently patients in long-term follow-up clinic can receive oncology and cardiac screening and see psychologists and social workers in one place. In the coming year, the staff will work to bring other specialists such as endocrinology or neurology into this multidisciplinary clinic. This means the doctors come to the patients.

Become proficient in the EPIC electronic medical record keeping programs recently installed and transition to the Beacon Module for Clinical Oncology. This will help the Children’s Cancer Center staff quickly track visits and treatment.

Create more opportunities for residents and medical students to learn about pediatric cancer treatment and participate in cancer research.
University Cancer Care adult and pediatric patients participate in nationally-monitored clinical trials each year. Clinical trials are the only way to find out how well new medicines, combinations of medicines or new techniques work to detect, diagnose or treat cancer.

Some trials may include possible improvements of existing treatments. Others may be larger tests of medicines which have shown promise in smaller trials. Some clinical trials seek to find if the order in which treatments are given affect the outcome.

Patients today benefit from the participation of many others in earlier trials. For example, the work of Dr. Jeanette Pullen, former director of the Children’s Cancer Center, helped set the standards now credited for longer survival of acute lymphoblastic leukemia patients.

Other trials have helped find new ways to detect cancer earlier. Today, University Cancer Care offers low dose CT scans which, based on results of a clinical trial, may detect lung cancer at an earlier stage and improve the likelihood of long-term survival. And some trials seek ways to prevent cancer’s recurrence. Dozens of Mississippi women are participating in a clinical trial now to study the results of exercise and weight loss in preventing breast cancer recurrence.

Inch by inch and step by step, researchers, physicians and volunteer participants working together are providing more and more information needed to stop cancer.

Cancer patients who enroll in a clinical trial are agreeing to test a new cancer treatment or technique. Clinical trial participants may receive treatment considered the standard for their disease or a new treatment. In some studies, the new drug is added to standard treatment to determine whether it can improve patient outcomes. Their doctors closely monitor each patient as the trial progresses.

Before anyone can enroll, physicians screen them to be sure they meet the requirements for that trial. Enrollment is voluntary and participants can leave a trial at any time.

Participation in trials often starts soon after a cancer diagnosis. At any given time at University Cancer Care, 70 to 80 clinical trials usually are open to adult patients with a variety of malignancies who qualify and about 80 to 90 are open to pediatric patients.

University Cancer Care initiates and participates in clinical trials that originate here and those operated nationally.

Many national trials are run by the Southwest Oncology Group, Radiation Oncology Group, the Cancer Trials Support Unit, the Gynecologic Oncology Group and the Children’s Oncology Group, large networks that involve many hospitals and clinics. The National Cancer Institute oversees these cooperative group trials and many others.

For more information on clinical trials offered at University Cancer Care, go to:
http://cancerinstitute.umc.edu/clinicaltrials.html

Several Cancer Institute programs have been recognized for excellence.

- The Commission on Cancer awarded the UMMC Cancer Program a three-year accreditation with commendation in its latest survey in October 2010.
- U.S. News and World Report for the second consecutive year recognized UMMC as a high-performing center in cancer care. Of the 22 UMMC physicians named among U.S. News’ Best Doctors, seven work with cancer patients.
- The Centers for Disease Control and Prevention presented the Mississippi Cancer Registry its highest award for data completeness, timeliness and quality. The program received recognition for meeting Advanced National Data Quality and Completeness Program standards. Only 24 state cancer registries nationwide met this standard.
Dr. John Ma (left), a radiation oncology resident, and Dr. Srinivasan “Dr. Vijay” Vijayakumar, department chairman, examine a mask made for one of their patients.
“We learn more every day about cancer and possible treatments. It is essential that we continue to study as well as prepare students, residents and fellows for their role in treating cancer, prepare scientists who will help us solve the cancer puzzle and provide new information on cancer and treatment to the public.”

Dr. Lucio Miele, Cancer Institute director

Training new caregivers essential

Educating students, residents, patients, researchers and medical staff is a key goal of the Cancer Institute.

“We learn more every day about cancer and possible treatments. It is essential that we continue to study as well as prepare students, residents and fellows for their role in treating cancer, prepare scientists who will help us solve the cancer puzzle and provide new information on cancer and treatment to the public,” said Dr. Lucio Miele, Cancer Institute director.

Cancer, its prevention, detection, diagnosis, cure and recovery, is taught in multiple classes across almost every University of Mississippi Medical Center program and in continuing education courses and seminars at UMMC and across the state.

The Cancer Institute concentrates on four facets of education:

STUDENTS, RESIDENTS AND FELLOWS
About 2,700 students attend classes in 28 degree programs in five schools at the University of Mississippi Medical Center. More than 500 residents and fellows are in graduate training here.

Physicians, researchers and others in the Cancer Institute participate in helping educate everyone from the first year medical student to the graduate researcher about cancer biology, prevention, screening, detection, diagnosis, treatment and recovery.

Cancer is taught in multiple courses in the medical curriculum.

UMMC residents do a three-month rotation with the Division of Medical Oncology that also offers seven fellowship slots. The Department Radiation Oncology offers four residency slots in radiation oncology and two in medical physics.

Cancer Institute investigators currently are training 11 Ph.D. students in their labs. These students are enrolled in several graduate programs, including biochemistry, pathology and pharmacology. A Ph.D. student has to perform original research under his or her mentor’s supervision in order to complete a dissertation. This process requires years of supervised work and is crucial to mold a well-trained, independent researcher. These students will become the cancer scientists of tomorrow.

The Cancer Institute also participates in the UMMC Base Pair program which pairs high school students with interest and ability in research with medical researchers.
COMMUNITY

Many at the Cancer Institute are involved in community outreach programs to help educate Mississippi residents how to lower their risk of getting some cancers, how to be screened for many cancers and to recognize cancer symptoms.

Efforts include:

- Speaking to community and civic groups and at health fairs.
- A more formal relationship with the Fannie Lou Hamer Cancer Foundation to provide information about cancer and screening to Mississippians in the Delta.
- Health screenings such as those offered by UMMC’s Oral Oncology Department for oral cancers and its Face and Skin Center for skin cancers. This year, the Cancer Institute added a low dose CT lung screening program for high risk smokers that is designed to detect lung cancers earlier with the hope of increasing a person’s chances of long-term survival.
- Distributing cancer information at selected community events and encouraging cancer screenings.
- A website, launched in October 2011, to provide layperson-friendly information about cancer to Mississippi residents. The website is at www.ummchealth.com/cancer

Medical oncologists Dr. Louis Puneky (seated, at left) and Dr. Ralph Vance (standing at left) work with fellows from the 2011-12 class.
Working within the GMaP/BMaP Consortium, of which the Cancer Institute is one of the founding members. Hospitals from six regional academic medical centers in five states and Puerto Rico are working together to help find ways they can cooperate to lessen health disparities within this region.

Cancer educators are working with the Mississippi Department of Health and Mississippi Public Broadcasting to develop a series of public service announcements encouraging Mississippians to be screened early for several cancers, such as oral and breast cancers.

PATIENTS

Making sure patients understand the type of cancer they have and the options available to them is crucial. Doctors and nurses work with each patient to help explain their cancer, treatments available to them and what to expect with cancer and treatment.

Resources available for patients include:

- A Patient Resource Center with more information on cancer, treatment and what to expect during and after treatment. The Center also provides computers and internet access for patients and their families.

- A breast cancer nurse navigator who meets with each breast cancer patient, women and men, and guides them through their upcoming treatment plan.

- An American Cancer Society patient navigator who can meet with each adult patient and help guide them through programs the ACS offers. Each patient is provided with a folder in which to store treatment information they will need for the rest of their lives.

- Social workers and dietitians in the adult and pediatric clinics who work with patients and families to help them deal with many of the details of treatment as well as the social and emotional ups and down that may come with this disease. Social workers provide counseling, information on care, on financial support when available and help patients find transportation and lodging when necessary.

- The Cancer Institute website, that provides information on many cancers and links to reliable national websites. (www.ummchealth.com/cancer)

PRACTICING CLINICIANS

Many involved in cancer care also help provide continuing medical education for physicians and clinical staff here and across the state, helping them stay up to date on the latest information in cancer prevention, detection, diagnosis and treatment.

The Cancer Institute also brings internationally known researchers to the campus to discuss their work and its treatment possibilities. The seminars have included speakers from the National Cancer Institute and National Institutes of Health, M.D. Anderson Cancer Center, Mayo Clinic Cancer Center, Loyola University Medical Center, and many other internationally recognized cancer research centers.

Several speakers have now joined the Cancer Institute research faculty.

Some conferences and seminars offer Continuing Medical Education credits. Subjects range from new treatments to new ways to detect cancer or a review of the detection and treatment of a particular type of cancer.

This is one way the Cancer Institute functions as a clearinghouse for the latest cancer knowledge for health-care providers across the state.

Physicians and staff in oncology and radiation therapy meet regularly to review the latest journal articles on cancer care so they can apply the latest principles to their patients and add it to their teaching materials.

Distinguished lecturers who have visited the campus in 2012-13 include:

- Dr. Jan Gustafsson from the University of Houston. Dr. Gustafsson is a member of the National Academy of Sciences and former chairman of the Nobel Prize Assembly of the Karolinska Institute. In the mid-1990s, Dr. Gustafsson’s research group discovered an estrogen receptor present in some breast and lung cancers. (ER-positive or ER-negative readings). Now others have developed drugs that help treat cancers with ER-positive readings.

- Dr. Craig Jordan from Georgetown University. Dr. Jordan is a member of the National Academy of Sciences and Order of the British Empire. He has received such awards as the Karnofsky Award for Oncology and the Brinker Award for Breast Cancer Research. He discovered tamoxifen, a drug used to treat breast cancer.
Researchers seek to halt cancer

A person who overhears two Cancer Institute researchers talking may understand only sporadic words and phrases. Yet the concepts they’re discussing are fairly simple: find out how cells communicate and either enhance that communication or halt it to cure cancer.

At the Cancer Institute, researchers know cancer isn’t one disease but many with hundreds of subtypes. They are focusing on multiple ways to halt it, including:

- Discovering how cells communicate and how genes that regulate cancer are turned off or on by communication between cells. Why do genes that suppress tumor growth stop working and how can they make them start again? Why do genes that promote tumor growth start working and how can they make them stop?

- Finding existing or new drugs that will halt cancer or prevent it. Researchers work with the Drug Discovery Core at the National Center for Natural Products Research in Oxford on many of these projects.

- Finding new ways to deliver drugs to malignant cells and finding ways to penetrate tumors so the drugs do not harm healthy cells.

- Seeking the seed, or stem cell, from which cancer grows. Scientists know these cells may survive treatment or “hide” from it, lie dormant for years, then cause cancer to recur.

- Finding indicators within a person’s body that may let them know they’re prone to a particular type of cancer.

Within the framework of three Cancer Institute basic research programs, more than 30 groups of researchers are seeking answers to these questions and hundreds of others.

This year, researchers are forming interest groups, with members from each program, to focus on breast and prostate cancers, and the effects of obesity on cancer. An additional interest group will focus on cancer stem cells, the suspected source of cancer recurrences.

“We picked cancers where Mississippi has health disparities, and where mortalities are high in Mississippi such as triple negative breast cancer and prostate cancer,” said Dr. Lucio Miele, Cancer Institute director. “Now we can apply these three scientific approaches to a specific cancer.”

The focus groups also will enable the Cancer Institute to seek larger grants that fund such collaborative efforts.
Luis Martinez, associate professor, and student Krishna Chauhan work in the Tumor Cell Biology Program.
The Cancer Institute orchestrates its basic research through these programs:

- The Molecular Cancer Therapeutics Program searches for new targets for treatment and the drugs that affect those targets.

- The Tumor Cell Biology Program searches for genes that predispose cancer cells to respond to treatment and for the cells where cancer originates, the cancer stem cells.

- The Cancer Genetics Program searches for the genetic changes in a cell that may lead to cancer or its progression and develops screening tools that can reduce cancer risks.

The programs, envisioned when the Cancer Institute originated, became fully active within the past year. Each brings its own share of research dollars with the National Cancer Institute, American Cancer Society, National Institutes of Health and U.S. Department of Defense providing large grants. Researchers also hold grants from many other organizations and individuals determined to help find a cure.

For the fiscal year ending June 30, 2012, Cancer Institute researchers held 40 national grants totaling almost $4.9 million. Of this amount $2.6 million could be specified as direct funding eligible for the Cancer Institute’s eventual application to the National Cancer Institute as a nationally designated Comprehensive Cancer Center.

The Cancer Institute’s national and state funding for the fiscal year had an estimated $26 million impact on the local economy based on standards developed by the Association of American Medical Colleges, used to calculate the economic activity generated by research dollars at medical schools and teaching hospitals. Additionally, this amount does not include...
the health benefits to people and benefits generated by spin-off business that may result from research discoveries or the benefits of researchers’ salaries on the local economy.

Cancer Institute researchers published 168 papers on their work in a variety of nationally and internationally acclaimed medical journals. Each paper helps researchers worldwide take another step toward halting cancer.

A fourth Cancer Institute program, the Cancer Epidemiology Program, is in the planning stages. It will work to understand the statistics of cancer, search communities for environmental factors that lead to cancer and search for obstacles that prevent people from seeking screening or treatment.

**SHARED RESOURCES AID RESEARCH**

Researchers work in state of the art laboratories completed this past year in the Arthur C. Guyton Research Center and have access to advanced, specialized research equipment across the UMMC campus.

Researchers use multiple cores (shared research resources or labs) to help conduct their work. The following cores are within the Cancer Institute:

- **Bioinformatics Core:** This core supports computational biology in cancer biomarker discovery and development of novel genetic risk factors and therapeutic targets.

- **Tissue Bank:** Officially called the Biospecimen Repository, this facility collects tumor samples donated by patients, freezes them and distributes them to CI researchers under nationally approved guidelines and protocols.

- **Flow Cytometry:** This technology aids in cell counting, cell sorting, detecting biomarkers and in identification and isolation of cancer stem cells from tumors.

- **Shared Instrumentation:** This lab offers state of the art, high-end equipment used in molecular biological research.

- **Drug Discovery:** The Cancer Drug Discovery Core is in the National Center for Natural Products Research at the University of Mississippi in Oxford. Researchers here, working with those at UMMC, hope to find natural products that can prevent and halt cancer growth. They are specifically targeting cancer stem cells.

- **Molecular Genetics and Genomics:** This core helps researchers with isolating and studying DNA and RNA, with gene expression profiling (determining which genes are on and off in cancer specimens or cancer cells) and with next-generation DNA sequencing, the technique that allows high-throughput sequencing of thousands of genes at once.
Animal Imaging: This imaging core helps researchers monitor the size of an experimental tumor in mice, and monitor the response of these tumors to newly discovered drugs or drug combinations before they are tested in patients.

While these cores with state-of-the-art equipment and facilities aid in research, the real progress comes from the people doing it.

Researchers at the Cancer Institute have been recognized worldwide for their work. Here they continue that work and help train the next generation of cancer researchers whether its doctoral students doing advanced work or beginning students with a budding interest in research.

This year, the Cancer Institute is conducting more disease-focused conferences between researchers and physicians treating specific cancer types. Integrating the groups more formally will help each draw ideas from the other and may help move research more quickly from the lab to treatment.

Some of that work already is in progress. Research completed here showed how obesity may increase breast cancer growth and the risk for breast cancer recurrence by producing pro-angiogenic cytokines in postmenopausal breast cancer survivors. A study under way will investigate whether exercise and weight loss will help lower that recurrence rate.

Other work done here soon may help target some subtypes of triple negative breast cancer. Researchers in one lab hope to work with physicians to start a clinical trial with an FDA-approved drug now used to treat another cancer. By testing tissue from a breast biopsy, doctors can tell if the person’s breast cancer may respond to this drug.

This is the future Dr. Miele hopes to see, one where research, education and treatment merge with a cure as the goal.

“We have many challenges ahead of us,” he said. “But if any group can do it, this one can. I’ve never seen this level of dedication to patient care, this drive to prepare new patient caregivers and scientists and this desire to search for a cure, this constant quest for excellence at every level.”
At the Cancer Institute, researchers from around the world are searching microscopic bits of tissue for ways to cure cancer.

And each knows his or her findings, even if they do not yield a cure, will broaden the foundation on which they and thousands of others worldwide are working.

Dr. Lucio Miele, CI director, and Dr. Kounosuke Watabe, CI associate director of basic science, coordinate work in three research programs operating at the Arthur C. Guyton Research Center on the University of Mississippi Medical Center campus. A program is a group of principal investigators, each with his or her own laboratory and staff, who work in related fields and collaborate with one another. CI programs are:

- Molecular Cancer Therapeutics, led by Dr. Wael ElShamy.
- Tumor Cell Biology, led by Dr. Azeddine Atfi.
- Cancer Genetics, led by Dr. Yin-Yuan Mo.

Dr. Watabe joined the faculty in July, 2012 and will help oversee the cancer research programs.

"We have to identify good prognostic markers, which groups of people are at greatest risk and find therapeutic targets," he said. "Our mission is to serve the people in Mississippi."

To that end, researchers here are focusing on the cancers that appear most often in Mississippi, such as breast and prostate, and on halting cancer recurrence by searching for cancer seeds, or stem cells, and other ways cancer can grow and spread.

Watabe outlined these goals for the basic science programs:

- Develop focus groups on breast and prostate cancer. Each group will include researchers from the three established research programs.

In breast cancer the group will investigate links between breast cancer and obesity, and identify therapeutic targets in different molecular subtypes of breast cancer.

In prostate cancer the group likely will focus on radiation-resistance, advanced "castration-resistant" prostate cancer and health disparities.

- Develop a focus group on cancer stem cells. Researchers are looking for these cancer seeds that appear to resist treatment, can lie dormant for years, and then recur in the organ where cancer originally started or elsewhere in the body.

- Metastasis. Researchers want to find out how cancer grows and spreads. Different types of cancers metastasize differently. And they can progress from one part of a person's body to another. So researchers want to find how these cells adapt and how they take advantage of new environments to grow.

Researchers want to find the routes they use and block them. One group is looking at how to suppress mutated genes that regulate metastasis or how to restore them to a normal function.

- Identify novel tumor-selective drugs, especially cancer stem-cell targeting drugs. Researchers are working with the Cancer Drug Discovery Core at Ole Miss in Oxford to isolate some compounds that may halt cancers. "Most cancer drugs used today came from plants," Dr. Watabe said. "This is a great resource."

- Prevention and prediction. If researchers can uncover how some normal cells become malignant and then stop them from changing, it could prevent cancer. As part of that effort, researchers are looking for new molecular markers that can predict whether a person will have cancer or a recurrence of it. Genetic sequencing plays a role in this.

"Now we can search an individual’s DNA and RNA in hopes of telling an individual’s risk for a specific cancer or how they will respond to treatment," Dr. Watabe said. DNA sequencing once cost millions but now is about $1,000. If someone knows they are at higher risk for a particular cancer, they can be screened regularly for it. Many times, catching cancer early is key to successfully treating it.
Researchers in the Molecular Cancer Therapeutics Program hope to find ways to switch on molecules that may help eliminate cancer and switch off those that may promote it.

Dr. Wael ElShamy heads this program where researchers focus on finding new targets for treatment and the drugs that will affect those targets.

**Work here involves:**

- Searching for the molecules that induce cancer or its metastases. Then they can search for drugs that may block those molecules.

- Searching for molecules that may prevent cancer or “tumor suppressors.” Then they can search for drugs that may encourage those molecules to work.

The work is slow and ever growing. Since some tumors develop drug resistance, there’s always a need to find new drugs and to find drugs that act primarily on the cancer, without excessive harm to healthy cells in a person’s body. This program works closely with the Cancer Drug Discovery Core, a part of the National Center for Natural Products Research at the University of Mississippi in Oxford.

Dr. ElShamy said knowledge comes in small steps. Sometimes researchers find ways to shorten the process. For example, in searching for a drug to work on triple negative breast cancers, they’ve found one molecule that may respond to a drug already approved for chronic myeloid leukemia.

“Finding and testing a new drug may take a decade or more,” he said. “We hope to use information we’ve gained today to use drugs already tested and marketed in new ways.”

Using an existing approved drug may shorten the time needed to use it on a different cancer, but even this discovery, which may aid about half of triple negative breast cancer patients, won’t be in clinics immediately. While Dr. ElShamy is impatient with the procedures, he says they are essential. First researchers must work with physicians and patients who agree to a clinical trial to discover the proper dosage, whether it works best given in conjunction with other drugs and the length of treatment. That is heavily regulated to be sure the process works and to safeguard those who participate in trials.

**Work in this program also includes:**

- Finding ways to deliver cancer drugs only to the tumor. Some of this lab’s efforts target triple negative breast cancers, among the hardest to treat and a cancer that occurs in higher than normal proportions in Mississippi.

- An oncogene, BRCA-1-IRIS, which Dr. ElShamy discovered. This oncogene, a gene that has the potential to cause cancer, is activated in women with breast and ovarian cancers who have mutant forms of BRCA-1, a recognized cause of hereditary breast and ovarian cancers. When BRCA-1-IRIS is active, it promotes metastases. Now the lab is seeking a way to limit or inhibit BRCA-1-IRIS.

- Seeking other ways to halt metastases. Research completed in this lab showed how obesity may increase the risk for breast cancer recurrence in postmenopausal women. Now, women are testing this premise in a clinical trial at UMMC. If researchers can find a way to lower recurrence or metastases, it may lower the deaths from breast cancer.
Tumor Cell Biology

Seeking cancer’s origins and weak spots

The Tumor Cell Biology program, headed by Dr. Azeddine Atfi, searches for genes that are predisposed to respond to treatment and for cells where cancer and cancer recurrences originate, the cancer stem cells.

The overall goal is to understand the signaling pathways in tumors, especially breast and prostate cancer, he said. That involves finding genes that may promote cancer, called oncogenes, or those that may prevent it, called tumor suppressor genes, identifying how these function, and subsequently finding ways to activate the genes that block cancer or block the genes that promote it.

Major Projects in this Program Include:

- **The role of Notch signaling in breast cancer.**
  The Notch signaling pathway helps cells communicate. If researchers can discover why this pathway becomes hyperactive in mammary cancer cells, they believe they can find ways to block them. These researchers recently highlighted a link between Notch signaling and the oncogenic AKT signaling pathway which may help them understand how breast cancer grows and spreads. Some researchers also are looking for ways to reactivate the LFGN gene. It is absent in some breast cancer patients. “This group is trying to find ways to activate LFGN with hopes it will block triple negative breast cancer,” Dr. Atfi said. Triple negative breast cancer affects a disproportionate number of Mississippians.

- **Tumor hypoxia.** Researchers know some tumors promote the formation of abnormal blood vessels and exploit them to supply oxygen and nutrients to the tumor. Researchers are trying to find out if hypoxia, a lack of oxygen, plays a role in prostate cancer and, if so, whether hypoxic tumors are more resistant to treatment. They also are searching for ways to halt blood vessel growth to starve the tumor.

  - **Metastases.** Researchers are investigating the ways in which some oncogenes promote cancer metastases, as exemplified by MTA1. MTA1 is a protein encoded by the MTA1 gene. It is present in breast and prostate cancer metastases. Ongoing projects are dedicated to finding a way to inactivate MTA1, with a particular emphasis on new derivatives of Resveratrol, a cancer-preventing compound found in red wine.

  - **Tumor suppressor genes.** Researchers are looking for genes that when absent or mutated, lead to cancer. For example, a gene called P53 suppresses tumors. When it’s absent or mutated, cancer grows. Researchers are trying to find a way to activate P53 and are seeking substances besides chemotherapy that will trigger it. Other genes, such as TGF, appear to keep some cancers at bay. Researchers have found that mice with low levels of this gene have more melanomas, lymphomas, thymus and fatty tumors. They also have found that older mice with lower levels of TGF have babies more likely to develop cancers. Now they are trying to find out if this gene, if absent in humans, has the same results.

  “We want to find out what signals cancer to grow and then stop it,” Dr. Atfi said. “Our main goal is to understand signaling pathways in breast and prostate cancer, which would open new avenues for the design of accurate and effective therapeutic trials against these devastating diseases.”
Cancer Genetics researchers are searching ever smaller pieces of human DNA to discover how to identify and regulate mutant genes that might one day cause cancer, said Dr. Yin-Yuan Mo, program director.

The team, with five laboratories, is studying the molecular and genetic factors that make some people predisposed to have cancer, the genetic alterations that affect cancer's origins, progression and spread and alterations that affect a tumor's aggressiveness and how it responds to therapy.

They hope to find techniques to identify genetic factors that may make a person more likely to have a particular cancer. Then, that person will know to screen aggressively and to reduce risk factors if possible. Those actions may enable someone to prevent a cancer or find it earlier, increasing their chances of long-term survival.

THE TEAM FOCUSES ON:

- Understanding the role of non-coding RNA (ribonucleic acid) in cancer. Like DNA, RNA is made of a chain of components. Some RNAs can direct protein production. Researchers know each person has coding RNA (the genes that make protein) and noncoding RNA (those that don’t). If researchers can find a way to regulate noncoding RNA, they may be able to influence the genes that cause cancer or inhibit it. Some noncoding RNA can be found in a cancer patient’s blood and may help identify people at higher risk or depict how they are responding to treatment.

- Understanding how inherited genetic variations influence someone’s chances of getting cancer. Only 5 percent to 10 percent of cancers are inherited, but hundreds of genes may affect one’s likelihood of getting cancer. One group is searching for gene variations that can lead to this predisposition to have cancer. Recent evidence indicates such studies can identify genetic risk factors for several diseases.

- Understanding how and why genes mutate and how cells repair DNA damage to avoid mutations. If researchers can find what causes genetic instability, then they will seek ways to prevent it which may prevent cancer. If they can find how cells repair mutated DNA, they will search for treatments to mimic those actions.

Much of this research focuses on how DNA and RNA communicate. Once they track the communications, researchers hope they can start or halt messages to prevent cancer or influence cells to heal it.

Dr. Mo said this research may lead to helping people identify how cancer may affect them. In five to 10 years, he said, he hopes each patient can get a genome profile. “Then we’ll know much better what their chances of cure and recurrence are and how they respond to therapy,” he said.

Researching breast cancer, which he calls a “model” cancer because of its different stages and subtypes, he said his lab hopes to use genome sequences to learn how to find the differences in cells. “If we can find that mechanism, we can use it to identify therapeutic markers, targets or biomarkers,” he said.

“It’s like a maze,” he said. “We know the beginning and the end. Our task is to find out how to get there.”
Donations help patients, fund research

Like all major academic cancer centers, the University of Mississippi Medical Center Cancer Institute and its clinical arm, University Cancer Care, rely on philanthropy and treasure the support Mississippians provide.

Whether it’s a child growing their hair to help provide wigs for cancer patients or a civic group raising funds for cancer research, the support is essential to end cancer.

DONATE MONEY
Many groups contribute to cancer care, education and research. Some, like the Ergon Foundation, that funded an Endowed Chair of Cancer Research, or the Robert C. Hearin Foundation that helped provide medical research equipment, made large donations. Multiple smaller donations help doctors, nurses and social workers provide small items patients need. Donors will find several cancer-related funds listed on the website, at www.umc.edu/giveto. Generally funds are divided into those that:

- Provide aid for patients. Both the adult and children’s cancer centers have funds dedicated to providing items cancer patients need.
- Provide funds to enhance research.
- Provide funds to support cancer education and screening efforts.

Some people have donated funds for equipment shared by physicians and investigators. Others donate to honor a friend or relative. In cancer centers nationwide, facilities large and small, donors have provided funding for everything from scholarships and conference rooms to entire buildings, often named after the donor or the person they wish to honor. If you are thinking of making a large donation that doesn’t fit into an established fund, please contact the UMMC Development Office.

If you wish to donate, go to www.umc.edu/giveto to give online or mail donations to:

UMMC Development Office
2500 N. State Street
Jackson, Mississippi 39216

DONATE GOODS
To donate goods to the adult cancer clinics, contact a social worker at 601-815-6700 or go to University Cancer Care website at www.ummchealth.com/cancer/. Once at the website click on “How to Help.”

To donate goods to Children’s Cancer Clinic, call the Child Life Department at 601-815-4282 or check the website at curekidscancer.umc.edu.

For more information on ways to help, go to our website: www.ummchealth.com/cancer/, enter “Cancer Services” and click on “How to Help.”

VOLUNTEER
The adult and children’s clinics need volunteers to help with a variety of tasks from filing to just talking to patients or reading a child a book so their parent can take a break.

Those who are interested should call Volunteer Services at 601-984-2068 to receive an application. Complete the application and a volunteer coordinator will get in touch with you about the remainder of the process.

Volunteers must be 16 or older, pass a background check, a TB test, complete a volunteer orientation and agree to work 30 hours per year. For more information, call 601-984-2068.
Physicians saw 1,851 new cancer patients.

Physicians and staff followed 4,368 cancer survivors.

U.S. News and World Report recognized University Cancer Care as a high-performing cancer center.

Cancer Institute members, associate members and affiliate members received millions in research funding. That equates to an economic impact of more than $26 million.

The Cancer Institute established a Biospecimen Repository, a tissue bank, to help further research and provide a safe way to keep patient tissue in case doctors need to test a new therapy on it later.

Cancer Institute members helped provide cancer training for 2,700 students in health education classes and to 500 residents and fellows in graduate training.