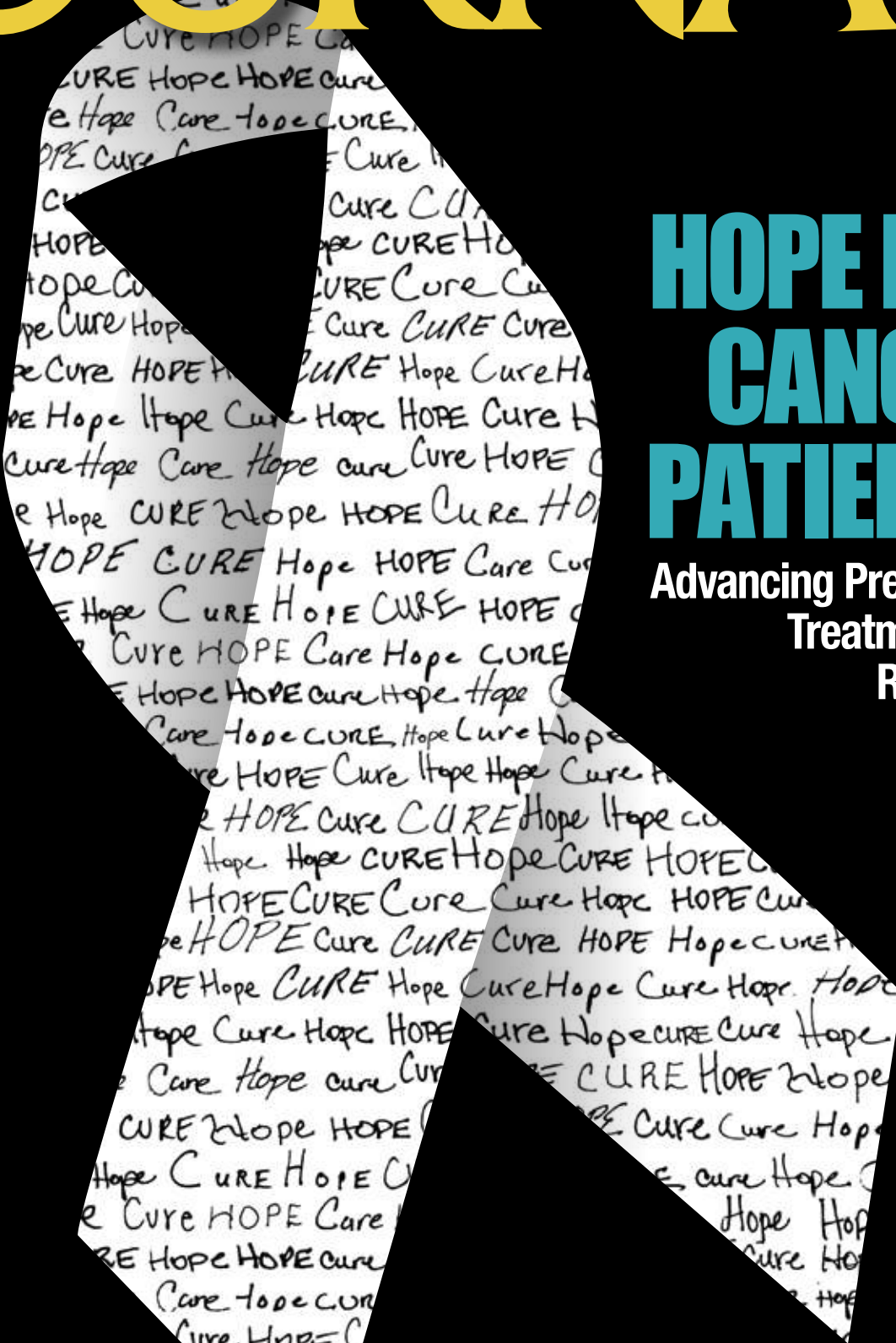


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UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES • FALL 2013



HOPE FOR CANCER PATIENTS

Advancing Prevention,
Treatment and
Research



MESSAGE

from the Chancellor

Dear Readers,

Cancer takes a devastating toll on individuals, families and society at large. Each of us has been affected by cancer. Next to cardiovascular disease, cancers of all types are the leading causes of premature death in Arkansas.

Compared with the nation as a whole, the incidence of cancer is lower in Arkansas than the national average but the death rate is higher. The reasons for this are complex and not fully understood, but UAMS is taking a comprehensive

approach to provide leadership in changing this statistic.

Personal habits, tobacco use, obesity, inconsistent participation in recommended screening, delays in seeking treatment and diagnosis due to absence of health insurance, and other factors all play a role. There is no single strategy or silver bullet that will decrease the burden that cancer places on all of us and our families.

However, there is a lot we can do. Right now at UAMS we are advancing patient engagement and public education programs, screening programs and health-system reform with insurance expansion as well as decreasing tobacco use. We are conducting research into the molecular causes of cancer and studying new therapeutic approaches involving vaccines, nanomedicine and targeted molecular therapies.

We hope that you will enjoy this issue that targets cancer and our work to eradicate it and that you will join us in this endeavor.

Sincerely,

Dan Rahn, M.D.
Chancellor, University of Arkansas for Medical Sciences

Next to cardiovascular disease, cancers of all types are the leading causes of premature death in Arkansas.

EDITOR

Elizabeth Caldwell

CREATIVE DIRECTOR

Laurie Shell

WRITERS

Ben Boulden
Holland Doran
Lauren Farabough
Nate Hinkel
Jon Parham
David Robinson
Susan Van Dusen

PHOTOGRAPHER

Johnpaul Jones

CHANCELLOR

Dan Rahn, M.D.

VICE CHANCELLOR
FOR COMMUNICATIONS
& MARKETING

Leslie Taylor

The *UAMS Journal* is published twice a year by the Office of Communications & Marketing, University of Arkansas for Medical Sciences, 4301 W. Markham St. #890, Little Rock, AR 72205.

Phone: (501) 686-5686

Fax: (501) 686-6020

ABOUT THE COVER: UAMS doctors, nurses, researchers, students and staff participated in signing the words Hope and Cure.

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CANCER IN ARKANSAS

➔ Arkansas Ranks High in Deaths from Cancer

By Elizabeth Caldwell

ARKANSANS ARE LESS LIKELY to get cancer than the rest of the United States population as a whole. That's certainly good news in a state that ranks near the bottom of most U.S. health rankings.

But that news is tempered by this — those Arkansans who do develop cancer are more likely to die from it than their U.S. counterparts, according to the federal Centers for Disease Control and Prevention.

In fact, the chance of an Arkansan of any age dying from cancer has changed little over the last 40 years. From 1968 to 2010, in the 45-64 age group, U.S. rates dropped from 280 cancer deaths per 100,000 people to 200 deaths, while in Arkansas, rates went from about 260 deaths per 100,000 people to 245.

Arkansas is in the group of states with the lowest incidence of cancer — 387 to 440 per 100,000 population, compared to the group of states with the highest incidence rate — up to 509 per 100,000 population.

But Arkansas is in the highest group when it comes to death from cancer — 185 to 207 per 100,000 population, compared to the lowest group, which had a death rate as low as 120 per 100,000 population.

The reasons for that are many, said Joseph Bates, M.D., the Arkansas Department of Health's deputy state health officer.

The state's agricultural nature — 54 of its 75 counties are considered rural — makes access to preventive screenings and regular checkups, as well as specialty care, a struggle. Arkansas ranks among the lowest states in providing preventive services to its citizens. Poverty makes the burden heavier. The

average annual household income for the state's 2.9 million people is \$38,000.

"Poverty and lack of transportation affect whether people get screened for cancer," Bates said. "They may have little sick leave, so their pay is docked or they may get fired if they take off work. They may have to find child care. One in four adults age 18 to 64 has no health insurance."

Cancer is the second biggest killer of Arkansans after heart disease. Lung, breast/prostate and colorectal cancers are the most prevalent.

Lung cancer is almost always a result of smoking, Bates said, adding that tobacco is the real No. 1 cause of cancer death in Arkansas. About 26 percent of Arkansas adults smoke and about 22 percent of youths smoke. The rate of boys using chewing tobacco is rising.

"Tobacco is our big devil," Bates said. "In addition to lung cancer, it can cause cancer of the lip, tonsil, larynx, tongue, esophagus, pancreas, kidney and urinary bladder. Women who smoke have a greater chance of getting cervical cancer."

Colorectal cancer could almost be eliminated if everyone age 50 could have a colonoscopy and then have repeated ones as necessary. Most colon cancers arise from polyps that can be removed before they become cancerous.

When it comes to treatment, more research is needed to determine which cancers will eventually cause harm to the patient.

"We are beginning to redefine cancer. Not all cancers grow and cause disease and death," Bates said. "Some progress and kill, some don't change very much, and some regress. This is a new understanding of the biologic behavior of cancer that has come to be understood in recent years." ❖

About 26 percent of Arkansas adults smoke. About 22 percent of youths smoke. The rate of boys using chewing tobacco is rising.



2.9 Million
People in Arkansas

CANCER & ARKANSAS

What the numbers say...



\$38K
AVERAGE ANNUAL INCOME

Poverty and lack of transportation affect whether people get screened for cancer.



States with highest INCIDENCE OF CANCER



States with lowest INCIDENCE OF CANCER (including AR)

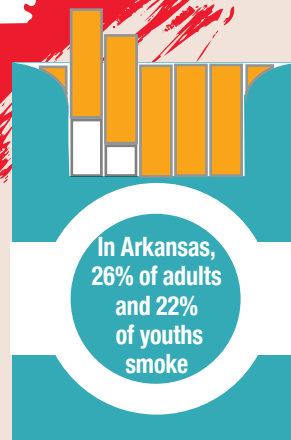


States with highest DEATHS FROM CANCER (including AR)



States with lowest DEATHS FROM CANCER

Arkansas is in the group of states with the lowest incidence of cancer, but Arkansas is in the highest group when it comes to deaths from cancer.



In Arkansas, 26% of adults and 22% of youths smoke

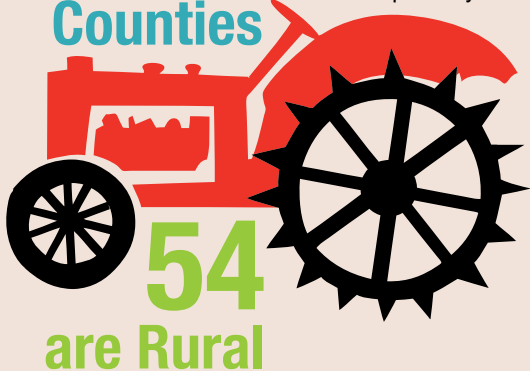
Lung cancer is tied in large part to smoking.



**In Arkansas, people younger than age 65
1 in 4 have health insurance**

75
Counties

75 counties are considered rural in Arkansas, which makes access to preventive screenings and regular checkups, as well as specialty care, a struggle.

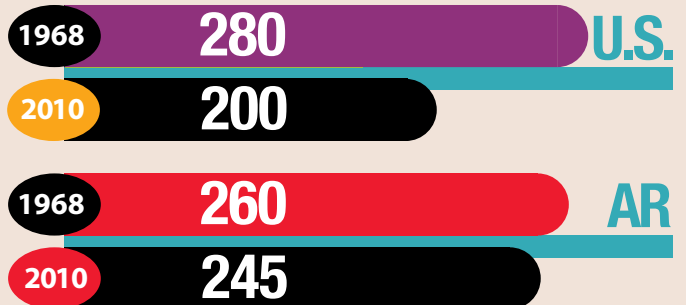


54
are Rural

Cancer Deaths

(per 100,000 people)

The death rate from cancer has not dropped much in the last 40 years for Arkansans.



WINTHROP P. ROCKEFELLER CANCER INSTITUTE

➔ UAMS Leads Arkansas in Cancer Education, Research and Treatment

By Susan Van Dusen



PHOTO BY: DERO SANFORD

WHAT STARTED AS A DREAM in the 1970s has evolved into Arkansas' largest and most advanced center for cancer treatment and research.

Named Arkansas' official cancer center by former Gov. Mike Huckabee, the UAMS Winthrop P. Rockefeller Cancer Institute not only provides treatment for thousands of people from Arkansas and beyond, it also serves as the state's hub for cancer research and education.

"The strength of the Cancer Institute lies in our comprehensive program. While we're educating the next generation of doctors and scientists, we're also searching for better ways to diagnose and treat the patients who need us most," said Peter Emanuel, M.D., Cancer Institute director and a widely respected expert in leukemia and lymphoma.

The institute records about 140,000 patient visits each year, yet it's the work behind the scenes that makes it possible for these patients to benefit from the latest treatment options.

The availability of about 200 clinical trials is a crucial component that sets the Cancer Institute apart from other treatment facilities. Participants in clinical trials may receive medications and therapies unavailable elsewhere in the state. And through their participation, these patients assist their doctors in discovering new ways to treat cancer and improve survivorship.

Patients also have the option of donating to the UAMS Tissue Procurement Facility, which serves as a collection, processing and storage facility for malignant tumors, benign brain tumors, blood and urine. These specimens play an important role in research conducted both at UAMS and other facilities across the country.

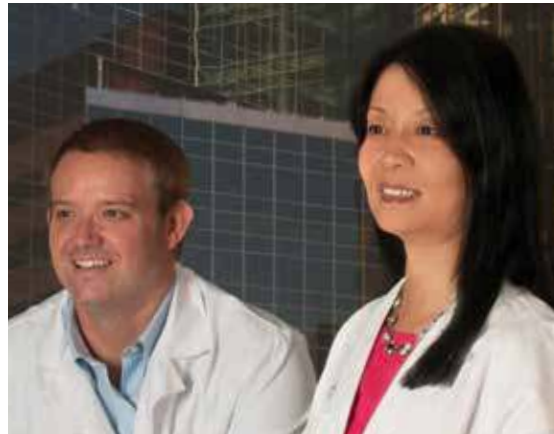
Linking the many elements within the institute is the Comprehensive Research Informatics Suite (CRIS). This electronic system developed at UAMS connects vital information about clinical trial registration, data collection and treatment, making it accessible to both physicians and researchers.

"CRIS is the lifeline of the clinical trials program and ties together research and clinical care information to best benefit the patient," said Laura Hutchins, M.D., director for clinical research.

Hutchins received a grant from the National Cancer Institute in 2007 to initiate the program at UAMS and continues to play a role in its implementation. Also instrumental in CRIS' development were Cheryl Lane, assistant vice chancellor for IT academic, research and enterprise systems, and Umit Topaloglu, Ph.D., assistant professor of biomedical informatics in the UAMS College of Medicine.

From an education perspective, nowhere in Arkansas can compare to the depth of knowledge provided young cancer researchers and physicians at UAMS. Four fellowship programs — hematology/oncology, pediatric hematology/oncology, breast and palliative care — offer training that produces some of the most skilled specialists in the nation.

The highly competitive programs draw applicants from across the country where they receive hands-on training in real-world diagnoses, treatment and patient interaction. "Our fellowship programs are



Jason Farrar, M.D., Ph.D., and Ling Gao, M.D., Ph.D.

among the best in the nation. Arkansans can be proud that some of the brightest minds in cancer care receive advanced training here at the Cancer Institute," Emanuel said.

A number of promising young researchers with grant funding also come to the Cancer Institute to establish their careers. Among those are Ling Gao, M.D., Ph.D., who studies a rare form of skin cancer called Merkel cell carcinoma, and Jason Farrar, M.D., Ph.D., whose research focuses on Diamond Blackfan anemia, a rare blood disorder that can predispose a person to the development of cancer. ❖

The institute records about 140,000 patient visits each year, yet it's the work behind the scenes that makes it possible for these patients to benefit from the latest treatment options.

SCREENING

➔ Family Medicine Clinics Raise Awareness

By Ben Boulden

The UAMS Family Medical Center was recently recognized for a second time as a Level 3 — the highest level — patient-centered medical home by the National Committee for Quality Assurance.

UAMS FAMILY MEDICAL CENTER physicians didn't wait for a software developer to create the tools to initiate a rigorous program of patient screening for certain cancers and other diseases. They went ahead and made the tools themselves.

Arlo Kahn, M.D., UAMS College of Medicine professor of family and preventive medicine, and other family medicine faculty members and staff several years ago began work on getting prompts built into the Centricity electronic medical record (EMR) system the clinic uses. The prompts remind a patient's doctor and clinic nurses to look for certain cancers and other diseases if the patient falls into a particular risk group for it.

A patient may be at risk for colon cancer and need a colonoscopy. It may be time for a female patient to have a pap smear to check for cervical cancer.

Such reminders have become standard in EMR systems.

The Family Medical Center at UAMS as well as family medical centers at the university's regional centers in Fort Smith, Texarkana, Jonesboro, Fayetteville, Pine Bluff and Magnolia all train medical residents how to screen.

At the UAMS Family Medical Center, residents do six prevention projects each year and about half of those involve cancer screening.

"It's both a learning project for them and a quality improvement project for us," Kahn said. "We always have a little extra activity going on to figure out how well we're doing with cancer screening. We issue reports and keep up with that. We make changes in our system if that's needed."

Geoffrey Goldsmith, M.D., M.P.H., helped secure a four-year NIH grant to boost colorectal

screening rates at the regional centers.

Mark Mengel, M.D., UAMS vice chancellor for regional programs, said the program helped increase overall screening rates at the centers from 20-30 percent to more than 50 percent.

He said the centers have begun a similar program to raise breast cancer screening rates, and it's already producing positive results by pushing them from about 42 percent to more than 60 percent.

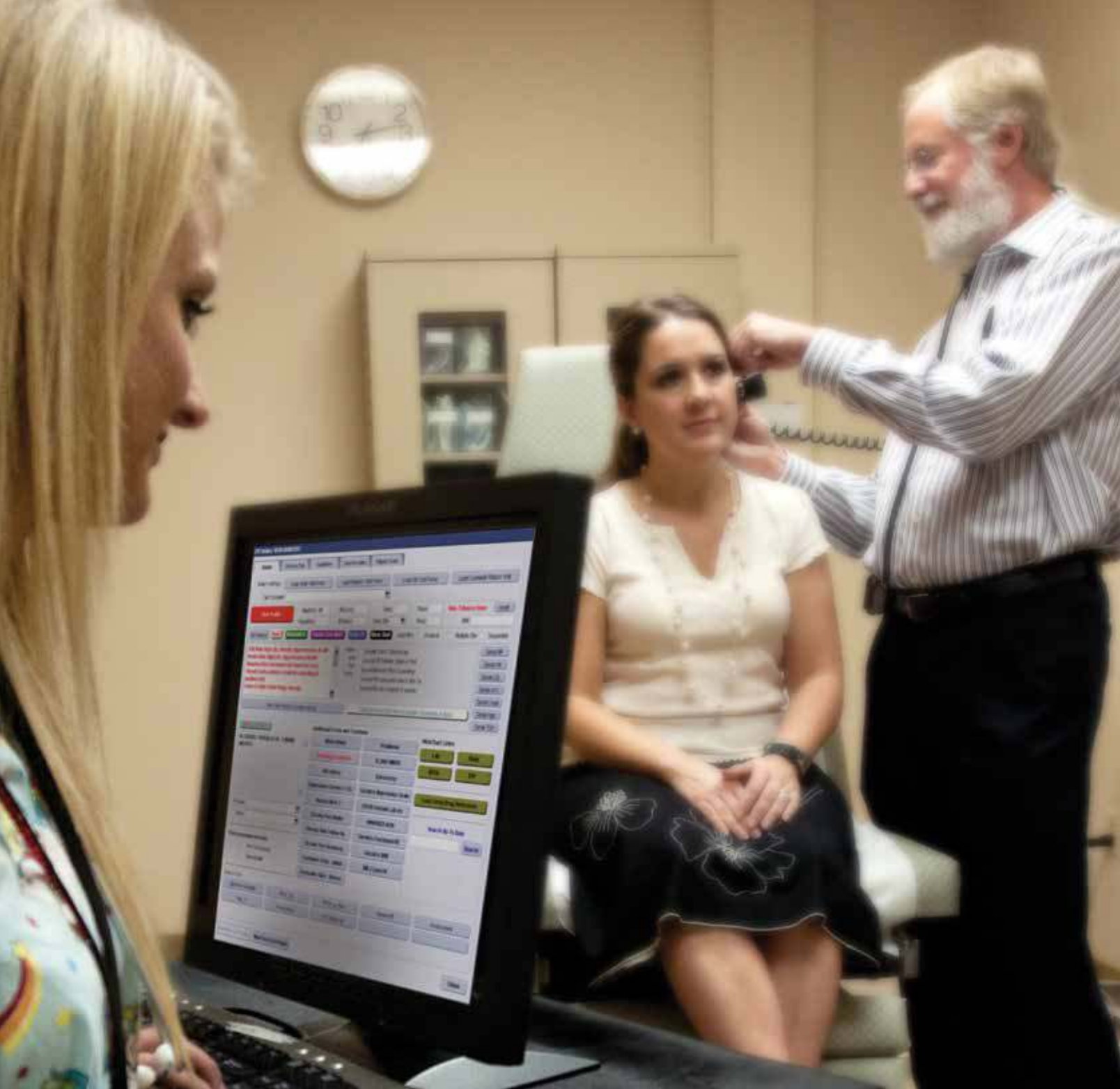
"We take an evidence-based approach," Mengel said. "It has to be proven that it's a cancer you can screen for successfully. Screening lowers mortality rates."

In addition to screening, residents and physicians at all the UAMS family medical centers counsel patients whose habits and lifestyles may be increasing their risk of developing cancer.

Kahn said to effectively reach a patient about obesity, a UAMS Family Medical Center dietician will meet with that patient 12-15 times a year to help work through a weight-loss program.

The UAMS Family Medical Center was recently recognized for a second time as a Level 3 — the highest level — patient-centered medical home by





Tiffany Williams, R.N., checks a patient's medical records for needed screenings while Arlo Kahn, M.D., examines the patient.

the National Committee for Quality Assurance. As all of UAMS moves toward that health care model, it's hoped patients will feel more responsible for their health care and even more motivated to make healthier choices.

"Team-based care is what is going to allow this to happen," said Daniel Knight, M.D., chair of the

Department of Family and Preventive Medicine. "You're not just going to have a doctor scolding the patient about their weight, their smoking or alcohol use. You'll have a team and care managers to get resources to the patients and get them in. That's what's going to be effective." ❖

ADDRESSING DISPARITIES

Colorectal Cancer Screening a Lifeline

By Holland Doran

UNTIL EIGHT YEARS AGO, Arkansas had no screening program for colorectal cancer, the state's third deadliest cancer. In 2006, just 52.6 percent of Arkansans were getting screened for a cancer where early detection almost guarantees survival.

But that all changed with the Arkansas Colorectal Act of 2005, a collaborative effort led by UAMS' Ronda Henry-Tillman, M.D., professor of surgery in the College of Medicine, and Paul Greene, Ph.D., health behavior and health education professor in the UAMS College of Public Health, as well as the Arkansas Department of Health.

The Act created the Colorectal Cancer Control and Research Program, which provides education and training for primary care physicians and no-cost screening for patients who meet program guidelines and have no insurance. It also mandated coverage for colorectal cancer screening by defined health care plans.

And it's working. Screening rates jumped to 60.9 percent in 2010 and are steadily trending upward.

"UAMS is on the forefront

of addressing disparities in screening rates," Henry-Tillman said. "It's important to look at what we need to do to get a person to get screened, which is the best thing they can do to prevent this cancer. We have to make sure that they have the time to get a screening — can they get off of work or can they find a babysitter?"

About 40 percent of Arkansans live in rural areas, which typically have less access to health screenings and health education. Fifty-four of the state's 75 counties are rural, with 42 of the 54 in the Delta region, which has a high minority population and the highest rates of colorectal cancer deaths. UAMS is focusing its research efforts there.

"We have the scientific data that shows us who needs

the screenings and we have a cost-effective solution," Henry-Tillman said. "We have to continue to support this program so more people do not die from this preventable disease." ❖

"UAMS is on the forefront of addressing disparities in screening rates."

Breast Cancer Screening for Hispanic Women

The UAMS Fay W. Boozman College of Public Health is providing health information and screenings at the Mexican Consulate in Little Rock to decrease the number of breast cancer cases among Hispanic, Mexican-American and Mexican women in Arkansas.

The program, which also provides referrals for needed services, reaches more than 30,000 Consulate visitors annually through the Ventanilla de Salud (Health Window Program) that began in 2010.

Led by Paul Greene, Ph.D., professor of health behavior and health education in the UAMS College of Public Health, the program has received funds from the Consulate and Susan G. Komen for the Cure.

MammoVan Breaking Boundaries

The UAMS MammoVan brings FDA-certified mammography services to women in 26 rural Arkansas counties that lack those facilities.

Since it first hit the road in 2010, the three-room mobile unit has provided mammograms to more than 6,200 women. The MammoVan is outfitted with the most advanced digital mammography equipment and is staffed by a certified mammography technologist and a technical assistant. Patients receive their test results within one to two weeks. If an abnormality is found, the patient is referred for follow-up to the appropriate services.

WORKING TOGETHER

➔ Physicians and Researchers Pool Their Expertise

By Nate Hinkel

IT DOESN'T JUST HAPPEN.

The research, clinical trials and patient care that bring patients hope each day at the UAMS Winthrop P. Rockefeller Cancer Institute needs synchronization to work efficiently and effectively.

Bringing all these pieces together is a program that is allowing physicians and researchers to pool their expertise as they translate that synergy into a focus on common disease sites.

Called the Disease Oriented Committees (DOCs) program, it is already paying dividends to support new and exciting collaborative research ideas throughout UAMS.

Leading this effort are Laura Hutchins, M.D., a professor and director for clinical research, and Dorothy Graves, Ph.D., a research assistant professor in the Cancer Institute

“The purpose is to bring together all clinicians and scientists who work on many different diseases to not only increase interaction and brainstorm, but to plan and direct traffic to operate more efficiently,” Hutchins said. “Where are the holes in the research? What obstacles are there? How can we best use our patient population to participate in different clinical trials?”

More the Merrier

In its second year, there are now 11 different DOCs focused on distinct cancer-related disease sites, including sarcoma, melanoma, lung, leukemia/lymphoma, head and neck, gynecology/oncology, genitourinary, gastrointestinal, breast and brain cancers, as well as palliative care.

Some meet more than once a week and some monthly, while others just get together as needed.

“It just makes so much more sense than going at things from an ‘everyone-for-himself’ type

approach,” Hutchins said. “We have to operate as teams to consolidate our efforts and get the most out of our resources.”

For Example

Hutchins said she recently ran into a road block on a breast cancer vaccine project that requires a special kind of biopsy.

The amount of work needed behind the scenes before she even sees a patient is enough to derail the project completely if not done efficiently.

“I had to discuss not only how we can get this type of biopsy done, but how we can get it preserved properly,” Hutchins said. “So I have to get surgeons on board and the tissue bank involved about handling the specimen and keeping it embargoed until we know if the patient is even eligible to use that sample for research, and so on.”

All of these different areas use DOCs to form a plan and carry it out. Not only for projects as developed as clinical trials, but starting from the inception of an idea.

“DOCs are a venue to talk about work in a group with feedback, and you end up with a better research plan or project in the long run,” she said. “You make sure consents are in the right place and all of the regulatory obstacles taken care of. It’s very complex. If they are discussed in DOCs they can be planned properly so we can actually execute the research; otherwise you just get a failed project.”

And that, Hutchins says, is what makes having DOCs incorporated into the state’s only comprehensive academic health center such an asset. ❖

“We have to operate as teams to consolidate our efforts.”



Thomas Kieber-Emmons, Ph.D., and Laura Hutchins, M.D., are working together to fight breast cancer.

LUNG CANCER

➔ Addressing the State's Most Deadly Cancer

By David Robinson

HAVING TRIED practically every way possible to quit smoking, Jackie Turnbow almost refused a UAMS tobacco cessation program when he was approached about it prior to his cancer surgery.

“I thought it would be just more blah, blah, blah,” said Turnbow, 58, a Jonesboro native who now lives in the Missouri bootheel. “But once I got in there I was almost on the edge of my seat. It was an approach that I haven’t heard before.”

Turnbow, who quit smoking April 22, 2013, was the beneficiary of a new program that patients of lung cancer specialist Matthew Steliga, M.D., are told is part of their treatment in the thoracic oncology surgery clinic.

“We’re treating the patient, not just the tumor,” Steliga said of the program that began in 2012 and the only such program integrated within a UAMS patient care clinic.

Steliga joined UAMS in 2009 motivated by the desire to help a state whose lung cancer death rate is among the highest in the country. As a key member of the UAMS lung cancer team, he has unique expertise that »



Erna Boone, Dr. P.H., helps deliver an evidence-based tobacco cessation program.



enables minimally invasive life-saving lung cancer surgeries for patients told elsewhere that their cancer is inoperable. The multidisciplinary team includes a pulmonary diagnostics specialist, hematologists/oncologists and radiation oncologists who meet on each patient's case to determine the best treatment.

New Team

Steliga sought out other UAMS experts to deliver his clinic's evidence-based smoking cessation program: Claudia Barone Ed.D., A.P.N., R.N., a professor in the College of Nursing and an advanced practice partner at the Center for Nursing Excellence, and Erna Boone, Dr.P.H., R.R.T., who chairs the Department of Respiratory and Surgical Technologies in the College of Health Professions.

Barone, a former dean of the College of Nursing, led the successful applications for two one-year Arkansas Cancer Coalition grants to support the cessation program through fiscal year 2014.

She and Boone also received formal training as tobacco cessation counselors. The two stalwarts of patient care and education are responsible for delivering the cessation service, which includes face-to-face counseling before a patient's surgery, postoperative face-to-face counseling, follow-up phone counseling, and medication, such as nicotine patches.

Turnbow, who had kidney cancer that spread to a lung, recalls his first counseling session with Boone.

"We were just hashing it out, and somehow she drove home to me the mental aspect of smoking," Turnbow said. "She reinforced my idea of just not taking that first cigarette again. I credit her."

He was also influenced by Steliga, who told him he could add years to his life if he quit.

Steliga, who also received the formal tobacco cessation training, said most health care professionals tell their patients simply "don't smoke, it's bad for you."

"That's not telling them anything they don't know," Steliga said. "How about 'Quitting is hard; you're stressed out and that's terrible. What can we

do to make it easier on you? We have a program for you."

The cessation team reports a phenomenal, if still short-term, 70 percent quit rate among its patients. That compares to 4 percent after one year for those who try to quit on their own.

Urgent Matter

A sense of urgency permeates the team, with the latest state Department of Health survey reporting that the percentage of Arkansans who smoke climbed from 22 percent to 27 percent in 2011. Barone said surveyors called only cell phone numbers rather than the past practice of calling landlines and cell phones, which may have skewed the results.

In a ranking of states, Arkansas' lung cancer death rate also moved from sixth in 2007 to third in 2009 (the latest year statistics are available), the national Centers for Disease Control and Prevention reports on its website.

Barone said the cessation program needs to grow beyond a single clinic to have the broad impact that is needed. She, Boone and Steliga say they hope that will happen given that UAMS' Vision 2020 Strategic Plan calls for providing tobacco cessation programs for UAMS patients and employees.

"Quitting smoking is the single most important behavioral change to improve a person's health, and it is still the No. 1 preventable cause of death and disability," Barone said.

Word about the successful program is getting around to other UAMS doctors. Mollie Meek, M.D., chief of the Division of Interventional Radiology, said she hopes a similar cessation program can be made available in her clinic.

"We have a lot of lung cancer patients, and right now they have to find cessation programs on their own. It would be fantastic if we could make Dr. Barone's program part of our patients' treatment plans," Meek said.

Steliga said tobacco cessation will also be integral to a lung cancer screening program that's in development at the UAMS Winthrop P. Rockefeller Cancer Institute. ❖

**"We're treating
the patient,
not just the
tumor."**



Troy Bond of Rison

GI CANCER

▶ With New Therapies, Survival Rates Rise

By Holland Doran

TROY BOND IS ALL TOO FAMILIAR with gastrointestinal (GI) cancer — since 2008, he's battled colon cancer, the third most common cancer in Arkansas. Today, after two surgeries and many rounds of chemotherapy, he is cancer free. But it was not an easy journey.

After being diagnosed with colon cancer,

Bond had surgery at a local hospital, then came to UAMS, where he received chemotherapy under the care of Rangaswamy Govindarajan, M.D., medical oncologist at the UAMS Winthrop P. Rockefeller Cancer Institute.

When the cancer spread to his liver two years later, Bond was devastated. But »



Govindarajan prescribed more chemotherapy and surgery for the metastatic disease. Bond was declared free of cancer again, only to have another recurrence in 2012.

This, too, was successfully treated, and thanks to the teamwork of Govindarajan and his surgical colleagues, Bond is still going strong.

“It’s a miracle,” Bond, 77, said. “During my last scan there were no signs of cancer. I have had the most fantastic care that a person can have at UAMS. Dr. Govindarajan is very attentive and has been encouraging through it all.”

Bond, who lives in the south Arkansas town of Rison, is one of the many UAMS cancer patients who have benefited from a multidisciplinary team of highly skilled cancer doctors.

“With our treatments, patients can still live a happy, normal life,” Govindarajan said.

UAMS oncologists offer individualized treatments for all GI cancers including esophageal, stomach, liver, pancreatic, appendix, anal, gallbladder and colorectal, the most common of the GI cancers.

No matter the stage of cancer, UAMS offers the most complete, cutting-edge GI cancer treatments in the state. Treatments include chemotherapy, radiation to shrink the tumors, and surgery to remove the cancerous portion.

With these therapies, GI cancer survival rates have risen within the past decade, most notably among colorectal cancer patients.

“About 10 years ago the survival rate of

metastatic colorectal cancer patients was about six months,” Govindarajan said. “Now, the median survival rate is three years. We even have 30 to 40 percent of patients with colon cancer metastatic to the liver living beyond five years.”

Govindarajan is hopeful that the future for GI cancer patients will continue to improve in the country and at UAMS as physicians participate in and develop clinical trials.

“The most important trial we are conducting right now involves testing the effect of an anti-diabetic drug on colorectal cancer,” Govindarajan said. “This trial will help understand the mechanism of action of these agents and also help us improve the outcome for GI cancer patients.”

Early detection improves outcomes of colorectal cancer, as it is nearly impossible to detect without a proper screening, which most people should receive at age 50. Symptoms can be overlooked because they are similar to other problems such as heartburn, abdominal pain, difficulty swallowing, fatigue, nausea and weight loss. More serious symptoms include rectal bleeding and jaundice. There are still no screening methods for some of the GI cancers such as esophageal, pancreatic and biliary.

“With adequate colorectal cancer screenings, numbers should decline,” Govindarajan said. “Public education about colonoscopies and hepatitis screenings are important. Unfortunately, I am seeing too many patients with advanced cancer that could have been prevented with early detection.” ❖

“With our treatments, patients can still live a happy, normal life.”

➔ Young Patients Receive Family-Centered Program

By Susan Van Dusen

THANKFULLY, childhood cancer is rare. But for the families that experience it, the impact is both immediate and far reaching.

Just ask David Becton, M.D. As a pediatric oncologist, Becton knows firsthand how families are impacted by the cancer diagnosis of a child.

“When a child has cancer, it doesn’t just affect him or her. It also has ramifications for siblings, parents, grandparents and friends,” Becton said.

That’s why the UAMS Department of Pediatrics, which treats patients at Arkansas Children’s Hospital (ACH), offers a comprehensive family-centered program that addresses not just the child’s illness, but also the physical, emotional and financial needs of families.

“I like to think we offer comprehensive care in the best sense of the word,” said Becton, professor in the UAMS College of Medicine Department of Pediatrics. Three full-time oncology social workers are on staff and work closely with each family starting on the day of diagnosis, offering everything from psychological counseling and parent support groups to assistance with resources for basic needs such as groceries, household bills

and transportation.

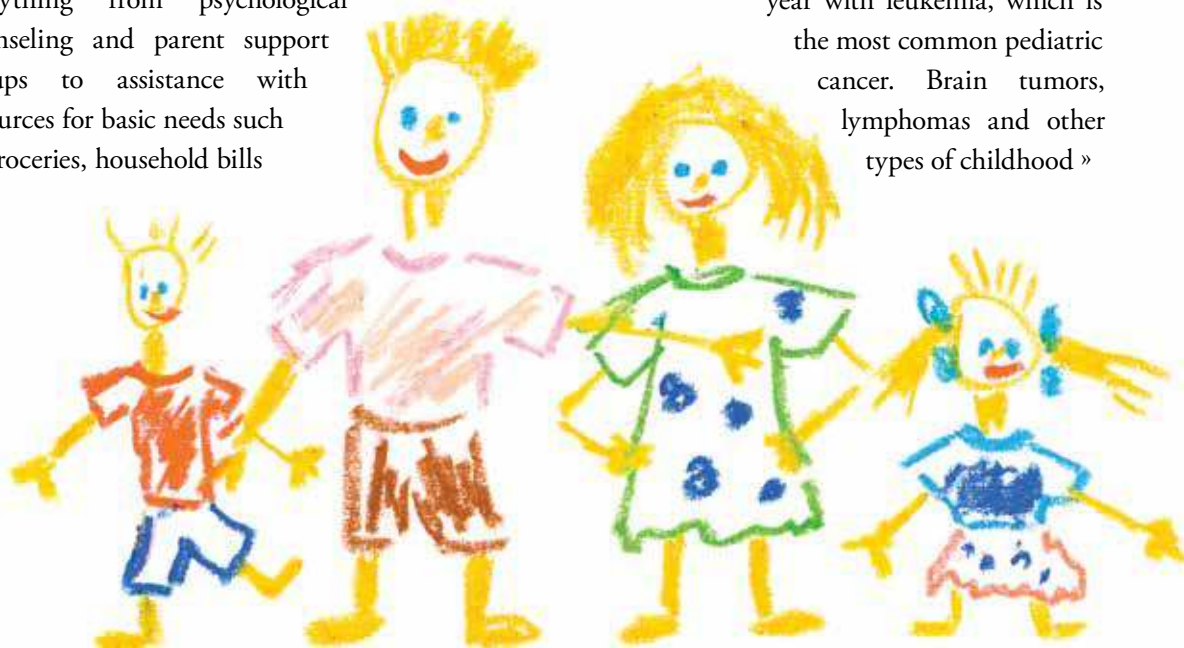
A number of other support programs give children undergoing cancer treatment a sense of normalcy in an otherwise unfamiliar environment. Art and play therapy are regular offerings, letting children express their emotions and learn to cope with the stress of illness, while a long-standing pet therapy program brings specially trained dogs to the hospital to visit with patients.

While these types of support programs are essential for children who may spend days or weeks in a hospital room away from their friends, school and regular routine, the central focus of their care is their treatment plan.

About 80-100 newly diagnosed pediatric cancer patients are treated each year at ACH by UAMS physicians. In addition, up to 1,500 patients are followed by the hospital for at least 10 years.

About 25 Arkansas children are diagnosed each year with leukemia, which is the most common pediatric cancer. Brain tumors, lymphomas and other types of childhood »

“Overall, about 80 percent of our children are cured, but there's still work to do.”





cancer follow. The vast majority of patients undergo chemotherapy, while those with solid tumors are likely also to have surgery, as well as radiation treatment at the UAMS Radiation Oncology Center.

Special requirements, including sedation, for children undergoing radiation therapy are carefully administered by physicians at the center. The number of radiation treatments can last anywhere

from one to six weeks, said Jose Penagaricano, M.D., a professor in the UAMS Department of Radiation Oncology who specializes in pediatrics.

While a child's cancer diagnosis is a particularly frightening and stressful experience, parents can take comfort in the fact that research advancements have led to better treatment and increased survival rates. This is due in large part to the overwhelming participation of children in cancer clinical trials.



Malik White shares a hug with therapy dog Nola, a black standard poodle.

PHOTO: KELLEY COOPER/ACH PUBLIC RELATIONS

About 75 percent of ACH cancer patients are eligible to participate in clinical trials, primarily offered through the Children’s Oncology Group, funded by the National Cancer Institute. Some trials provides patients with new treatment options, while others study their cancer cells to find better ways of preventing, diagnosing and treating various types of cancer.

“Pediatric patients should always be encouraged to participate in clinical trials,” Penagaricano said. Trials and basic research have led to more targeted treatments that improve outcomes for many children.

“Overall, about 80 percent of our children are cured, but there’s still work to do,” Becton said. ❖

➔ Two Breakthrough Drugs Adding Years to Patients' Lives

By Nate Hinkel

UNTIL RECENTLY, a metastatic melanoma diagnosis meant cancer had spread so far into lymph nodes and other parts of a patient's body that any hope of overcoming the disease was futile.

But researchers at UAMS have played a large role in developing and testing two groundbreaking treatments that are adding years to melanoma patients' lives.

Previously only 8 percent of patients had a chance of survival. Even for those lucky few, the available treatment came with unpleasant side effects and was only given in an intensive care unit setting to patients in good enough physical condition to withstand it.

"Unlike other cancers, chemo and radiation are not as effective for melanoma," said Laura Hutchins, M.D., a professor and director for clinical research in the Winthrop P. Rockefeller Cancer Institute. "The only other hope was an immune treatment that only worked in a very small number of patients. It just wasn't very practical and not very many people were candidates for it."

Breakthrough Trials

But in the last two years, two new breakthrough drugs tested at the UAMS Winthrop P. Rockefeller Cancer Institute have become available.

One of the drugs is Ipilimumab, marketed as Yervoy, which blocks a signal that cancers send out through the body to suppress the immune system. In nearly 30 percent of patients, this intravenous treatment has shown long-term control of the disease.

"I've had patients with cancer that has spread all over their bodies and they are alive and well five, six, eight years after taking this drug," Hutchins said.

The use of ipilimumab at UAMS began as a clinical trial eight years ago.

"Because we participated in this clinical trial, I

Mohs Micrographic Surgery

If melanoma is caught early enough, a process known as Mohs Micrographic Surgery holds hope that the cancer can be removed before it spreads and without disfigurement.

UAMS dermatologist and skin cancer surgeon Daniel Davis, M.D., is one of the few surgeons in Arkansas able to perform the surgery and he's been doing it for nearly 20 years.

"The bottom line is that if the melanoma is spotted early, biopsied early and cut out early, then people do well," he said.

Davis removes the skin lesion thin layer by thin layer, allowing him to trace and remove the deep roots while leaving healthy tissue unharmed. As he removes each layer, he immediately examines it under a microscope to determine if all cancer cells have been removed. There is no handoff to another doctor or technician to look at it under the microscope.

"That method where the biopsy is sent off has an 85 percent success rate," Davis said. "But with the same physician cutting out the melanoma and examining it, there is a 99 percent success rate."

--Lauren Farabough

have extensive experience using it," Hutchins said. "It just came on the market in the last couple years, but we've been treating patients with it for about eight years."

That experience is key because some of the side effects are ones that most oncologists are not used to dealing with and could potentially be deadly if they are undetected.

While it hasn't been around long enough to know for sure, this drug could very well be a cure, Hutchins said. UAMS also is in a trial using this drug for high-risk patients to prevent reoccurrences.

The second breakthrough drug, Zelboraf, or vemurafanib, is an oral medication that works in



**“It’s
dramatically
different
nowadays to
those of us who
have been doing
this for a while.”**

nearly 80 percent of metastatic melanoma patients. Though not a cure, it rapidly shrinks the cancer and nearly doubles the length of time a person can expect to live with the disease.

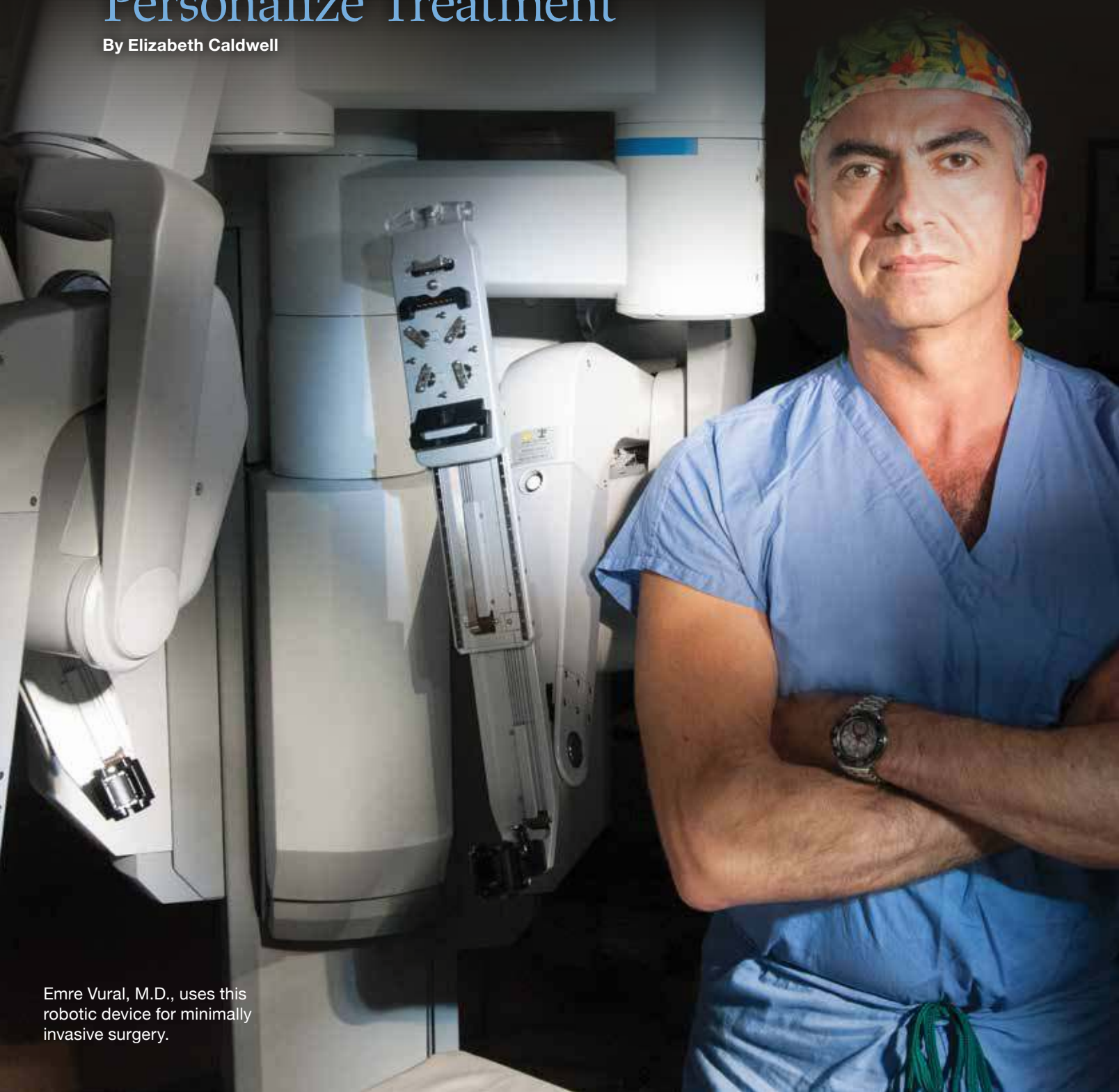
Hutchins said Zelboraf can work more efficiently when paired with other drugs to prevent some of its side effects. UAMS is working to get a clinical trial activated to test combinations.

“It’s exciting because there are new generations of these drugs being developed and we hope to continue being among the first to use them,” Hutchins said. “This disease is something that was universally very fatal very quickly, so it’s dramatically different nowadays to those of us who have been doing this for a while.” ❖

HEAD AND NECK CANCER

→ Tissue-sparing Techniques Personalize Treatment

By Elizabeth Caldwell



Emre Vural, M.D., uses this robotic device for minimally invasive surgery.



SMOKERS AND DRINKERS made up the bulk of head and neck cancers seen by James Suen, M.D. ... until recently.

The preeminent head and neck cancer surgeon who wrote the textbook for 30 years on treating that medical specialty says the sexually transmitted human papilloma virus (HPV) is changing that.

In the past, 80 to 90 percent of oral cancers were related to tobacco and alcohol, he said. And while tobacco still causes a high percent of cancer of the oral cavity, 50 percent to 60 percent of tonsil and base of the tongue cancers now are related to the HPV virus.

“We’re going to see an epidemic of it, a marked increase in this type of cancer in the next 10 to 15 years,” said Suen, chair of the Department of Otolaryngology — Head and Neck Surgery in the UAMS College of Medicine.

The good news is though it’s still squamous cell carcinoma, it is less aggressive and, therefore, so is the treatment. “It’s allowing us, now that we’ve got more data, to do more tissue-sparing treatment,” Suen said.

In the past, oropharyngeal cancer was treated vigorously with complicated surgery, radiation and chemotherapy. Patients had huge side effects, sometimes resulting in their inability to swallow, talk or breathe.

But surgery has evolved. What previously was done by going through the neck and face can now be done through the mouth with a robotic device by specially trained UAMS surgeon Emre Vural, M.D.

Hospital stays went from five or six days to one or two days. Patients often don’t require feeding tubes, scar tissue is minimized and complications are reduced.

“Instead of treating everybody the same, we really personalize treatment because we have a lot of different modalities,” Suen said, including the fact that many can be treated successfully with just radiation and chemotherapy.

UAMS treats hundreds of these cases a year, allowing its physicians to develop the expertise to personalize treatment. Radiation physicians who treat only one or two cases a month tend to give higher doses of radiation, Suen said. The higher doses may not be necessary and cause greater complications.

Suen entered the head and neck cancer field in the early 1970s, when most physicians wouldn’t treat it because results were so bad. After focusing on the field at UAMS, he became the first head and neck cancer fellow at M.D. Anderson Cancer Center in Houston and was asked to join the faculty just seven months into the one-year fellowship.

A native of Dermott, he was recruited to return to UAMS, where he helped start the Winthrop P. Rockefeller Cancer Institute and continues to treat patients and train residents in the specialty.

He’s always been ahead of the curve. In the early days he began doing modified neck dissections to treat neck cancer when it was still commonplace to do a more radical procedure that removed muscles, nerves and blood vessels.

“I was criticized; they said ‘you can’t show that modified is better.’ I said ‘I’m not trying to show they are better. I’m trying to show they are just as good with fewer side effects.’ We started using modified neck dissections in the 70s and 80s, and now it’s accepted as the standard.” ❖

What previously was done through the neck and face can now be done through the mouth with a robotic device.

➔ 'Total Therapy' Promotes Recovery

Bart Barlogie, M.D., Ph.D., founder of the UAMS Myeloma Institute for Research and Therapy

By Jon Parham

IN THE PAST 25 YEARS, the UAMS Myeloma Institute for Research and Therapy established itself as the world's foremost treatment center for multiple myeloma, a particularly nasty cancer of the bone marrow.

A potent combination of technology, teamwork and a culture of moving fast has served the institute well and positioned it for the future.

Many of the 39 surviving patients who were part of the institute's first major clinical trial for treating multiple myeloma, which started in November 1989, still return for care. The institute has had a relentless dedication to cure multiple myeloma since Bart Barlogie, M.D., Ph.D., arrived at UAMS that same year, a time when the median survival for myeloma patients was only 30 months.

Today's median survival figures for patients treated at the Myeloma Institute exceed 10 years. The institute uses the newest genetic analysis tools to guide treatment plans determined by the genetics of myeloma in each patient. This puts the Myeloma Institute on the vanguard of personalized medicine.

"I think historically we have taken rather bold approaches and patients have trusted our judgment," said Bart Barlogie, M.D., Ph.D., the Myeloma Institute's founding director. "We are unique because our patients are being cared for here from diagnosis on. They don't come here just for consultation but for active, continuous management."

Multiple myeloma, the second most common blood cancer, weakens the body's immune system and often causes bone destruction, leading to pain and broken bones.

The Myeloma Institute developed a "total therapy" concept — applying all elements of treatment, including high-dose chemotherapy and eventually transplants of blood stem cells

that promote recovery all together. Advances in imaging technology and genetic analysis allowed the institute to identify how different tumor genetics can be used to predict patient outcome.

Those discoveries led to a method for identifying patients who would be more responsive to treatment (low-risk) or less responsive (high-risk) based on the genetic makeup of their disease. It allowed use of the word "cure" for the first time — a word Barlogie insists is appropriate.

"We now predict that half of the patients diagnosed with the low-risk, less aggressive form of the disease — which makes up 85 percent of newly diagnosed cases — can be cured," Barlogie said. "In the low-risk disease, we have finally published — and it was very difficult — we actually had the 'cure' word in the title of a journal article in 2012."

More than 90 percent of patients are actively followed over the course of their lifetime. The close follow-up of patients has allowed early detection of relapse and helped the institute amass an enormous amount of data on the disease that has led to a better understanding of the disease's behavior and treatment response.

That data and the growing biorepository, includes more than 100,000 cell samples, some 10,000 genetic samples, 50,000 MRI scans and 25,000 PET scans. The clinical data and biorepository represent an unmatched resource for future research, Barlogie said.

Now the Myeloma Institute seeks better treatments for high-risk patients while working toward less arduous and less expensive — but no less effective — treatment plans for those with low-risk myeloma.

Barlogie dismissed those who talk merely of controlling multiple myeloma like diabetes. "I want to cure everybody with myeloma." ❖

The institute uses the newest genetic analysis tools to guide treatment plans.



PROSTATE CANCER

➔ Over-diagnosis and Over-treatment Lead to Changes

By David Robinson

CONVENTIONAL WISDOM says that finding cancer early leads to the best outcomes. But the more researchers have learned about prostate cancer the more it has bedeviled doctors and patients.

Rodney Davis, M.D., who leads the Department of Urology in the UAMS College of Medicine, said patients are counseled differently today than just a few years ago.

“Prostate cancer is a mixed bag,” Davis said. “About 85 percent of men with prostate cancer will never die of the disease. Others will die regardless of when you actually diagnose it.”

Since about 1990, screening for prostate cancer has involved the prostate specific antigen (PSA) test. A high PSA score or rising PSA have been used as indicators of prostate cancer, but the PSA does not distinguish between cancers that are deadly and those that are not. It also may produce false positives and false negatives.

In May 2012, the U.S. Preventive Services Task Force recommended against the PSA screening, saying the test may result in over-diagnosis and over-treatment because “most prostate cancer is asymptomatic for life,” and treatments involve risks of complications.

The American Cancer Society also recommends against the PSA screening unless patients have consulted with their doctor and received information about the uncertainties, risks and potential benefits of screening. This discussion for men at average risk for prostate cancer should occur at about age 50 and as early as age 40 for men with more than one first-degree relative (father, brother or son) with prostate

cancer and men of African descent.

“It is called shared decision making,” Davis said. “We talk to patients and let them know the risks and benefits.”

Given the uncertainty of the PSA and the fact that 85 to 90 percent of prostate cancer patients won’t die of the disease, Davis said it’s important that they understand all that’s involved with biopsy, surgery and radiation and the associated risks for erectile dysfunction and incontinence.

“Quality of life is a big issue,” he said.

The nature of prostate cancer is that it can slowly come back, usually years after initial treatment. This has led Davis, who joined UAMS in 2012, to establish the Advanced Prostate Cancer Clinic for men whose cancer has returned. Davis recently saw an 81-year-old patient with recurrent cancer 10 years after a radical prostatectomy. After considering the patient’s age, that he was already incontinent and radiation was likely to make the condition worse, the decision was made to forego treatment but to provide ongoing surveillance.

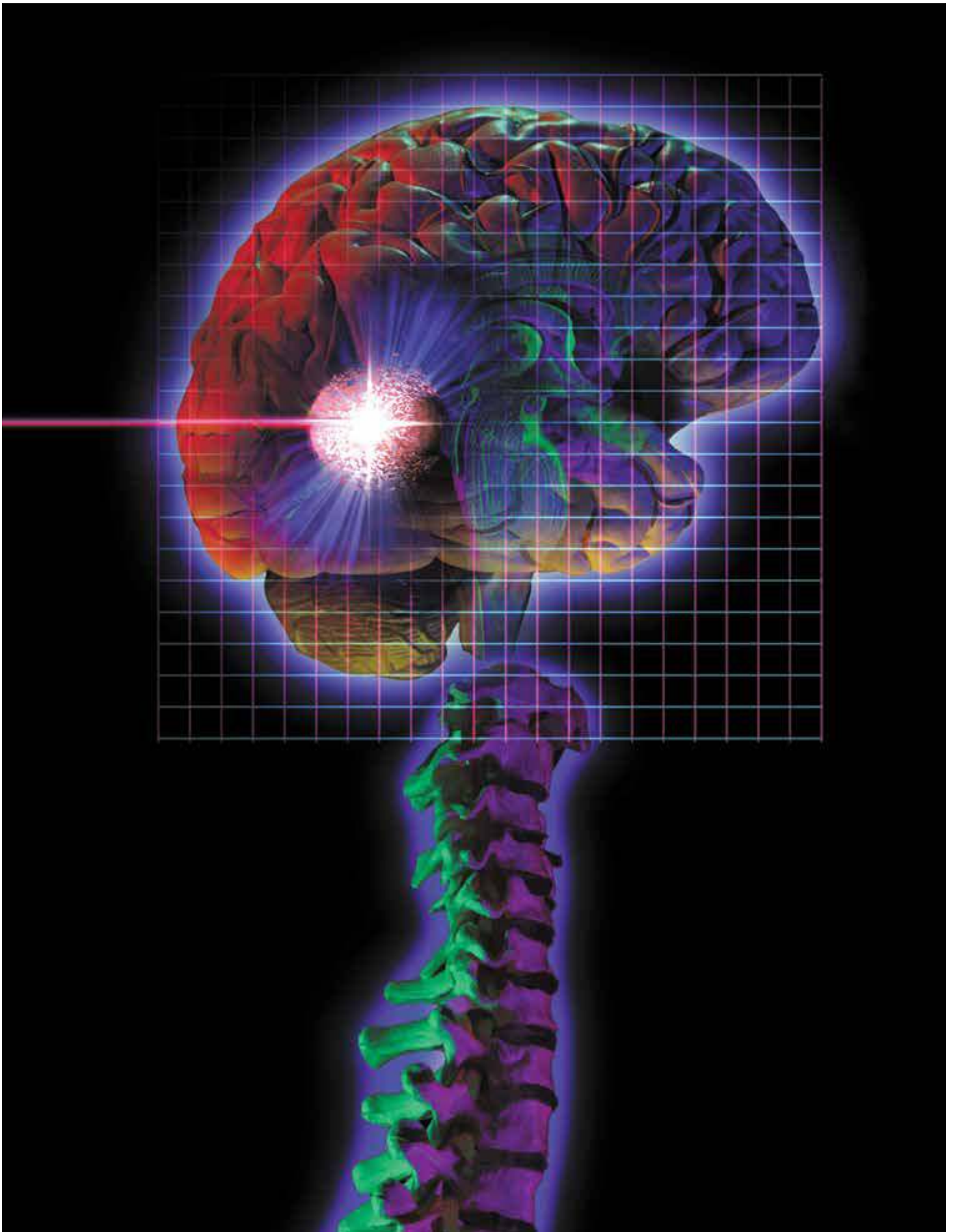
Davis is an internationally recognized expert in minimally invasive techniques for the treatment of urologic cancers. He leads a team with two additional urologic oncology surgeons whose advanced training enables UAMS to offer the latest minimally invasive treatments: Mohamed I. Kamel, M.D., and Matthew D. Katz, M.D.

“Our main focus is to treat urological cancers using techniques that allow us to return patients to normal activities as quickly as possible,” Davis said. “We want to decrease their length of stay in the hospital, and most importantly enhance their long-term survival. ❖

“Our main focus is to treat urological cancers using techniques that allow us to return patients to normal activities as quickly as possible.”

Rodney Davis, M.D., counsels a patient about treatment options for prostate cancer.





BRAIN CANCER

➔ New Brain Tumor Procedure Lessens Risk

By Holland Doran

A NEW neurosurgery technique using a small port is a promising development in allowing brain tumor removal with a minimum of injury to normal surrounding brain tissue.

John D. Day, M.D., a nationally renowned neurosurgeon at UAMS in 2013 became the first in the state to use a minimally invasive, breakthrough brain tumor removal procedure using a tube-like tool and sophisticated three-dimensional brain imaging in two successful surgeries.

The cutting-edge surgery uses a new BrainPath™ tube, advanced imaging of tracts in the brain and a computerized brain navigation system, which allows physicians to navigate the brain with unprecedented clarity to target and suction out deep-seated brain tumors, abscesses and hemorrhages with much less disruption of tissue than with traditional techniques.

The surgery removes deeply located tumors in the brain considered difficult to safely access, such as glioblastoma multiforme (GBMs) and metastatic cancerous brain tumors.

Day, chair of the Department of Neurosurgery in the UAMS College of Medicine, has performed this new surgery twice at UAMS with success — once for a malignant tumor and once for an abscess.

“The procedure is the closest that we can get to a precisely targeted, flawless surgery for

deep brain tumors,” Day said. “We are able to get to tumors in a much safer way that will put patients at less risk of brain damage and will preserve critical brain structures and tracts.”

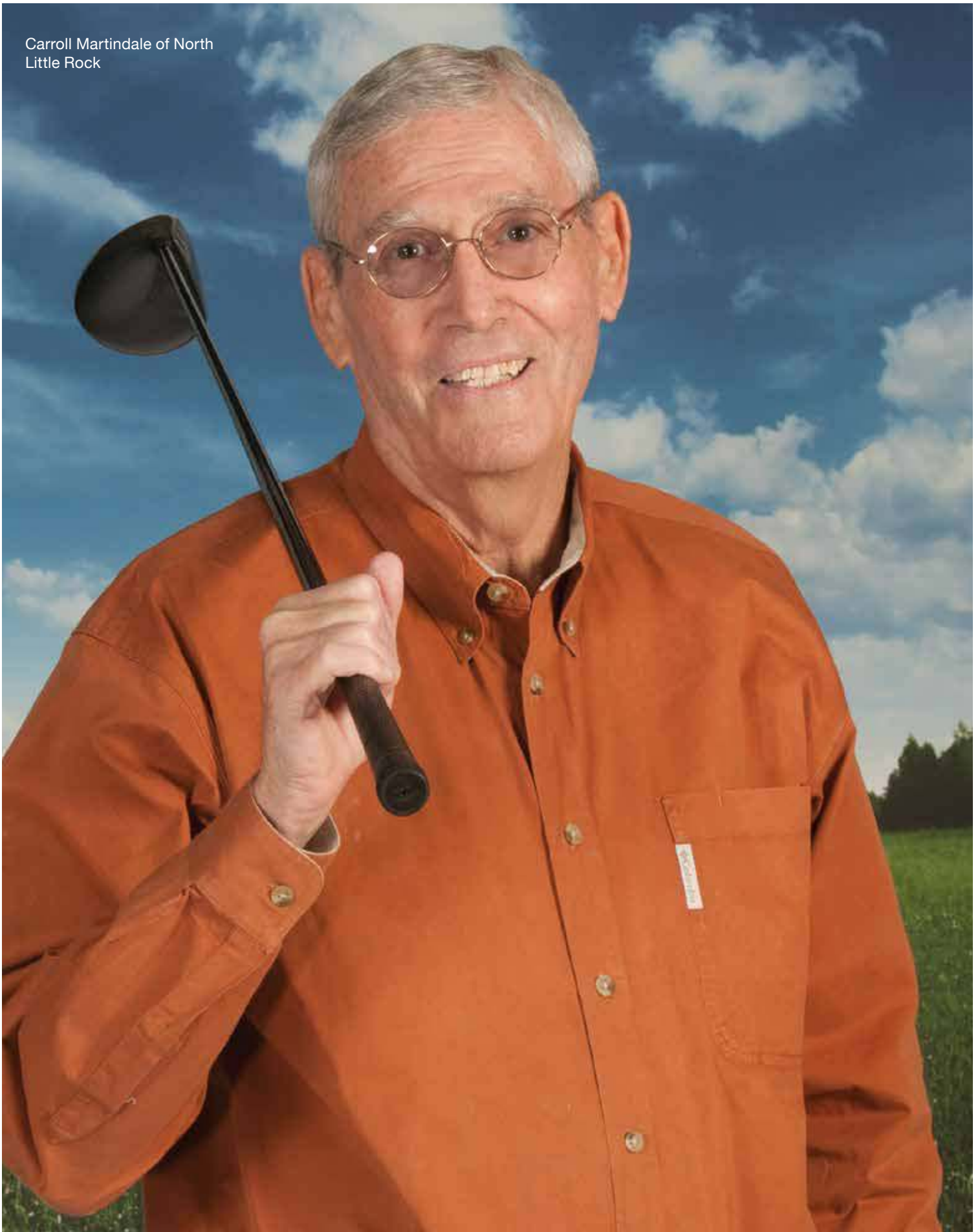
Along with the Brain Path™ device, the Myriad™, a thin, tubular, three-in-one device (scissors, suction and blunt dissector) designed by NICO, is used to remove hard-to-reach tumors through the narrow corridor. The device can be used on multiple procedures and does not use heat, so there is less risk to surrounding tissue.

The many benefits of the breakthrough procedure, which creates a small, dime-size channel through the brain, include a faster recovery time, minimal internal and external scarring, less trauma to the brain and nerves, and few side effects and complications post-surgery. The procedure trumps traditional open surgery because a limited opening is created to access deep in the brain, so less of the brain is exposed, and the brain tissue is minimally disrupted, Day said.

Day underwent extensive training in March 2013 at Ottawa Civic Hospital in Canada in order to perform the surgery and says there are only about 50 neurosurgeons in the United States equipped to use the new devices. There have been around 150 of these procedures completed in the United States and Canada. ❖

“The procedure is the closest that we can get to a precisely targeted, flawless surgery for deep brain tumors.”

Carroll Martindale of North
Little Rock



LIVER CANCER

➔ Treatments for All Types of Tumors

By Holland Doran

WHEN UAMS ONCOLOGISTS found malignant tumors on Carroll Martindale's liver in 2010, he believed he had four months to live. An "exercise nut" with no family history of cancer, he was shocked to hear that he needed a liver transplant.

"If it wasn't for Dr. Borja-Cacho and Dr. Beheshti, I would have been dead," said Martindale, 73. "UAMS doctors are the best. They explained everything to me and I knew what was going on. I had very little problems with my treatments."

Four months after Martindale's liver transplant in March 2013, performed by UAMS' multidisciplinary liver transplant team, he was biking, walking and hitting the golf course.

"I would recommend the UAMS Cancer Institute to anybody in the world. They really took care of me."

About 70 percent of the patients with hepatocellular carcinoma, the most common type of liver cancer, can live up to five years after surgery, said Daniel Borja-Cacho, M.D., assistant professor in the UAMS College of Medicine's Department of Surgery. Martindale is one of the few liver cancer patients each year who are able to receive a transplant.

"In the U.S. about 16,000 people are waiting for a liver and we only perform about 6,000 liver transplants a year," Borja-Cacho said. "This means that we do not have a liver for everybody."

Because a liver transplant is not an option for every patient, UAMS offers alternatives that have proven successful. These include chemotherapy, local intravenous radiation to shrink the tumors, or surgery to remove the cancerous portion.

"Liver cancer treatment requires a multidisciplinary team, and we have a great one," Borja-Cacho said. "We have hepatologists, interventional radiologists, medical oncologists and liver surgeons, who all work together to review every single patient's case. With this type of team treatment we can provide the best possible outcome for the patient."

The type of treatment is based on the stage of the cancer and the patient's overall health, including whether there are disorders such as diabetes, heart problems, cirrhosis or viral hepatitis — the most influential risk factor for liver cancer.

However, viral hepatitis as a cause of liver cancer could take a backseat to obesity in the next 10 years, Borja-Cacho said. Obesity is increasing at alarming rates in Arkansas and the nation. One-third of Arkansans are obese, and obese people have more fat in the liver. Severe cases of fatty liver — when fat makes up more than 5-10 percent of the weight of the liver — can lead to cirrhosis and eventually liver cancer.

Metastatic liver tumors, meaning cancerous tumors that originated in the liver but have spread to other areas of the body from the liver, also affect the choice of treatment.

"Our oncologists and hepatologists have options for patients with metastatic disease," Borja-Cacho said. "The difference is that those with a metastasis cannot benefit from a liver transplant because the cancer has spread. However, a transplant can cure a patient with cirrhosis."

UAMS oncologists are even capable of shrinking liver tumors for a patient to be a transplant candidate. ❖

"I would recommend the UAMS Cancer Institute to anybody in the world. They really took care of me."

➔ New Devices Provide Faster, Fewer Radiotherapy Sessions

By David Robinson

RECENT TECHNOLOGY investments at UAMS' Radiation Oncology Center are significantly reducing treatment times and frequency, leading to a better quality of life for UAMS cancer patients.

Today, an early-stage lung cancer patient may need as few as three visits for radiation treatment compared to 30 or more visits using conventional radiotherapy.

"We could literally not have any more advanced equipment than we have now," said Matthew Hardee, M.D., Ph.D., one of three physicians who staff the Radiation Oncology Center, a component of the UAMS Winthrop P. Rockefeller Cancer Institute.

The center purchased two Varian TrueBeam STx linear accelerators this year. They are the only two identical devices at one site in Arkansas capable of delivering precision external beam radiation with ultra-high dose rates. This means no delays in treatment. In addition, UAMS now offers the state's only Accuray TomoHDA and a VoLO treatment planning system, replacing the previous Tomotherapy unit.

For patients, the technology means not just faster and fewer visits to the Radiation Oncology Center, but peace of mind that the devices are suited for the most challenging cases in all body sites, accurately delivering large doses to small and even mobile targets, such as tumors that move as a result of breathing. In addition to adult patients, children treated by UAMS pediatric oncologists at Arkansas Children's Hospital are treated at the center.

"We are extremely excited to have the very latest technology so that we can make treatment much more manageable for our patients and their families," said Vaneerat Ratanatharathorn,

M.D., M.B.A., medical director of the Radiation Oncology Center and chair of the Department of Radiation Oncology in the College of Medicine.

Just as important as the technology, she said, are the faculty and staff who are capable of getting the most out of the center's sophisticated software and equipment. In addition to its three M.D.s, the Radiation Oncology Center is staffed by five Ph.D. physicists, four medical dosimetrists, and 14 radiation therapists. It is the only site in Arkansas conducting federally funded radiation oncology research.

Hardee recently received a UAMS Translational Research Institute pilot award to study a promising compound, glutamine, which appears to protect breast cancer patients' skin and other normal tissue while enhancing the effect of radiation on tumor cells. The study is being conducted in collaboration with V. Suzanne Klimberg, M.D., director of the UAMS Winthrop P. Rockefeller Cancer Institute Breast Cancer Program.

"The ingenuity of our staff has led to the development of several unique techniques to best treat our most challenging cases," Ratanatharathorn said. "Having these newest technologies will enable them to take our clinical, educational and research programs to new heights."

The higher dose rates of the new devices are paired with sophisticated 3-D imaging, dynamic beam-shaping technology, drastically shortened treatment times, and improved targeting accuracy that spares normal tissue.

"Radiation oncology is very technology driven and there have been some major advances in the last few years," Hardee said. "Cross-sectional imaging, CT scans and MRIs have really revolutionized the way radiation treatments are planned and how effectively and safely we can deliver radiation." ❖

"We could literally not have any more advanced equipment than we have now."

Mathew Hardee, M.D., Ph.D.,
displays the latest technology at
the Radiation Oncology Center





Jeri Hudson of Batesville

→ Treating the Whole Person a Priority

By Lauren Farabough

AS BATESVILLE RESIDENT JERI HUDSON took another look in the mirror, she couldn't believe how much the wig looked like her own hair. As a woman, she never thought she would lose her hair, but as a cancer patient undergoing chemotherapy it was to be expected.

As she looked at her reflection with the new wig, she realized with gratitude that not only was UAMS providing her with excellent medical care, but dedicated staff and volunteers were meeting other needs as well.

Hudson, diagnosed with lobular breast cancer, received more than she anticipated through the Patient Support Pavilion.

Located on the first floor of the UAMS Winthrop P. Rockefeller Cancer Institute, "the Patient Support Pavilion is designed to meet the patient's emotional needs," said Porter Puckett, manager of hospitality at the Cancer Institute.

The area includes a relaxation room with a quiet atmosphere with comfortable seating and blankets. The pavilion also has cancer education materials as well as books, puzzles and newspapers. Patients can choose from among 22 CDs on the use of guided imagery to enhance their healing. Session topics include "Fighting Cancer," "Easing Pain" and "Relieving Depression."

The Wig and Hat Shop provides patients who are losing their hair with one free wig and several hats per year. Trained volunteers and staff fit patients so they may get what best suits them.

"I had no idea that they offered this," Hudson said. "When I walked in, they told me all that was available to me. I really appreciate all they did to help me get what I needed and wanted."

The "Look Good ... Feel Better" program sponsored by the American Cancer Society provides a free makeover by a trained cosmetologist. "These

women have to face the reality of cancer, but we can provide comfort and a feeling of hope. It's a short fix, but it helps them as they undergo treatment," Holly Tindall, education coordinator, said.

It's not only about helping them feel better during treatment, but to continue with their everyday lives. A business center in the pavilion provides access to computers, Wi-Fi, a fax machine, scanner and copier.

In addition to the support pavilion, a team of social workers, pharmacists, chaplains and dietitians at the Cancer Institute provide assistance to patients.

Located in the Palliative Care Clinic, Lindsey Dayer, Pharm. D., and a board-certified ambulatory care pharmacist, is available throughout the day to consult with cancer patients. She helps physicians with prescriptions and counsels with patients about dosage, interactions and side effects.

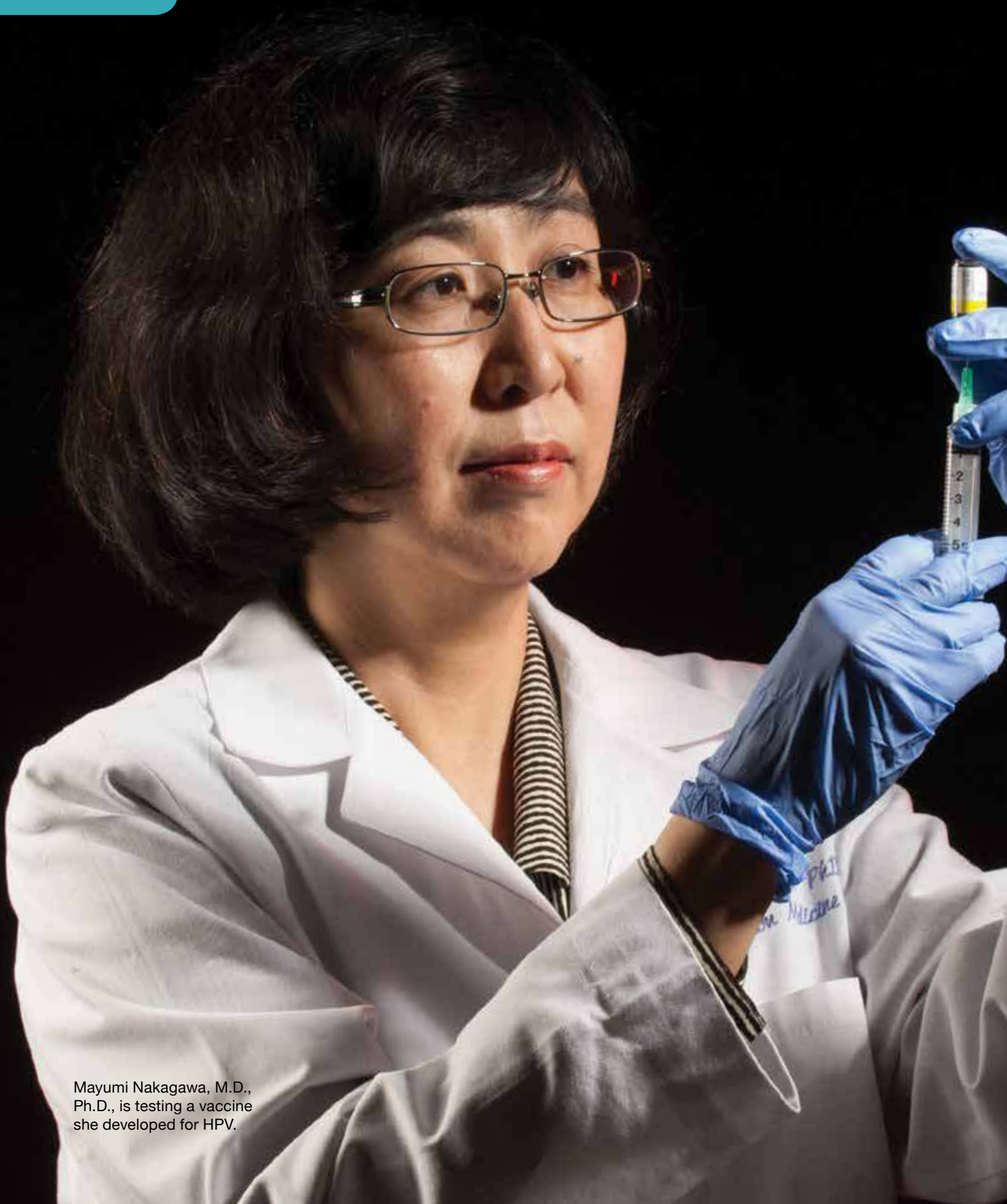
Three fulltime social workers provide resources for patients' emotional needs and serve as their advocates.

"We are here to be with patients and families in several parts of their journey with cancer," said Harriet Farley, social work program manager. "We can act as advocates and help them navigate the medical system. We can provide assistance with concrete needs and refer to financial resources. And we are here to be with patients and families in sorting through the emotional impact of this disease on their lives."

Dietitians in the Cancer Institute ensure patients' diets fit with their lifestyle and treatment plan.

At UAMS it's not only about patients getting the best medical treatment, it's making sure patients like Hudson aren't thought of just as a cancer patient — but as a person. ❖

It's not only about helping them feel better during treatment, but to continue with their everyday lives.



Mayumi Nakagawa, M.D., Ph.D., is testing a vaccine she developed for HPV.



➔ Searching for New Drug Therapies

By Susan Van Dusen

WHEN A DOCTOR prescribes a medication — whether for a common sinus infection or a complex cancer — most people follow their doctor's orders and trust that the medicine will fight their illness. They probably don't think about how it works or the years-long process it took to get to the pharmacist's shelf.

Luckily, there are people who focus their careers on the intricate task of discovering new drugs that can lead to longer, healthier lives.

One such person is Peter Crooks, Ph.D., D.Sc.

A self-proclaimed “drug hunter,” Crooks has spent the past 40-odd years in the field of drug discovery, searching for ways to convert scientific discoveries into potentially viable drug therapies.

“I come in after a basic scientist has discovered a new protein that is a potential target for a new drug therapy,” said Crooks, chairman of the Department of Pharmaceutical Sciences in the UAMS College of Pharmacy. He then begins a stringent, multi-step process that can take 10 or more years and may or may not result in a new drug hitting the shelves.

“The chances of finding a drug that will work well are pretty remote,” he said. That's why “drug hunters” test thousands of compounds looking for the ones that are most likely either to shut down or activate the protein in question and alleviate the symptoms of the disease.

Through a process called

optimization, his group painstakingly searches for a molecule that is potent and will selectively bind to the protein without affecting other proteins in the body. When they find that molecule and it passes toxicological scrutiny, drug development begins, eventually leading to clinical trials in humans and potentially FDA approval for widespread use in patients.

But before Crooks can start his discovery process, a basic scientist has to lay the groundwork. Thomas Kieber-Emmons, Ph.D., is one such scientist who has made his mark in the field of immunotherapy, a process that engages the immune system to accomplish a goal, such as inhibiting tumor growth.

“In immunotherapy, you are either targeting a specific tumor cell or trying to circumvent the shutdown of the immune system caused by tumor cells,” said Kieber-Emmons, professor of pathology. The problem, he added, is that no one is exactly sure how that process works.

A breast cancer vaccine developed by Kieber-Emmons to prevent recurrence of the disease is nearing the end of its phase 1 clinical trial, which is being conducted at the UAMS Winthrop P. Rockefeller Cancer Institute. The vaccine was computer engineered and rationally designed as a “shotgun approach,” Kieber-Emmons said, meaning that the vaccine was designed to elicit a response that hits multiple targets simultaneously.

Phase 1 trials are intended to »

test safety and tolerability of new drugs and involve a small group of participants. All of the women in Kieber-Emmons' trial are stage 4 breast cancer patients, and so far they are showing positive results.

"Our vaccine is inducing an immune response directly destroying tumor cells, similar to what you see with drugs in chemotherapy. It's very hard to do that, and we've accomplished it," he said. "We think we're succeeding because we're hitting multiple targets associated with cancer cell survival."

Another immunotherapy vaccine developed at UAMS is designed to prevent cervical cancer in women who have already acquired the virus that causes the disease, human papillomavirus (HPV). Developed by Mayumi Nakagawa, M.D., Ph.D., associate professor of pathology, this vaccine

also is in a phase 1 clinical trial at UAMS and uses candida, a naturally occurring yeast in the body, with the vaccine to enhance the immune response.

Both of these vaccines have passed many hurdles from drug discovery to human clinical trials, but they still have intense testing to complete before becoming available to the general public.

The multiple myeloma program at UAMS perhaps best epitomizes the path from immunotherapy research to direct patient care. The UAMS Myeloma Institute for Research and Therapy is highly regarded for its aggressive treatment of myeloma, which is characterized by malignant plasma cells that reproduce uncontrollably.

"Recent advancements in the treatment of myeloma have resulted in new drugs with promising results," said Sarah Waheed, M.D.,

associate professor of medicine in the UAMS College of Medicine. UAMS myeloma patients are actively involved in clinical trials of new medications, and two new myeloma drugs approved by the FDA in the past year are showing strong results.

Another drug, elotuzumab, also has shown success in targeting an antigen on the myeloma cell surface called CS1. When used alongside immune cells known as natural killer cells, a mechanism called antibody-dependent cell-mediated cytotoxicity occurs and myeloma cells are killed.

"Elotuzumab, in combination with other drugs, has shown an 82 percent response for relapsed myeloma patients participating in phase 1 and 2 clinical trials," Waheed said. ♦

The Food/Cancer Connection



Can certain types of food lower our risk for certain types of cancer? That's one of the questions that scientist Frank A. Simmen, Ph.D., is attempting to answer in his research lab at UAMS.

Funded by a National Institutes of Health grant, Simmen studies whether a diet high in soy protein can reduce obesity

and metabolic syndrome, while having the added benefit of preventing colorectal cancer.

"We have found that by feeding mice a high soy protein diet, they produce less fat tissue. That translates into an altered metabolic state that helps protect against development of gastrointestinal cancers," said Simmen, professor of physiology in the UAMS Department of Physiology and Biophysics. He added that their findings may potentially lead to improved

therapies that combine dietary changes with drug interventions.

While the jury is still out on whether soy foods can in fact prevent cancer, Simmen said they are making a strong case for it, given the known connections between overweight/obesity and cancer.

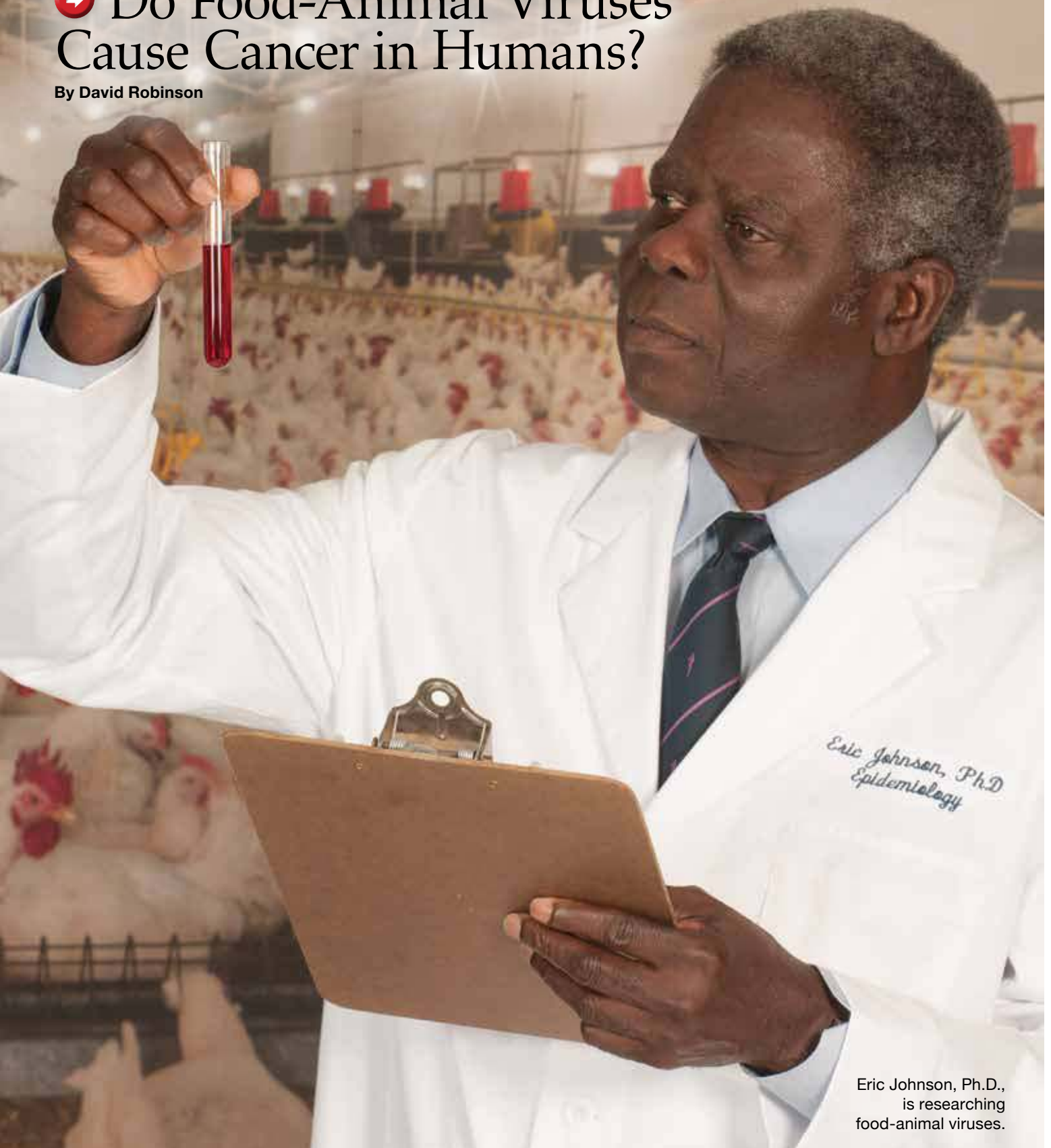
"We're trying to see if we can intervene in that link and use what we find to prevent cancer from forming," Simmen said.

--Susan Van Dusen

EPIDEMIOLOGY

➔ Do Food-Animal Viruses Cause Cancer in Humans?

By David Robinson



Eric Johnson, Ph.D., is researching food-animal viruses.

“We know that certain viruses are potent cancer-causing agents in animals.”

HIS RESEARCH has taken him around the world, and over the last 30 years, Eric Johnson, M.D., Ph.D., M.P.H., has developed an international reputation for his work.

Johnson, an epidemiologist, is an expert in the cancer-causing roles of chemicals and food-animal viruses.

He was recruited to UAMS in January 2012, with the Translational Research Institute, the Fay W. Boozman College of Public Health and the Winthrop P. Rockefeller Cancer Institute all pitching in to provide the laboratory he needs to further his research.

Johnson is in the second year of a five-year study that is focused on whether food-animal viruses are to blame for high cancer rates among poultry workers. The \$3.7 million study is funded by the National Institute for Occupational Safety and Health.

“We know that certain viruses are potent cancer-causing agents in animals,” said Johnson, who chairs the Department of Epidemiology in the College of Public Health. “It is very common for animals to get cancers from these viruses. They are natural infections that have been identified in cattle, chickens, sheep and pigs.”

Viruses may not be the first thing that comes to mind when considering the causes of cancer, but at least six human viruses contribute to 10-15 percent of cancers worldwide: Epstein-Barr virus (EBV), hepatitis B virus (HBV), hepatitis C virus (HCV), human papilloma virus (HPV), human T-cell lymphotropic virus (HTLV-1) and Kaposi’s associated sarcoma virus (KSHV).

While scientists don’t know if food-animal viruses cause cancer in humans, there are troubling signs, said Johnson, who has served as a scientist on several projects with the National Institutes of

Stomach Bacteria Linked to Gastric Cancer



Most people in the world have never heard of *Helicobacter pylori*, but more than two-thirds of people worldwide have this type of bacterium in their stomachs. Many people may also not be aware of the link between this bacteria and the risk for gastric cancer. Gastric cancer, or stomach cancer, will have more than 20,000 new cases in the U.S. in 2013 according to the National Cancer Institute.

Lori Fischbach, Ph.D., associate professor in the Department of Epidemiology in the UAMS College of Public Health, is leading research on *H. pylori*, comparing the effectiveness of treatments, how it relates to cancer epidemiology and how this has contributed to guiding treatment recommendations worldwide.

Her analysis examining the effectiveness of *H. pylori* treatments in 44 countries and 618 treatment arms was featured in the Systematic Review themed issue of the International Journal

of Epidemiology. Her meta-analyses have also received attention at international meetings since it affects so many worldwide.

Fischbach’s research has included three studies in Colombia, one along the border of the United States and Mexico and analyses using data throughout the world. She has chaired sessions on *H. pylori* treatments at the largest gastroenterology conference in the world, Digestive Disease Week. She also chaired the committee to review abstracts on *H. pylori* diagnosis, treatment and antimicrobial resistance.

While the burden of *H. pylori* is greater in the developing world, most treatments have been tested primarily in developed countries. Fischbach said that treatments for *H. pylori* haven’t been shown to be effective in developing countries where the infection affects the vast majority of the population. One of her upcoming projects is an analysis of treatments for *H. pylori* in these developing countries.

--By Lauren Farabough

Using Mammographic Density to Predict Breast Cancer



a mammogram.

Barbara Fuhrman, Ph.D., an assistant professor of epidemiology in the UAMS College of Public Health, is leading research looking more closely at a woman's mammographic density and her risk for breast cancer.

Mammographic density (MD) is the measure of the extent of radiodense breast tissue. Fuhrman said that this factor has consistently been one of the best predictors of breast cancer risk in women other than age. Also, because radiodense tissue can obscure tumors, MD is also an indicator of the sensitivity of mammographic screening.

Even though MD has important implications

UAMS scientists are tracking key risk factors for breast cancer in an effort to measure that risk. One of those risk factors recognized for more than a decade is the density of breast tissue as it shows up in

for breast screening and health, its measurement has not been standardized or incorporated into screening algorithms. Methods for measuring MD have either been too time-consuming or subjective for use in the clinic.

With this study, Fuhrman and her colleagues are using the UAMS Enterprise Data Warehouse to collect information on women who have undergone digital mammography at UAMS.

They retrieve the images for each participant and then use special software to measure MD. They will use this dataset to demonstrate that the new automated measures predict breast cancer risk. They will also look at the impact of MD on screening practices and outcomes in women seen at UAMS.

Fuhrman said that so far, this method has proved as good as the standard method at predicting risk. In addition, it does not require a technician, and is more efficient when going through a large number of images.

--By Lauren Farabough

Health (NIH) and the World Health Organization (WHO), including as an epidemiologist with the WHO International Agency for Research on Cancer in Lyon, France.

"Humans are widely exposed to these animals and we now know that humans do get infected with some of these viruses," he said.

His research has looked at humans with the highest exposure to these viruses – those responsible for killing chickens, cows, sheep and pigs.

"Over the last 30 years we have demonstrated quite clearly that workers in poultry slaughtering plants and cattle slaughtering plants and pig slaughtering plants are dying at a very high rate of cancer," Johnson said. "Other investigators all over the world have also confirmed these findings. So the question is, is it due to these viruses or other causes?"

The cancers experienced by the workers being studied vary widely, and include lung, esophageal, pancreas, liver and brain cancers.

Johnson's study of poultry workers will consider other potential causes, such as exposure to cancer-causing agents produced in meat smoking, curing and cooking at high temperature. Frying meat converts the fat to powerful carcinogens that are released in the fumes, he said.

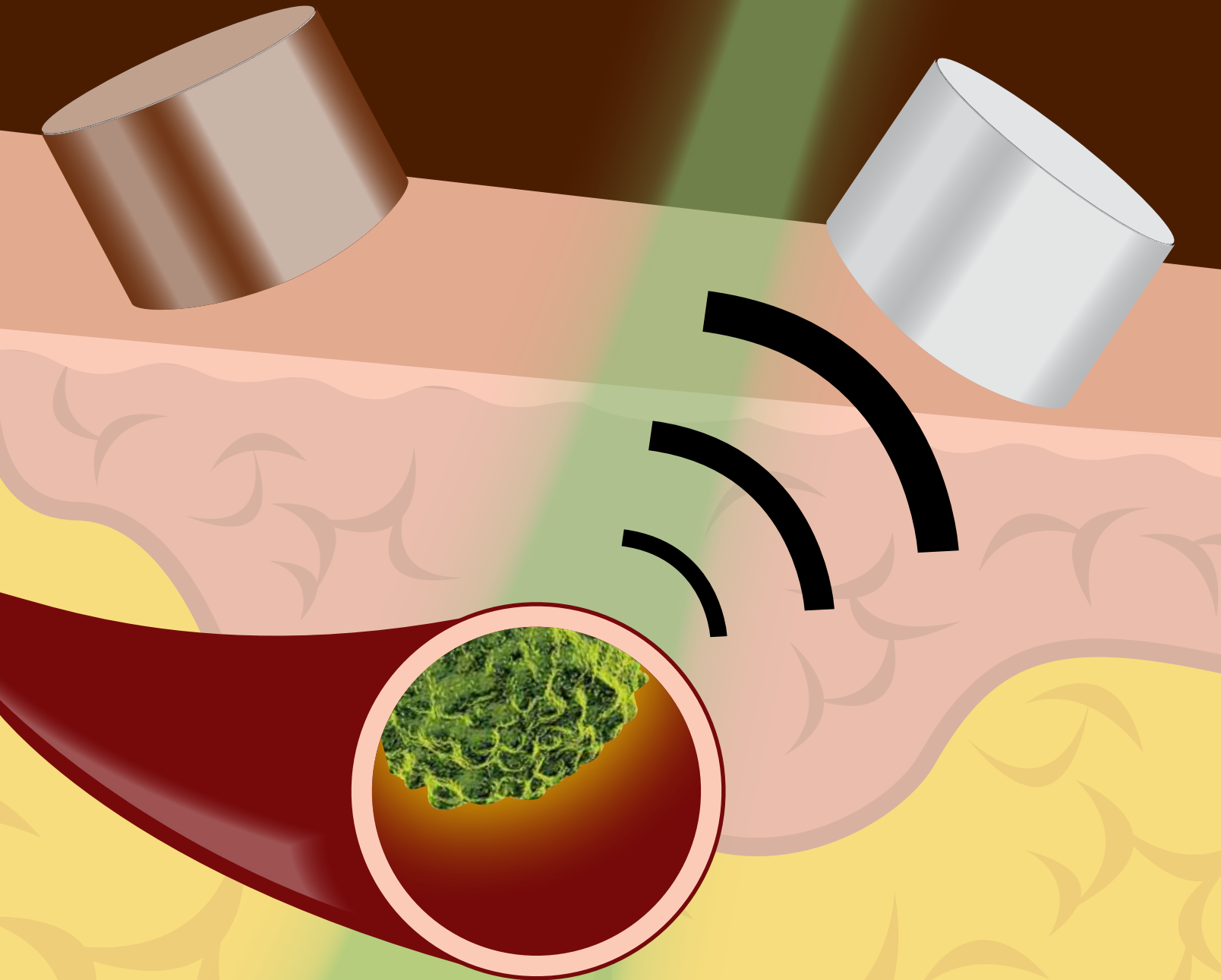
Johnson's new lab will play a key role, providing the methods needed to examine cancer tissue samples from poultry workers and cancer patients across the United States.

"At the end of this study, we hope to have definitive proof that viruses present in animals used for food either do or don't cause cancer in humans," he said. ❖

NANOMEDICINE

→ Nanotechnology Changing Cancer Detection and Treatment

By Nate Hinkel



THE SUDDEN EXPLOSION in the last decade of understanding highly technical medical research and practice at a molecular scale, about one-millionth of a millimeter, is already changing the health care landscape.

And while nanotechnology has possible applications in nearly every aspect of our lives, its use in medical research, called nanomedicine, will radically change the way we diagnose, treat and prevent cancer. Researchers at UAMS are on the leading edge of several collaborative nanomedicine projects and programs that are gaining nationwide attention in cancer detection and treatment arenas.

“There is a lot of research in nanomedicine going on all over the world, and everyone agrees that its potential is the future of health care,” said Vladimir Zharov, Ph.D., a world-renowned senior scientist in the UAMS Winthrop P. Rockefeller Cancer Institute, director of the Arkansas Nanomedicine Center, and professor in the Department of Otolaryngology - Head and Neck Surgery in the UAMS College of Medicine.

Seek and Destroy

Zharov’s research is beginning to come full circle now that his project to detect and destroy cancer cells recently translated into clinical trial.

Developed during six years with nearly \$5 million from the National Cancer Institute, the U.S. Department of Defense and the National Science Foundation, Zharov says he has a magnetic device that is placed on a patient’s skin that attracts and captures deadly metastasis cells.

Cancer patients are first injected with a cocktail of magnetic, gold carbon nanotubes that have a special biological coating to target moving cancer cells in their bloodstream. A device, similar to a cuff, is placed on the patient’s skin that reins in the deadly cells before they are either removed for further genetic analysis or killed directly in the blood vessels with a noninvasive laser.

The process opens a new possibility in the fight

to eradicate cancer with a treatment beyond surgery, radiation or chemotherapy. The discovery, fueled by Zharov’s cancer-catching device called the iV3, recently became UAMS’ first-ever nanomedicine-related clinical trial.

Another recent collaboration between Zharov and Robert Griffin, Ph.D., professor and director of radiation oncology at UAMS, involved developing a new concept of nanodrug using laser-activated physical and biological effects in gold nanoparticle drug conjugates that opens new avenues in the development of promising cancer treatment.

Team Players

In 2012 UAMS created the Arkansas Nanomedicine Center in the College of Medicine to serve as the hub of all nanomedicine efforts on campus and through a network of statewide collaborators: UAMS’ College of Medicine, Winthrop P. Rockefeller Cancer Institute and the Translational Research Institute, the Arkansas Children’s Hospital Research Institute, the Institute of Nanoscience and Engineering at the University of Arkansas, Fayetteville, the Center for Integrative Nanotechnology Sciences at the University of Arkansas at Little Rock, and the National Center for Toxicological Research.

“Nanotechnology has the potential to affect all aspects of our lives from energy to materials to health care,” said Alexandru Biris, director and chief scientist of the UALR Center for Integrative Nanotechnology Sciences.

Recent collaborative research between Zharov and Biris has already led to new discoveries published in several leading nanotechnology journals.

Zharov said the statewide collaboration recently helped execute a memorandum of understanding with the U.S. Food and Drug Administration to establish the Arkansas Research Consortium in Nanotoxicity. ❖

“There is a lot of research in nanomedicine going on all over the world, and everyone agrees that its potential is the future of health care.”

PRECISION MEDICINE

➔ Center Will Mean New Tools for Cancer Prevention, Diagnosis

By Jon Parham

THE PLANNED UAMS CENTER for Innovation in Precision Medicine could put cancer patients in Arkansas and beyond closer to new diagnostic tools and expertise for assessing risk and achieving even earlier diagnoses.

The clinicians seeing patients as well as the researchers developing new medicines or diagnostic tools are talking and sketching ideas for taking the center from concept to execution. It's not a question of "if," it's "when," said Jennifer Hunt, M.D., chair of the Department of Pathology in the UAMS College of Medicine.

The important early component for the center will be genetic testing equipment and other instruments for analyzing or documenting a patient's genetic blueprint. Planners are seeking space on the UAMS campus for the lab equipment since the existing clinical lab is at maximum capacity.

"The center and its lab will mean we can deliver really cutting-edge care in the state without sending lab work or patients out of Arkansas," Hunt said. "We're here and would be able to take the results directly to the clinicians caring for the patients."

The lab would be a centralized campuswide resource. Each department, institute or program could recruit or assign faculty to the project.

Kent McKelvey, M.D., a founding member of the Division of Genetics in the UAMS College of Medicine, is one clinician researcher excited about the forces coming together at UAMS. As director of Cancer Genetics Services in the UAMS Winthrop P. Rockefeller Cancer Institute, he has been helping patients make treatment decisions using genetic information for several years. But, he said, the tools are getting better so the potential at

UAMS is even greater.

"This center will mean we can systematically apply the latest understandings in molecular genomics to the clinical care of our patients," he said. "While our cancer genetics clinic has always been a resource for personalized medicine for those who knew about it or were referred, we will soon have resources and impetus to broaden our efforts in cancer prevention and be more precise in the molecular diagnosis and treatment of some cancers when they occur."

With more precise lab testing available through the center, results can be focused down to the individual patient. Test results could point clinicians to a specific treatment or series of treatments that will work best for that particular patient based on his or her genetic makeup.

Genetic tests can already identify risk for various types of cancer. As understanding of the human genome increases, more advanced testing promises to find new targets for treatment or disease prevention.

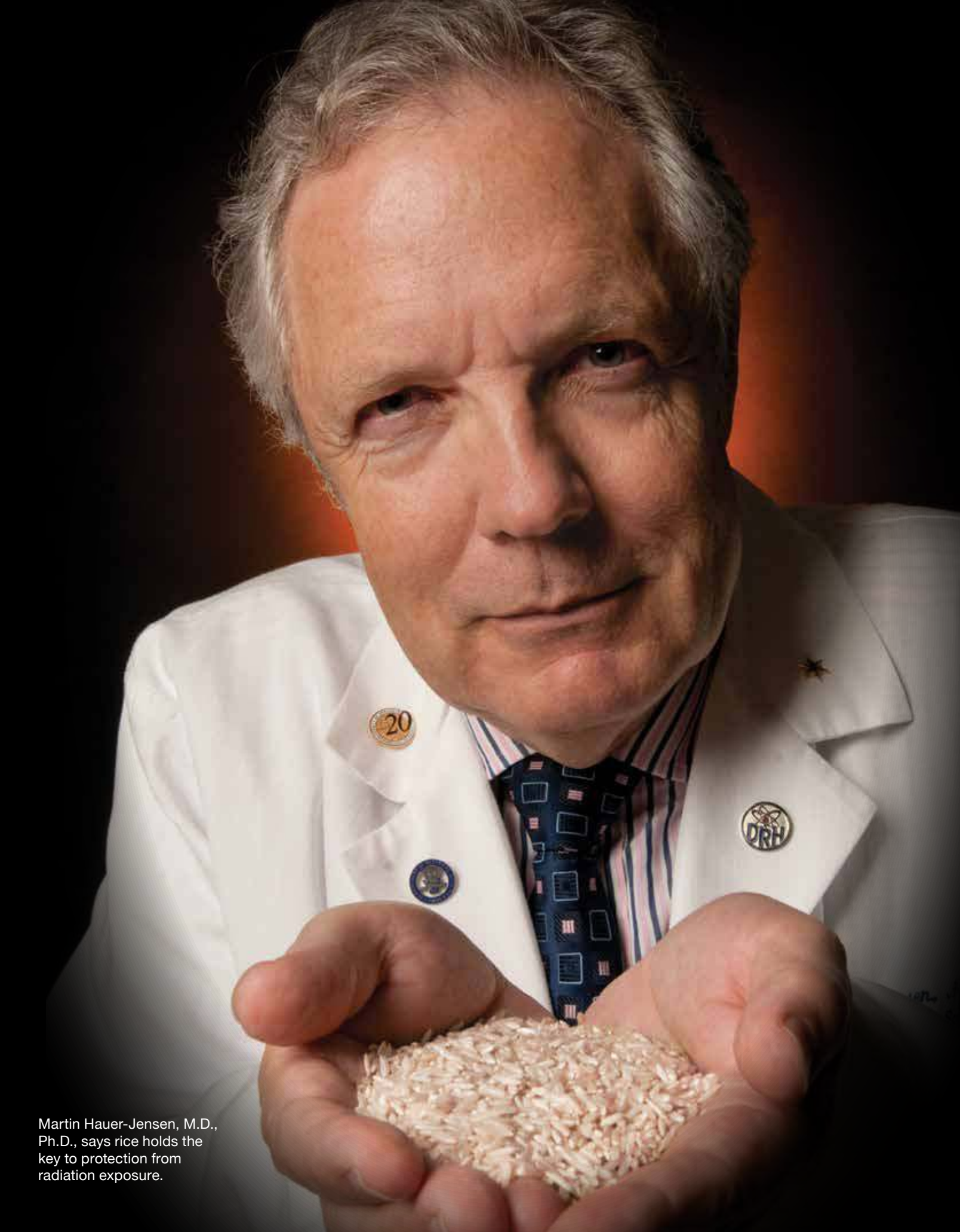
"We are now able to test hundreds of genes on a clinical basis and these genes represent more than 50 well-described cancer syndromes — all with implications for care," said McKelvey, who in 2009 became the inaugural recipient of the Winthrop P. Rockefeller Chair in Clinical Genetics at UAMS.

"In some cases we literally have the whole genome at our fingertips."

In planning for the lab construction, both Hunt and McKelvey expressed optimism. "This is just the beginning of the genomics era in precision medicine and UAMS is at that interface of technology and patient care, so momentum is really picking up," McKelvey said. ❖

"This center will mean we can systematically apply the latest understandings in molecular genomics to the clinical care of our patients."





Martin Hauer-Jensen, M.D., Ph.D., says rice holds the key to protection from radiation exposure.

➔ Rice Compound Provides Natural Protection

By Nate Hinkel

WHAT DO RICE, radiological emergencies and cancer treatment all have in common?

However odd the combo seems, there's no punch line to this query. The very serious answer lies in the astonishing results of years of intense study done by researchers in the UAMS College of Pharmacy's Division of Radiation Health, led by world-renowned radiation injury expert Martin Hauer-Jensen, M.D., Ph.D.

"What we've found is that there's a compound derived from rice that is the most potent radio-protector ever discovered from a natural product," said Hauer-Jensen, who has detailed his work in national and international media interviews and publications. "And it just so happens that we're in the rice bowl of America and well situated to take advantage of that."

Rice bran is one of the richest sources of tocopherols, which are potent antioxidants that have many other important biological properties. A major property of tocopherols is the ability to protect against the adverse effects of ionizing radiation. Hauer-Jensen, along with Sree Kumar, M.D., at the Armed Forces Radiobiology Research Institute in Bethesda, Md., found that one of rice's eight naturally occurring tocopherols, called gamma-tocotrienol (GT3), if administered 12-to-24 hours before exposure, can provide 100 percent protection against a radiation dose that would otherwise be 100 percent fatal.

"That is the highest degree of protection demonstrated for any natural compound that's been discovered so far," Hauer-Jensen said.

While the immediate application of Hauer-Jensen's research lies in soothing the fears of radiation exposure following a large-scale radiological or nuclear disaster or attack, GT3 has many other uses.

The number of cancer survivors in America has increased dramatically during the last 30 years. But so has the number of patients experiencing secondary problems stemming from radiation

and chemotherapy treatments. Cancer patients, particularly those undergoing radiation therapy and struggling with side effects, could see those troubles greatly diminished.

Developing Division

While Hauer-Jensen's discovery related to GT3 is very promising and moving toward clinical trials, much more research is needed to address cancer treatment possibilities.

The UAMS College of Pharmacy's Division of Radiation Health is headed in that direction.

Hauer-Jensen began as a surgical oncologist in his native Norway and has spent the last 23 years at UAMS as both a surgeon and researcher. He transitioned fully to radiation research to lead the division in 2008. And what began as a one-man effort now has more than 30 faculty and staff and generates more than \$7 million in external funding annually.

Along with the 2010 addition of Daohong Zhou, M.D., another world-renowned radiation researcher and drug developer, and Marjan Boerma, Ph.D., Snehalata Pawar, Ph.D. and Nukhet Aykin-Burns, Ph.D., Hauer-Jensen is excited about the very recent recruitment of Antino Allen, Ph.D., a neuroscientist from the University of California at San Francisco School of Medicine. Allen "presents big opportunities to investigate the effects of radiation and chemotherapy on cognition and memory," Hauer-Jensen said.

"The division here is a concept that's totally unique in medicine with this approach to cancer treatment from a radiation health perspective," Hauer-Jensen said. "A lot of places mainly look at treating tumors with radiation. We, on the other hand, strive to make cancer therapy safer and more effective while focusing not only on today's cancer patients, but also on tomorrow's cancer survivors." ❖

"We strive to make cancer therapy safer and more effective."

➔ Heat Can Make Other Cancer Treatments More Effective

By Ben Boulden

ROBERT GRIFFIN, Ph.D., along with a few colleagues, has rediscovered the value in a cancer treatment — hyperthermia — begun many years ago but not yet widely used in the United States.

Griffin is associate professor in the Department of Radiation Oncology in the UAMS College of Medicine and director of its Radiation Biology Division.

Using microwaves, ultrasound, lasers and radio frequency, therapeutic hyperthermia involves elevating the temperature in a part of the body so that it absorbs more heat than it dissipates.

In the late 1970s and into the 1980s, researchers thought that simply heating a tumor might kill it without the need for any other treatment like radiation or chemotherapy, but they lacked the ability to calibrate and measure delivery of that heat. Clinical trials of hyperthermia were disappointing. Later it was discovered that a major reason was the temperatures were too low.

“The whole field turned upside down then,” Griffin said. “The clinical trials were not conclusive because of the lack of consistent thermal doses. That became a stigma, but since then the field of thermal medicine has been re-developing.”

Some of those early studies and quite a few large clinical studies since showed that hyperthermia was effective in conjunction with radiation therapy, but no one understood why. Eventually, it was the promise of combining those treatments that led researchers like Griffin to reexamine mechanisms by which hyperthermia acts on living tissue — specifically cancerous tissue

Many tumors thrive in a hypoxic environment in which the oxygenation of the tumor is much lower than in normal tissue. Because tumors cannot dissipate heat as quickly as healthy tissue, they can get hotter than that tissue if enough heat is applied. Hyperthermia at relatively low levels —

as in the early clinical use of thermal medicine — ends up increasing the amount of blood flow and oxygenation of the tumor, making it more sensitive to radiation and chemotherapies.

One of the challenges of cancer treatment is treating or killing all the cancer cells that are part of a tumor. Failing to do that can make the remaining cancer cells more resistant to radiation or chemotherapy should they start multiplying again. Increasing oxygenation means fewer cells survive initial treatments. Hyperthermia kills some of the cancer cells and makes the remaining ones more vulnerable when radiation or chemotherapy are applied.

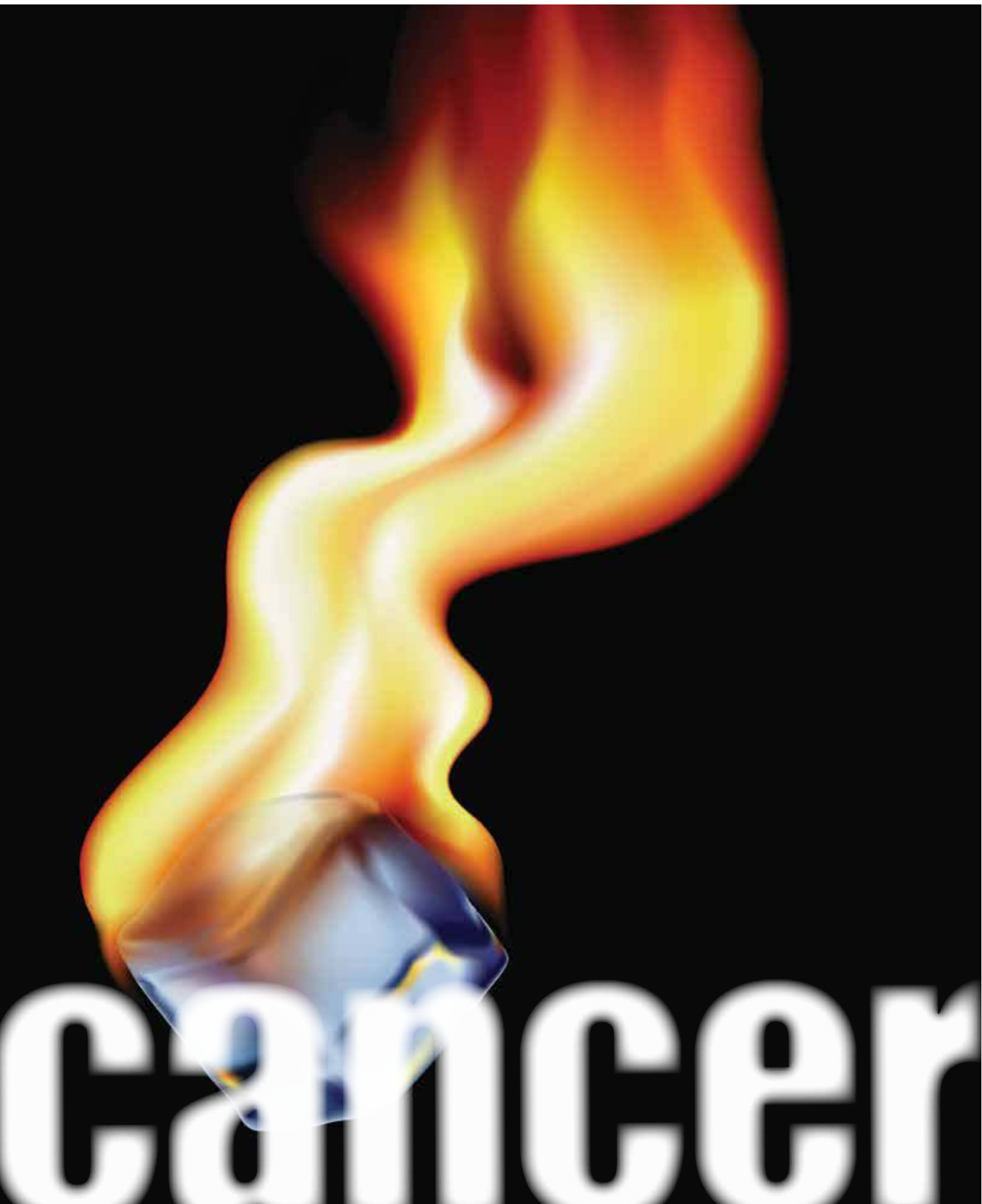
Another rapidly growing aspect of the thermal medicine field is thermal ablation, or the destruction of tissue with high temperatures or even the converse — freezing.

“We’ve also found that combined with radiation therapy, thermal ablation can produce a good cure rate if done in the proper sequence,” Griffin said. “You would ablate first and irradiate second. You destroy a considerable portion of the tumor and what’s left becomes more oxygenated and more vulnerable to radiation in the days following the ablation.”

Technological advances in the last 15 years also have contributed to the effectiveness of hyperthermia as part of a combined treatment approach. MRI thermometry to measure the exact heat distribution and level in a tumor and surrounding tissue can allow physicians to deliver just the right temperature to the tumor.

“We now have many systems that heat at low temperatures, but we also have thermal ablation that destroys the tissue,” Griffin said. “That has become a large part of the field of interventional radiology.” ❖

One of the challenges of cancer treatment is treating or killing all the cancer cells that are part of a tumor.



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