

Summer 1990

## Focal Spot, Summer 1990

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SUMMER, 1990

VOLUME 21, NUMBER 2

# FOCAL SPOT

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MALLINCKRODT INSTITUTE OF RADIOLOGY

TREATING  
INFERTILITY



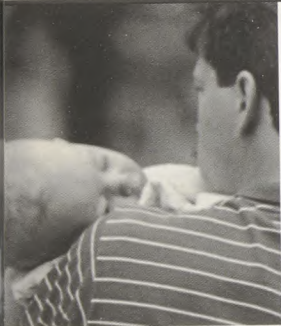


*As MIR prepares for its 60th anniversary reunion in 1991, the 1966-1967 residents and fellows will join in the celebration for their 25th anniversary. Seated, left to right, are Doctors William Miller; Richard Trackler; Juan Taveras, director of the Institute from 1964 to 1971; Hugh M. Wilson, director of the Institute from 1949 to 1963; William Mill; and Robert Hurley. Middle row, left to right, are Doctors C. Jay Kees; Katherine Jacobs; John Bardsley, presently on staff as assistant professor of clinical radiology; Gerald Shaikun, presently on staff as instructor in clinical radiology; Charles Williams; and Allan McCown, presently on staff as assistant professor of clinical radiology. Back row, left to right, are Doctors Myo Kyaw, John Fenlon, James Debnam, and Emilio Torres-Reyes. Photograph courtesy of the Office of the Director—Mallinckrodt Institute of Radiology.*

# FOCAL SPOT

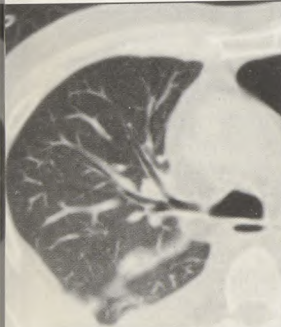
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MALLINCKRODT INSTITUTE OF RADIOLOGY



## 6 AND BABY MAKES THREE

An interventional radiology procedure called selective ostial salpingography and recanalization is making dreams come true for some of the 3.5 million infertile couples in the U.S.



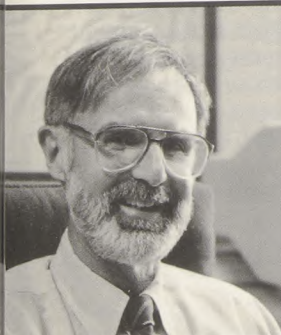
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**ON THE COVER:**

*On March 21, 1988, Connie Pisetta became the first patient at MIR to undergo selective ostial salpingography. Brenden is the happy result.*

*Photograph by Cliff Willis.*

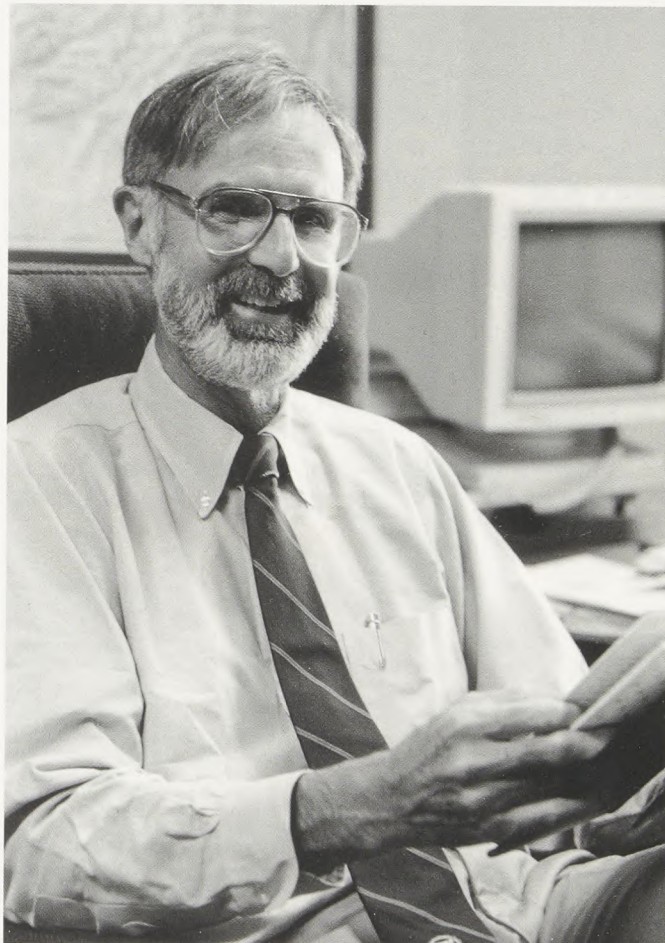
# SPOT NEWS

## Raichle 1990 Recipient of Aebersold Award

The Society of Nuclear Medicine (SNM) annually presents the prestigious Aebersold Award to that researcher whose work has produced outstanding achievements in the field of nuclear medicine while promoting a widespread appreciation of the scientific value of nuclear medicine through basic and clinical research. Marcus Raichle, M.D., professor of radiology and neurology, was the logical and deserving choice for this year's honor, which was presented at the Society's 36th Annual Meeting held in June.

For the past two decades, Raichle has focused his attention and efforts on the study of the human brain. Using the tools of nuclear medicine, especially cyclotron-produced short-lived radionuclides and positron emission tomography (PET), Raichle's studies of cerebral blood flow and metabolism have provided a sound scientific foundation on which other researchers can build.

Raichle began using positron-emitting cyclotron-produced radionuclides coupled with angiography for studies of human and other primate brains as far back as 1971, at a time when other neurosciences researchers were not familiar with the tracers. His desire to find a less invasive method of studying the brain led Raichle to PET and the development of methods for the measurement of regional cerebral blood flow and metabolism; methods that to this day are regarded as the only



Steve Kohler

*Marcus Raichle, M.D., is a pioneer in the field of cerebral blood flow and metabolism.*

procedure to use.

Within the past 10 years, Raichle's work has focused on the application of PET to the study of psychiatric disorders and developing functional maps of the areas of the brain involved in sensory and language information processing.

percent recurrence of breast cancer—one of the lowest figures reported in medical literature.

According to statistics from the American Cancer Society (ACS), more than 1,000 women in Missouri will die from breast cancer in 1990. The Department of Health also had a startling prediction for Missouri—3,200 new cases of breast cancer will be diagnosed this year. With the increasing incidence of breast cancer and the public's increased awareness of the disease, more women now are aware of the various treatment options. Many patients are choosing lumpectomy (removing only the malignant lump plus a margin of surrounding tissue) followed by radiation. Some of these women will have radiation implants placed in the affected breast in addition to standard external radiotherapy. It is this group of women in whom the recurrence rates have been lowered so drastically.

According to Kuske, "Brachytherapy shortens the overall treatment time because the implant gives two weeks worth of radiation in two days. This treatment option gives a higher dose of radiation and it's concentrated on the area of the breast at highest risk. We can also target large tumors that are located deep in the breast tissue."

## Breast Cancer Recurrence Rate Lowered by Brachytherapy

Robert R. Kuske, M.D., assistant professor of radiology and chief of breast service in Radiation Oncology, had some good news to share at the Second International Brachytherapy and Remote Afterloading Symposium held April 19-21 in St. Louis.

In his study involving 417 women with breast cancer who were followed a minimum of five years after treatment and half of whom received radiation breast implants (brachytherapy), Kuske reported a low 4.6

# SPOT NEWS

## McClennan Named FDA Consultant

Bruce L. McClennan, M.D., professor of radiology, has been appointed a consultant to the Center for Drug Evaluation and Research by the Food and Drug Administration (FDA). The Center reviews and approves all U.S. prescription drugs and monitors the quality of marketed drug products as well as conducts research and develops scientific standards on the quality, safety and effectiveness of drugs for human use.

McClennan, a nationally recognized expert in the field of genitourinary radiological research and in the assessment of radioiodinated contrast agents, will advise the Center on the safety and efficacy of substances proposed for use in the treatment or diagnosis of diseases and illnesses.

## Winthrop Award Goes to Mirowitz

A team of researchers led by Scott A. Mirowitz, M.D., instructor of radiology, has developed a technique for magnetic resonance imaging of the upper abdominal area. The results of their research was published in the April, 1990 issue of the journal, *Radiology*, and was placed into competition at the annual meeting of the Society of Computed Body Tomography held recently in Palm Springs, California.

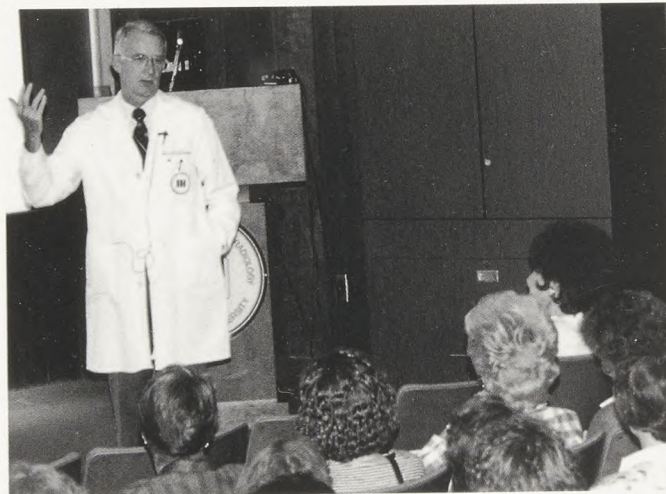
From more than 20 papers presented for the competition, Mirowitz, along with Joseph K. T. Lee,

M.D.; Jeffrey J. Brown, M.D.; Steven S. Eilenberg, M.D.; Jay P. Heiken, M.D.; and William Perman, Ph.D., received one of three major awards—the prestigious Winthrop Award, which carries a \$10,000 grant for further research.

Called rapid acquisition spin-echo (RASE), the technique produces images that are free of respiratory-induced blurring while allowing for dynamic contrast material-enhanced scanning of the entire liver using the contrast agent, gadolinium. The study, the only one of its kind in the United States, involved the imaging of various organs in 100 patients who each had to hold his breath for 23 seconds, which is well within the breath-holding capability of most patients, while a contrast agent was administered intravenously.

According to Mirowitz, "Although previous studies have demonstrated superior sensitivity of magnetic resonance imaging compared to computed tomography in detecting liver lesions, implementation of MR for scanning the upper abdomen has been met with several obstacles. Foremost among these obstacles are the long acquisition times and the degrading effects of physiologic motion, such as breathing, on the MR image."

This breath-holding technique will improve the quality of MR images as well as reduce imaging times for claustrophobic patients or those with other conditions that limit tolerance of extended imaging times.



Thomas Murry

*Ronald G. Evens, M.D., director of the Institute, greeted the members of Greater Missouri: Focus on Leadership. This diverse group of professional women believes that effective leadership calls for knowledge as well as commitment. Evens talked about the health-care dilemma our society faces:*

*how to make a shrinking budget cover costlier health care. "The answer ultimately lies with you; you will have to decide what you are willing to forgo in the way of medical technology. We can't have it all," explained Evens to more than 60 attendees.*

## Roti Roti Elected to Office

Joseph L. Roti Roti, Ph.D., professor of radiology and chief of the cancer biology section, has been elected to a three-year term for the office of councilor-at-large of the Radiation Research Society in recognition of his contributions to cancer biology research, his work in the measurement of molecular changes in cancer cells' response to heat and radiation, and his development of mathematical tools measuring the effects of radiation and heat. Roti Roti's research has centered on the mechanisms of cell response to radiation, chemotherapy, and hyper-

thermia with emphasis on cell kinetics and nuclear targets.

As one of 10 members serving in this capacity, Roti Roti will assist in policy recommendations and changes and committee reports as well as voting on issues and bylaws.

An international organization of over 2,000 scientists, the 38-year-old Radiation Research Society encourages the advancement of radiation research in all areas of the natural sciences while promoting the dissemination of knowledge.

# SPOT NEWS



(left to right) William J. Hoskins, M.D., speaker for the 1990 Probstein Oncology Lecture and an advocate for the development of a screening method for ovarian cancer, was cited for his contributions to clinical oncology by Carlos A. Perez, M.D., director of the Radiation Oncology Center.

## Ovarian Cancer: The Silent Killer

William J. Hoskins, M.D., guest speaker for the annual Probstein Oncology Lecture, had some disturbing statistics to share with his audience: more than 20,000 women in the United States will be diagnosed with ovarian cancer (attributed to 29 percent of cancers in women), and 53 percent of those women will die as a result of the disease.

The cause of ovarian cancer is unknown; there is no screening examination as there is the Pap smear for cervical cancer or the mammogram for breast cancer. Called "the silent killer," ovarian cancer usually demonstrates no signs or symptoms until the

disease is in an advanced stage. This cancer tends to spread quickly throughout the abdominal area, often involving lymph glands, the liver, or the lungs.

Hoskins, associate chief of the gynecology service at Memorial Sloan-Kettering Cancer Center and associate professor of obstetrics/gynecology at Cornell University Medical Center in New York, pointed out in his talk, "Ovarian Cancer: Current Treatment and Future Perspective," that there is a bright spot in the fight against this disease. The National Cancer Institute has formed a task force to establish some

method of screening for ovarian cancer. Research into the staging of this cancer holds great promise.

In one of Hoskins' studies involving 67 patients, 25 percent of those women whose cancer had been detected and then had undergone surgery had tumors remaining after surgery.

"The importance of surgical evaluation of the entire tumor area and its staging is critical in the second look. The less tumor remaining at the end of surgery, the better the survival rate," said Hoskins.

According to Hoskins, chemotherapy will play a major role in defeating ovarian cancer. Patients will have a 50 percent chance of survival if tumors remaining after surgery are detected and if surgery is followed by chemotherapy.

"A very intensive chemotherapy treatment plan, a high dose administered intravenously, may be effective," he said.

## Welch's Research Earns American Chemical Society Honors

In the 23 years since Michael J. Welch, Ph.D., professor of radiation chemistry, first joined the MIR staff, his contributions in the field of radiopharmaceutical chemistry have been many. His work, focusing on the labeling of chemical compounds with short-lived radionuclides, is cited worldwide, and the compounds developed by Welch and his research team are used for medical research and diagnosis throughout the world.

In recognition of his achievements, the more than 30,000 members of the American Chemical Society (ACS) selected Welch as recipient of the prestigious ACS Award for Nuclear Chemistry. The presentation was made in April at the 199th ACS National Meeting in Boston.

# SPOT NEWS

## Royal Assesses Effects of Chernobyl

Henry D. Royal, M.D., associate professor of radiology and associate director of Nuclear Medicine, was one of two U.S. physicians invited to participate in an in-depth study of illnesses attributed to the 1986 nuclear reactor explosion in Chernobyl. Prompted by a request from the International Atomic Energy Agency (IAEA) and the Soviet government, Royal, who serves on the IAEA's medical effects team, reviewed data collected by Soviet scientists regarding the effects of the nuclear accident.

The IAEA includes representatives from 113 countries who are considered experts in the fields of radiation protection, medicine, epidemiology, radioecology and psychology. The medical effects team analyzed the clinical health effects from radiation exposure and evaluated the general health situation in the areas of corroboration of bioassay and biological dosimetry, blood disorders, immune function, lead toxicity, neoplasms, thyroid disease, the effects on pregnancy and birth rate, nutrition analysis, cataracts, and stress effects.

The government and the people of the Soviet Union are concerned about the radiological conse-

quences from the nuclear accident as well as the impact of living in contaminated areas. "The people are our main concern," said Royal. "Although a complete assessment of the effects of the accident will take many years, the presence of an independent team of international experts hopefully will alleviate some of the anxiety of the Soviet people."

The medical effects team will make a second visit in the fall of 1990 to perform its own health survey, examining the people from contaminated and noncontaminated villages to determine the incidence of potential radiation-related illnesses.

## Dual Honors for Wilson Award

For the fourth consecutive year, the presentation of the Hugh M. Wilson Award was made to two graduating medical students who made meritorious contributions to the Department of Radiology. The 1990 recipients are Paul L. Chesis, M.D., Ph.D., and Christopher M. Speidel, M.D.

According to Fernando R. Gutierrez, M.D., associate professor of radiology, who assisted in reviewing the nominations, "Each year the continuous high quality of the nominees causes the selection process to become more and more difficult. This year's nominees have made significant contributions with their work at the Institute."

Chesis, who completed his Ph.D. studies while working with Michael J.



Michelle Wynn

According to Ernest L. Wynder, M.D., president and founder of the American Health Foundation and keynote speaker for the 1990 Freund Lecture, "The function of medicine is to help people die young as late in life as possible." Wynder's

lecture, "Cancer Prevention and the Role of Nutrition," highlighted the correlation between lung cancer and smoking and dietary fat. Carlos A. Perez, M.D., (right) honored Wynder for his meritorious research in clinical oncology.

Welch, Ph.D., professor of radiation chemistry, conducted research on the synthesis and characterization of positron emitting ligands for the opioid receptor system. His work has resulted in four publications (one in the *Journal of Nuclear Medicine* and three in press) as well as five presentations at the Society of Nuclear Medicine meeting in June.

In his work with Michael W. Vannier, M.D., professor of radiology and director of the image processing lab, Speidel

implemented a comprehensive computerized database consisting of thousands of examination records. "Speidel's research in the area of multispectral magnetic resonance image analysis is very important in our laboratory," said Vannier.

Chesis and Speidel were officially presented with the Wilson Award, which honors former Mallinckrodt Institute Director Hugh M. Wilson, by Ronald G. Evens, M.D., director of the Institute, at the Annual Senior Awards night in May.



A N D B A B Y M



*Connie and Jim Pisetta:  
"Brenden will always  
be our miracle."*

# MAKES THREE



**N**o matter what room you are in, the cozy home of Jim and Connie Pisetta in suburban St. Louis conveys a distinct message: A baby lives here. Playpen in the living room. Pediatrician's phone number on a kitchen blackboard. Baby pictures on the refrigerator door. Stenciled teddy bears in a small bedroom belonging to eight-month-old Brenden.

But as the plump child sleeps in his mother's arms, Connie Pisetta recalls a time when this scene was only a dream. Before Brenden was conceived, she and Jim had waged a war against their infertility—in their case, caused by an obstruction in Connie's Fallopian tubes. Riding an emotional roller coaster of hope and despair, Connie eventually stopped going to the baby showers of friends and relatives.

"I was happy they could have a baby," says Connie, 33, "but it just reminded me of something I really wanted and couldn't have."

By Robert Lowes

CHRIS W.

# BABY

**T**hanks to an innovative, two-step procedure for infertile women, available through the Mallinckrodt Institute of Radiology (MIR) and Barnes Hospital at the Washington University Medical Center, Connie and Jim Pisetta's dream has come true. The new technique, which pinpoints and removes blockage in the Fallopian tubes without surgery, is beginning to produce results for some of the nation's 3.5 million infertile couples.

McClelland calls the success rate of 58 percent a "statistical variant" and predicts that as he performs more of the procedures, the success rate will resemble the somewhat lower percentages attained by Amy S. Thurmond, M.D., the radiologist at the Oregon Health Sciences Univer-

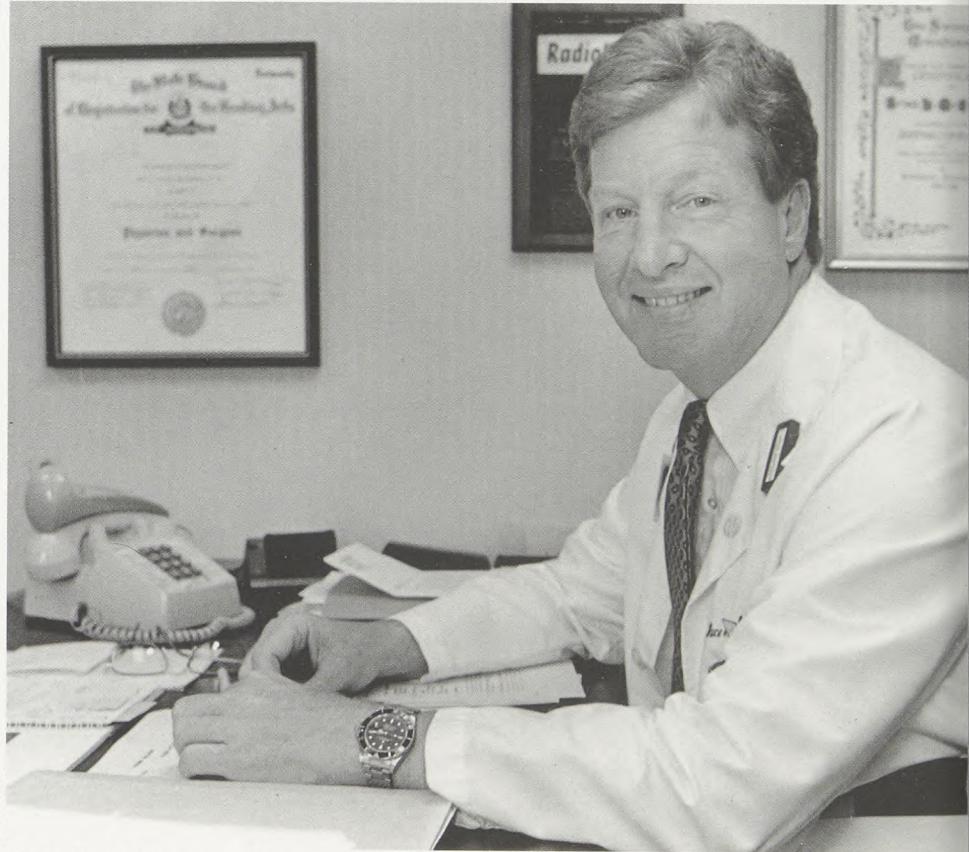
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*Clogged or diseased Fallopian tubes account for between 30 and 50 percent of all cases of female infertility.*

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sity in Portland who perfected the technique.

"Depending upon the background of the women and the length of follow-up, we're seeing success rates between thirty and fifty percent," says Thurmond, an assistant professor of radiology and obstetrics-gynecology.



Cliff Willis

**Bruce L. McClelland, M.D.**

**"O**ne reason for the higher success rate in St. Louis could be the careful follow-up," explains Pineda. "Identification and treatment of other factors contributing to the infertility in many of our patients explain—in my belief—our success. This case is just one of many examples we have with more than one factor present."

McClelland notes that the selective ostial salpingography and recanalization performed at both Washington University Medical Center and Oregon Health Sciences University has involved the so-called proximal (initial) section of the Fallopian tube feeding into the uterus. Blockage

here usually stems from easily removed webs or debris. Recanalization is not effective in the peripheral portions of the tubes near the ovaries, where scar tissue following an infection is a common cause for blockage. Scar tissue often does not give way to a probing catheter or guide wire. The proximal section also invites the new procedure because it is smaller in diameter than the peripheral section, close to the uterus itself, and thus less accessible to surgeons.

Selective ostial salpingography and recanalization, introduced in

1986, boasts several advantages over traditional methods to treat blocked Fallopian tubes. Hysterosalpingography (HSG) has been the standard test for detecting occlusions. A contrast medium is injected into the uterus as opposed to the Fallopian tubes themselves. HSG uncovers tubal barriers, but does not define them as precisely as selective ostial salpingography. The latter technique, for example, can tell whether blockage is due to a muscle spasm or an actual physical barrier.

Clogged or diseased Fallopian tubes account for between 30 and 50 percent of all cases of female infertility, which in turn is responsible for 60 percent of all infertile couples. Dysfunctional tubes prevent the union of sperm and egg necessary for conception.

Selective ostial salpingography, the first step of the procedure used with Connie, involves injecting a contrast medium into the openings, or ostia, of the Fallopian tubes via a catheter. An X ray will reveal any barrier, such as a plug of mucus or scar tissue. In the procedure's second step, called recanalization, a flexible, soft-tipped wire is pushed through the catheter into the Fallopian tubes to penetrate and/or bypass the obstructions.

A radiologist frequently can open a tube by manipulating the catheter without resorting to the wire. In some cases, recanalization per se is not necessary; the contrast medium itself will clear out the tubes. Because the tubes can shut down again over time, a few women must have a second recanalization.

**O**n March 21, 1988, Connie Pisetta became the first patient to undergo selective ostial salpingography and recanalization at the Washington University Medical Center. Doing the honors were Bruce L. McClennan, M.D., professor of radiology at MIR, and Jorge Pineda, M.D., assistant professor in the Obstetrics-Gynecology Department of Washington University School of Medicine's

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*Connie's hopes repeatedly skyrocketed and crashed. Jim kept his expectations in check as a counterbalance.*

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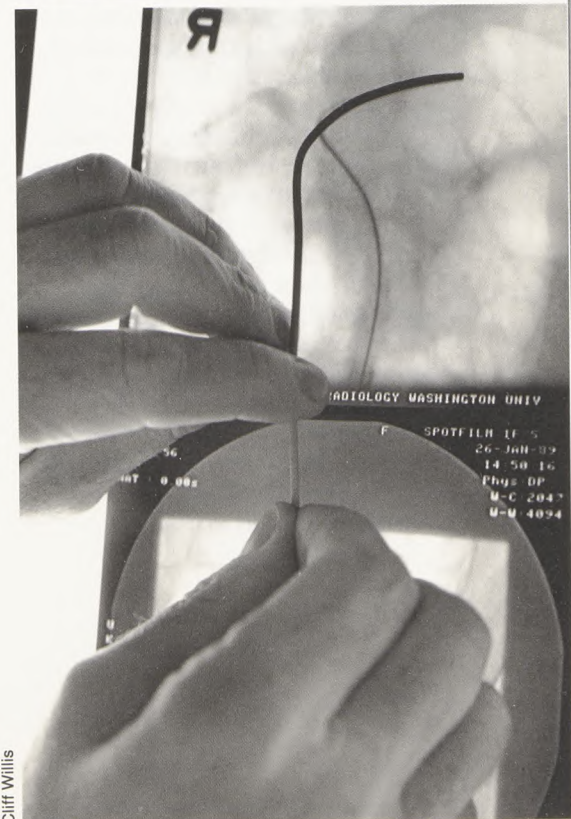
Division of Reproductive Endocrinology.

Since then, McClennan, Pineda and other members of the Obstetrics-Gynecology Department have performed the procedure on over 30 patients. Among the first 25 patients selected for follow-up study, 22 had at least one Fallopian tube opened and 17 of these were attempting to conceive after recanalization. Ten of these 17 patients indeed became pregnant, a success rate of 58 percent. While two women had three miscarriages and another an ectopic pregnancy, five other women delivered babies—four boys and one girl—and two had ongoing pregnancies as of June, 1990.

**U**ntil recanalization came along, infertility specialists routinely turned to surgery to unblock Fallopian tubes. The defective portion is excised and the ends refastened. However, the patient typically spends several hours on the operating table and four days in the hospital. Her medical bills run as high as \$10,000. The recovery period can stretch out for four weeks. Plus, the patient might not know for months whether her tubes are functional.

In contrast, selective ostial salpingography and recanalization can be performed together on an out-patient basis in less than 45 minutes using little or no intravenous sedation. A second injection of contrast medium

*This soft-tipped flexible guide wire (placed on top of the hysterosalpingogram here) is fed inside a catheter through the cervix, across the uterus, and into the Fallopian tube.*



Cliff Willis

# BABY

immediately following recanalization confirms whether the tubes are open, sparing the patient months of uncertainty. She also avoids the risks associated with surgery. Recovery is a matter of hours, not weeks. And the cost is about \$1,000—an important consideration for infertile couples who normally spend a great deal of money attempting to conceive.

The new procedure also outshines the old in terms of efficacy. "The overall viable pregnancy rate we quote for surgery will be between twenty to forty percent," says Pineda. And *in vitro* fertilization, another expensive option, yields pregnancies only 15 percent of the time.

For Connie Pisetta, however, the only statistic worth knowing about infertility cures is one called Brenden Pisetta.

"The happiest day of my life, I would have to say, was when this little guy was born and I heard him cry," says Pisetta, a hairstylist with seven brothers and sisters.

**M**any unhappy days had gone before. Connie and her husband Jim, 35, a county construction inspector, had been married a year when, in 1986, they decided to start their family. Connie had vowed to have a baby by the age of 30. Yet after six months of unprotected intercourse (the time it usually takes for one of every two women to become pregnant the first time), the Pisettas' family remained at two.

They sought help from Connie's doctor. Jim underwent sperm tests. Connie was tested to determine whether she was ovulating properly, and, yes, she was. Another test, however, showed that her progesterone output was low, so her physician prescribed drug therapy to raise the level. Connie took her basal

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*"There are few things  
I've done in radiology  
as gratifying as  
helping someone have  
a live birth."*

*Bruce McClennan, M.D.*

---

body temperature religiously to identify the most fertile days of her menstrual cycle. She and her husband prayed. Still no baby.

Her 30th birthday was coming up fast. Connie says her goal of motherhood became an obsession.

"All my sisters had babies and I'm the oldest, and I still didn't have a baby," says Connie. "I became very, very moody. It seemed like every month, I would live two weeks at a time. I'd think, 'Two weeks from now I will ovulate and two weeks from then I'll probably be pregnant.' When I had my period, I would actually mourn. It was just a letdown, such a big, bitter letdown."

Connie's hopes repeatedly skyrocketed and crashed. Jim kept his expectations in check as a counterbalance.

"I tried never to get too emotionally high," he says. "She

sometimes thought I wasn't concerned enough."

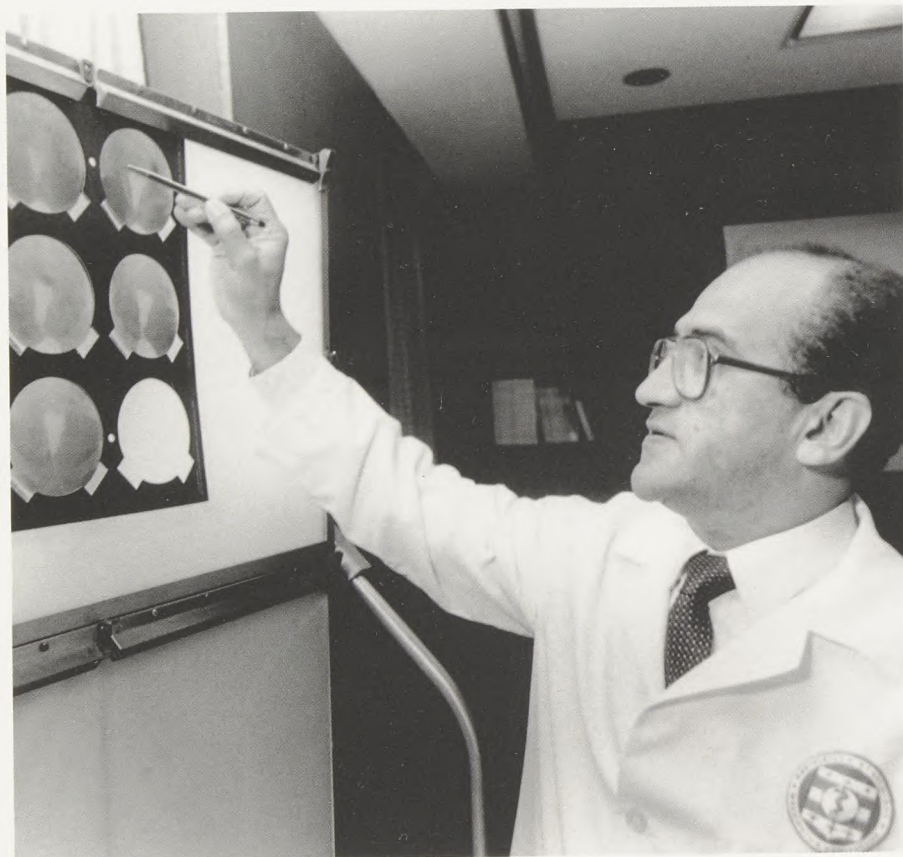
With its load of anguish and guilt, infertility crushes many a marriage. It tested the strength of Connie's and Jim's marriage, but despite scheduled sex, endless tests and false-alarm pregnancies, their foundation of love didn't crack.

"I told her if we don't have children, I'll still love her and grow old with her," says Jim.

**C**onnie's private physician finally referred her to Pineda at the Washington University Medical Center in late 1987 after an HSG suggested her Fallopian tubes were blocked. A laparoscopy, in which an endoscope is inserted through an incision through the navel, failed to reveal any kinking or scarring that might have shut down her tubes. These findings, says Pineda, suggested that debris in the proximal section of the tubes was the culprit.

Connie was scheduled for selective ostial salpingography and recanalization at 7:30 a.m., March 21, 1988. Because this was Mallinckrodt Institute's first, "we did the procedure in the operating room," says McClennan. "We took every precaution known to man."

Under fluoroscopic guidance, a catheter was advanced through the cervix, across the uterus and to the opening of one Fallopian tube. McClennan injected the contrast medium. Where the contrast medium stopped flowing in the tube marked the



**Jorge Pineda, M.D.**

occlusion. Then McClennan inserted a smaller catheter inside the first catheter. Inside the second catheter went a guide wire. Two pairs of hands were needed to snake the small catheter and wire into the Fallopian tube. Recanalization took only a few minutes. Pineda recalls

that the barrier felt very soft.

McClennan flushed contrast medium into the tube again. This time, it filled up completely—proof that the obstruction was gone. The process was repeated for the second tube. It, too, was opened.

Connie's joy over the successful procedure outweighed the slight discomfort she was experiencing. She eagerly asked Pineda if she and Jim could resume their baby-making efforts. Pineda advised her to wait a month for safety's sake.

Pregnancy eluded the Pisettas for many months, and Pineda urged his anxious patient

to relax. "He could see this was taking over my life," she says. Fortunately, Pineda spotted the last problem. Because Connie didn't produce enough progesterone on her own, her uterine lining did not mature to the point where it could support a fertilized, implanted egg. Therefore, Pineda prescribed Clomid as well as another hormonal medication to boost her progesterone production.

**F**inally, in March 1989, a pregnancy test proved positive. Connie recalls coming home to tell Jim, "We're going to have a baby! We're really going to have a baby!" After tears of joy, the Pisettas celebrated by dining on linguine in shrimp sauce at an Italian restaurant.

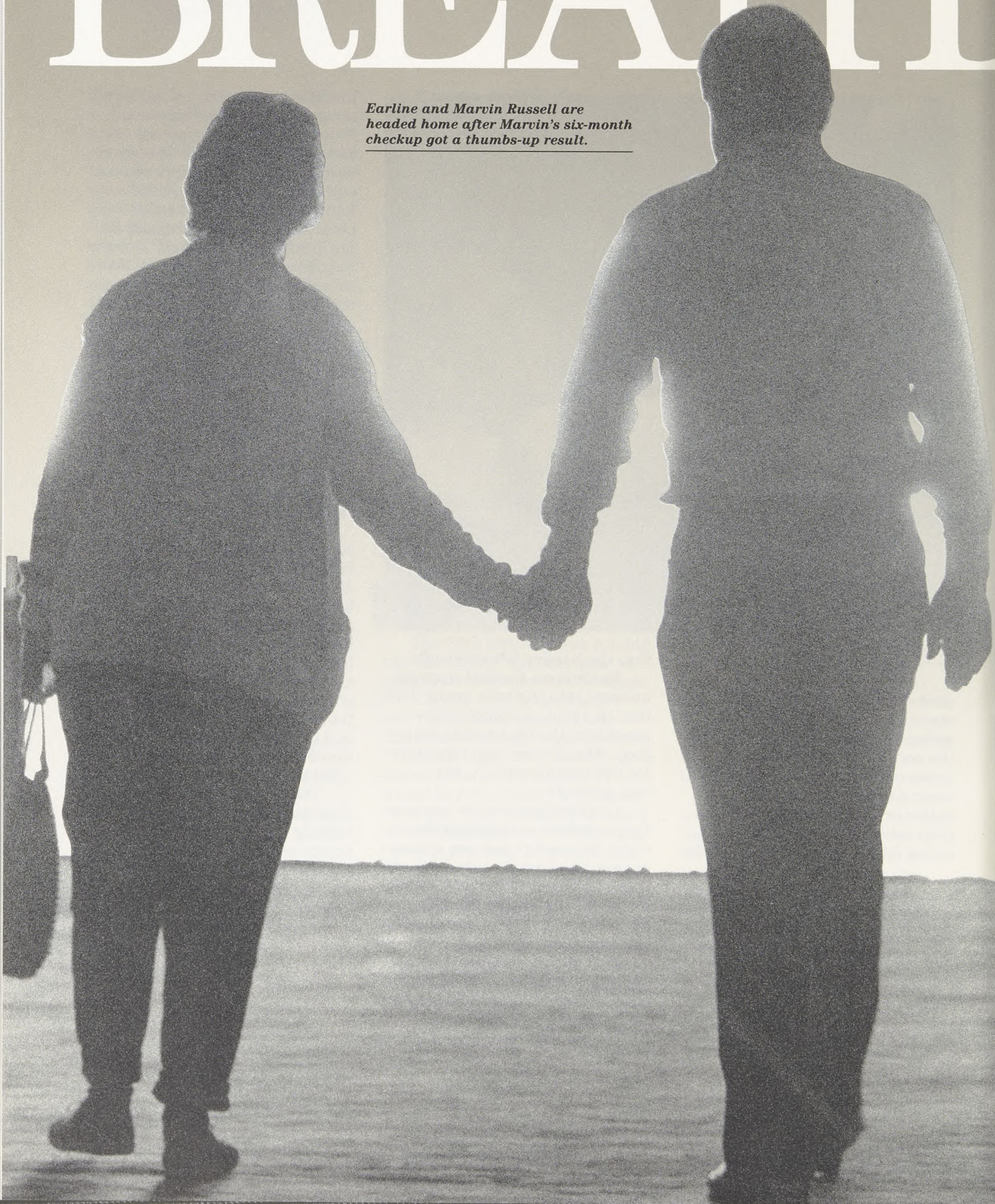
These days, Connie cooks supper with one arm while cradling Brenden in the other. Jim makes late-night runs for baby food and formula. Although some of the initial awe of Brenden's birth has worn off, the Pisettas like parenthood enough to want a second child someday. That goal is no painfully entertained fantasy, now that radiologists and gynecologists can journey into Fallopian tubes to open what nature has closed.

"There are few things I've done in radiology as gratifying as helping someone have a live birth," says McClennan. □

Cliff Willis

# BREATHED

*Earline and Marvin Russell are headed home after Marvin's six-month checkup got a thumbs-up result.*



# NG EASY

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by Vicki Kunkler

**M**ost of us take breathing for granted. We don't have to think about it or push a button to make it happen—we just breathe, effortlessly and automatically. But for some breathing becomes an all-consuming task.

Ask emphysema sufferers what part of their lives are concerned with the problem of breathing, and most will say 100 percent. There are more than 1.9 million people in the United States who have varying stages of emphysema, which is categorized as a chronic obstructive pulmonary disease (COPD) along with asthma and chronic bronchitis. Patients with an advanced form of the disease literally can smother to death from the large pools of air held in their lungs. The outlook, however, is not as bleak as it appears. There is hope for emphysema patients.

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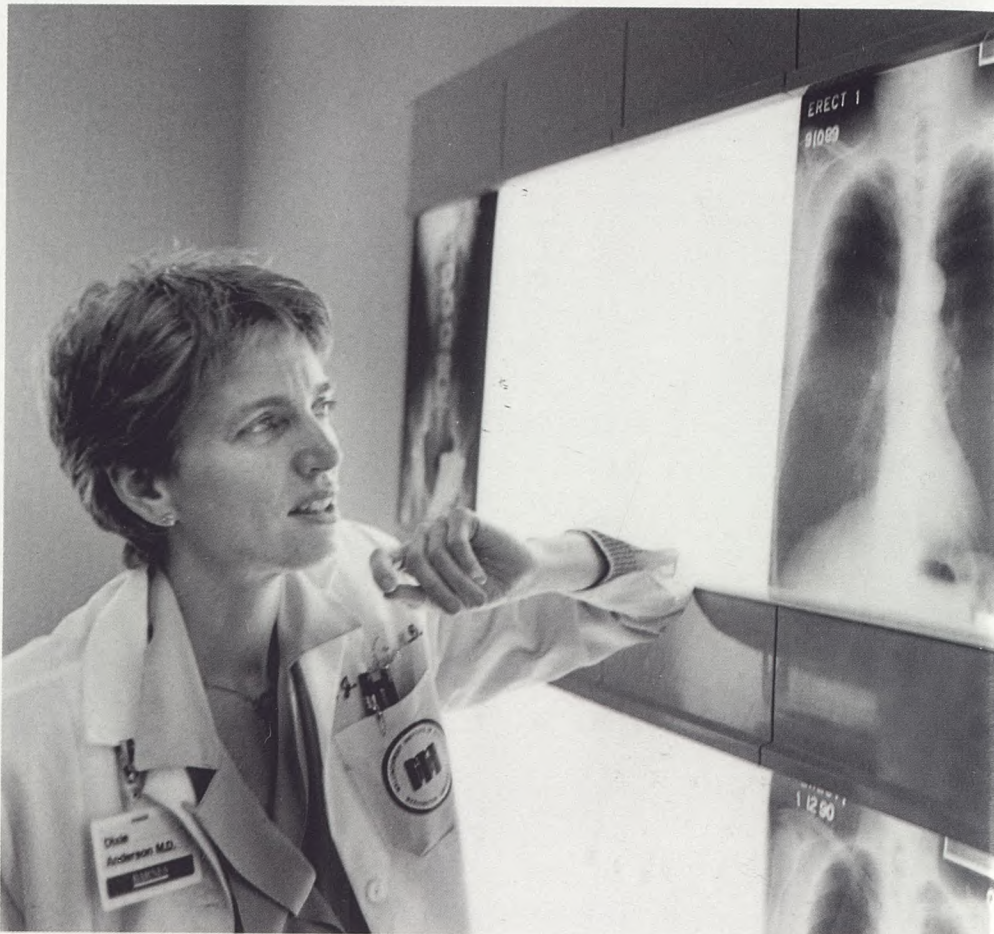


# BREATHING EASY

## BREATHING EASY

Joel D. Cooper, M.D., professor of surgery and head of the Section of Thoracic Surgery at Barnes Hospital, and Dixie J. Anderson, M.D., associate professor of radiology at the Mallinckrodt Institute of Radiology, are collaborating on a study involving patients who have undergone single lung transplants for emphysema. The two most common complications for transplant cases are infection and rejection. Anderson and Cooper hope this study, the first of its kind involving this particular type of surgery, will play a key role in the detection of either of these two problems.

Marvin Russell of Fordyce, Arkansas, has emphysema. A robust man of 56, Russell says now he is having the time of his life, thanks to a lung transplant performed by Cooper and his thoracic surgery team in November of 1989. Russell was diagnosed as having emphysema by his physician in Arkansas during a routine physical examination eight years ago. According to Russell, the diagnosis was a complete surprise. He appeared to have none of the symptoms commonly indicating emphysema: a barrel-shaped chest caused by an overabundance of air in the lungs, severe breathlessness from any type of exertion, weight loss, frequent swelling in the arms and legs, a bluish tinge to the skin caused by insufficient gas exchange, tightness in the chest area, wheezing, or intolerance to cold or smoky atmospheres.



Cliff Willis

*Dixie Anderson, M.D.*

The exam showed that Russell's lung capacity was below the accepted average level. The culprit? In Russell's case, it was undoubtedly his habit of smoking two packs of cigarettes a day, a habit he had cultivated since the age of 26. According to Cooper, "Emphysema falls into two categories: smoking-induced or inherited, with smoking-induced being the more common of the two, especially in older patients. Emphysema in younger patients usually stems from an inherited predisposition to the disease."

What is this disease called emphysema? To understand the disease, we need to understand exactly what part the lungs play in the make-up of our bodies. The right lung has three lobes (or portions): superior, middle, and inferior. The left lung has two: superior and inferior. Each lung is surrounded by two layers of protective tissue called pleura. The lungs are made up of air passage-ways (bronchi), gas exchange

# ING EASY

sacs (alveoli), and numerous blood vessels. Situated under the rib cage and protected and supported by 12 pairs of ribs, muscles, and the diaphragm, the lungs provide our bodies with oxygen—without oxygen, no organ or tissue can survive.

Oxygen, paired with chemical reactions in our bodies, produces energy. Carbon dioxide, a waste

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*The two most common complications for transplant cases are infection and rejection.*

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product of these reactions, must be removed from the body, and this exchange of inhaled oxygen and exhaled carbon dioxide is why our lungs are so important.

In end-stage emphysema, both lungs are affected as they no longer perform their vital gas exchange functions. Large pools of air fill the lungs, causing the air ducts and air sacs to distend either throughout the lungs or in particular sections. This enlargement often causes destruction of the partitions between the air sacs. The lung tissue loses elasticity and, therefore, cannot push out the air. The capillary walls are diminished or disappear entirely. The lung tissue becomes dry and pale from malnutrition and has a "lacy" appearance.

Russell's wife, Earline, says, "Marvin isn't the type to just lie down and give in to being ill. At first, he kept right on working in the garden and fishing and doing almost everything he had always done."

However, Russell's condition rapidly deteriorated and within the six years following his initial diagnosis, his life drastically changed. As breathing became more and more difficult, Russell had to forgo many of the activities he had always enjoyed. Eventually the disease forced him into an early retirement from his position as director of the Assessment Coordination Division of the Public Service Commission for the State of Arkansas. He acquired a new companion—a tank of portable oxygen. And, finally, he was dealt the final blow; his doctors told him he had from eight to 12 months to live.

"I guess that was the lowest point in my life," says Russell. "I considered myself a fairly young man, too young to die. Earline and I have nine children and twenty-three grandchildren. I had a lot of reasons to live."

Russell credits oldest son Steve with saving his life, "along with Doctor Cooper;" he quickly adds. Steve was in the home-care field of inhalation therapy and had heard about a surgeon in Toronto, who, in 1986, had begun working with double-lung transplantations in emphysema patients. That surgeon was Joel Cooper. A call was made to Toronto in an effort to learn more about the procedure.

Russell explains, "At first thought, the drawbacks seemed overwhelming—all the costs of traveling to Canada for the transplant plus the transplant itself and the fact that the odds of surviving the transplant were about one percent. But I decided

that somehow everything would work out, and I didn't care what the odds were. Any odds were better than what I had."

A sprinkling of luck and a large dose of the Russell family's strong faith seemed to intervene. Cooper transferred from Toronto to the Washington University Medical Center in St. Louis, or, as Russell says, "practically in my backyard."

The Russells headed to St. Louis. After a two-week evaluation of his condition by a transplant team (which included a pulmonary physician, a thoracic surgeon, a cardiologist, a cardiovascular surgeon, the transplant coordinator, a psychologist, a dietician, a social worker, and a pulmonary therapist), Russell was accepted as a candidate for lung transplantation. Based on the results of several tests, the evaluation team determined that Russell's right lung had the lowest exchange of air and, therefore, was the lung to be replaced. Now came the hard part, waiting for a suitable donor.

In lung transplants, and all transplant procedures, time is crucial. A lung must be transplanted within six hours from the time of removal from the donor. Out of necessity, the Russells remained in St. Louis, renting an apartment near the Medical Center. Russell was told that a donor lung could be available anywhere from two days up to six months. His subsequent days were filled with hope as well as fear and frustration.

But as Russell explains, "The fear was minimal. All I could think about was that I was being given a second chance."

# BRI

## BREATHING EASY

By November of 1989, within two months of his acceptance into the program, Russell was in the operating room receiving a new right lung from a donor who matched Russell in height, weight, chest measurements, and blood type.

During the six weeks following Russell's transplant, he underwent dozens of tests and his X rays became part of a study conducted by Anderson aimed at the detection of complications. A definite plus in transplant procedures is the early detection of any complications that could lead to infection or rejection. Early detection can mean the difference between successful treatment or losing the transplanted organ or possibly the patient.

Cooper, the pioneer in the field of lung transplantation in emphysema patients, performed the first successful transplant in North America in 1986 while in Toronto. In the early stages of the program, Cooper said that the double-lung transplant was very complicated and not well tolerated by older patients. Eventually, the program placed an age restriction on candidates: only those patients 50 years old or younger would be eligible.

What about these so-called high-risk patients over 50? Cooper knew that one or two successful single transplants had been done in Paris. He was determined to redesign his program to accommodate the age group where emphysema appeared to be more prevalent.



Patti Gabriel

The lung transplant program at the Washington University Medical Center began in July, 1988, and has involved more than 40 patients, with 20 of these patients suffering with emphysema. The Medical Center boasts the largest transplant program in North America, with similar programs available only in San Antonio and Toronto. Anderson's and Cooper's study focuses on 11 of these emphysema patients who had undergone single-lung transplants since May, 1989.

According to Anderson, "A series of chest radiographs were reviewed to determine the usual postoperative appearance of the transplant and to evaluate changes correlating with specific complications. We organized these films according to the number of the week following surgery, first week out, second, and so on."

Anderson's eyes searched the films for volume loss, the presence of liquid in the pleura of the thoracic and lung cavity,

*In 1986, Joel D. Cooper, M.D., performed the first successful lung transplant in an emphysema patient in North America.*

and variations in the positioning of the diaphragm, or collections of air in the lung. For study purposes, the lung was divided into four regions: perihilar (that area of the lung where the bronchial tubes, blood vessels, and nerves enter the lung), apical (the rounded upper portion of the lung), midlung, and lower lung. Each of the four areas was evaluated for the fluids, cells, or other abnormalities that had accumulated in the lung tissue.

Ventilation perfusion studies measuring the exchange of air between the lungs and the sur-

# NG EASY

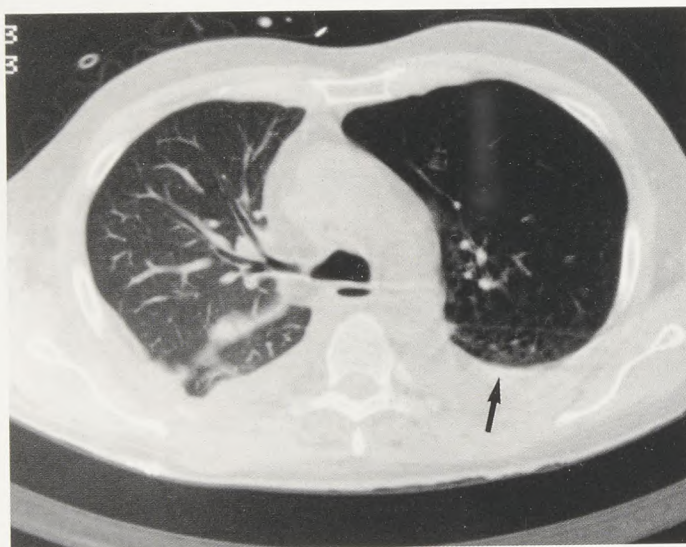
rounding air were obtained on the first postoperative day and at regularly scheduled intervals thereafter. These results then were compared with the studies taken before the operation.

Computed tomography (CT) scans evaluated any abnormal opacity on the chest X rays or a suspected tear in the airway. In addition, fluoroscopy was administered to show diaphragmatic motion, an angiogram assessed vascular conditions, and a bronchogram monitored the incision made in the bronchial tube in order to attach the new lung.

Test results from each of the 11 patients were individually and collectively recorded, analyzed, and compared. As a result, Anderson believes that (1) the chest X ray will very likely show changes in the transplanted lung within the first six weeks following surgery, especially in the perihilar and lower lung region, (2) the

*Anderson's eyes searched the films for volume loss, liquid in the pleura, and changes in the position of the diaphragm.*

perfusion studies accurately assess individual lung function and can be a valuable guide for confirming vascular patency, and (3) CT is an excellent method for assessing bronchial condition following single lung transplant.



According to Anderson, "Single lung transplant for emphysema is a technique likely to be performed in many transplant centers in the coming decade. The results of our study thus far have been very promising, and the conclusions from the study should play a major role in the assessment of these transplants."

Cooper agrees, "This is a very new field, and a diagnosis of possible rejection is difficult to obtain. This study will greatly enhance our general management of the transplanted lung, while affording us a reasonable idea of what changes can be expected after the operation."

Marvin Russell considers himself a total success story "from the minute my new lung settled in my body and started breathing on its own."

"I was in intensive care just two days instead of the usual five and stayed in the hospital

*In this computed tomography (CT) scan, evidence of the destruction caused by emphysema (shown by arrow) is apparent when compared with the healthy, transplanted right lung. The transplanted lung clearly shows branching blood vessels and open air passageways.*

only nineteen days," he says. "I was back home in Fordyce a month before I had planned."

Russell feels great and attributes his well-being to the fact that he follows his doctor's instructions to the letter. His regimen includes Prednisone (a medication to suppress rejection of the lung) taken twice daily, a special diet, an exercise program, and scheduled rest periods. Although it's been eight months since the transplant, Russell still is in a recovery period. He recently returned to Barnes Hospital for his six-month checkup and will return again in one year. All test results from the six-month checkup were good, and Russell is optimistic that he'll "live to a ripe old age."

"But, if I die tomorrow, I'll still think it was a success," he adds. "Most people go from life to death; this new lung allowed me to go from death to life." □



*To regain mobility in her left knee, Marie Tarter, M.D., underwent one to two hours of physical therapy daily for six weeks.*

# Joint Effort

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MRI Helps Diagnose  
Thousands of Sports Injuries  
Suffered by Athletes Each Year

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By Vicki Kunkler

A year ago, Marie Tartar was speeding down a ski slope in Salt Lake City, Utah. Two miles up the mountain, she was enjoying a good run. Within a matter of seconds, she was shaking off the snow and uprighting herself after what Tartar calls "an unlucky fall." The tumble had not produced agonizing pain, but, instinctively, she knew something was wrong.

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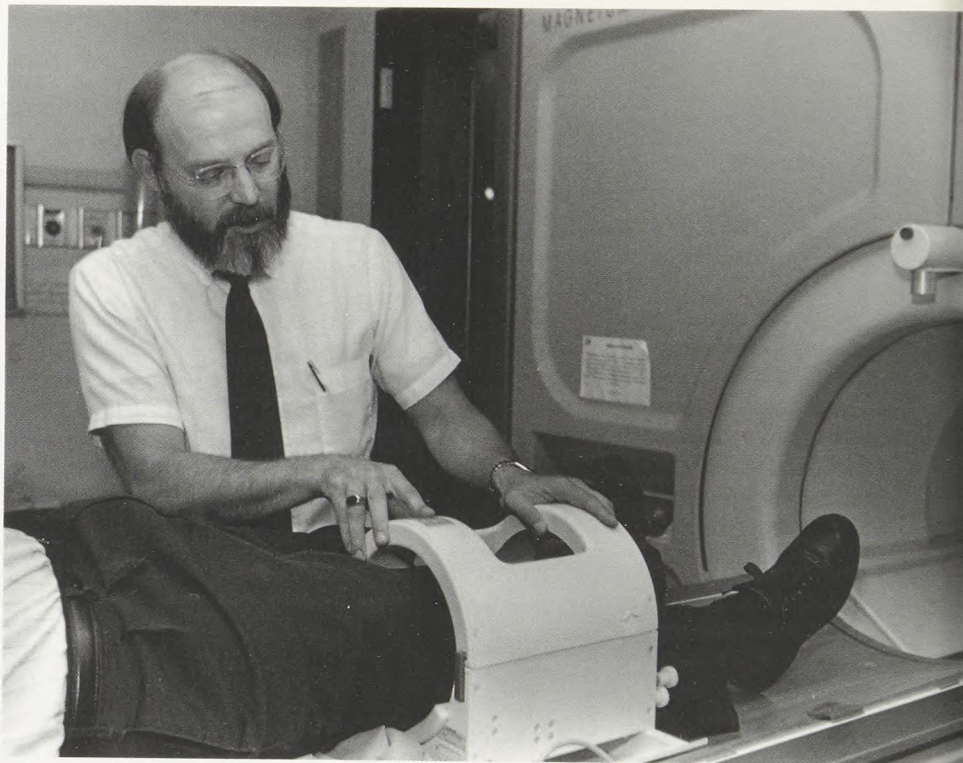
# Joint Effort

**M**arie Tartar, M.D., senior resident at Mallinckrodt Institute of Radiology, knew her left knee had more play in it than it should. Luckily for her, and for thousands of other athletes—professional and amateur—who suffer injuries each year, magnetic resonance imaging (MRI) provides a comprehensive, painless way of diagnosing joint injuries.

According to William G. Totty, M.D., associate professor of radiology in the Institute's musculoskeletal section, "Joints take all the stress and strain of our bodies. It's reasonable that joint injuries are going to be commonplace."

Nuclear magnetic resonance (NMR), the forerunner of MRI, has been around since the 1950s when scientists first used magnetic forces to analyze laboratory chemicals. Clinical trials involving the MR scanning of human patients occurred in 1973. Now, almost three decades past its inception, MRI has become the procedure of choice for diagnosing trauma-related disorders involving the musculoskeletal system.

**U**sing no ionizing radiation (an important aspect for many patients who may require multiple or periodic scans), MRI is based on interactions between a large magnetic field in the imaging equipment and atoms in the human body. The principle of MRI is similar to that of an ordinary radio, using a transmitter and a receiver to produce energy. A patient under-



Cliff Willis

going an MR scan is placed in a strong magnetic field within the scanner. Using a transmitter, radio-frequency energy is transferred to the protons in the patient's body. The protons then return the radio-frequency energy, which is retrieved by the receiver and processed with computers.

MRI places few restrictions on its users. Because of the magnetic field and its effects on metal, patients with pacemakers or those who have undergone certain types of vascular surgery cannot be scanned by MRI, nor can those patients with skull plates, middle-ear prostheses, aneurysm clips in the brain, or metal fragments in or about the eyes.

*William G. Totty, M.D., associate professor of radiology, in the musculoskeletal section.*

**“M**allinckrodt Institute installed the first of three magnetic resonance scanners in June of 1983,” Totty explains. “And we’ve kept them busy ever since. We image about four knee injuries per day.”

Joseph K. T. Lee, M.D., professor of radiology and director of the magnetic resonance imaging section, adds, “Imaging of joints with MRI has really snowballed. Our unit puts in many extra hours to keep up with the requests for scans. The MR scanners run to capacity from seven in the morning to midnight, five days a week and half a day on Saturday.”

As Totty points out, exact numbers of sports-related injuries are hard to predict. The term “sports injury” is ambiguous—covering the younger generation who are actively engaged in some type of sports activity, the older participant who is enrolled in a fitness program, or someone who had a previous sports-related injury and is now, perhaps years later, having problems.

Most knee injuries occur in sports that require twisting or

turning, such as football (the most common knee injury in males), basketball, roller skating, bicycle riding, and snow skiing. According to the National Safety Council, in 1988, more than 450,000 basketball players suffered some type of injury as compared with the 20,000 injuries associated with golfers. The knee is the largest joint in the body, a compound joint between the femur (the large bone in the upper leg), the patella (knee cap), and the tibia (the bone of the lower leg). Because of the upright nature of man, the knee is weightbearing and is the most commonly injured of all joints in the human body.

Since Tartar was aware of her options regarding her injury, she went to an orthopedic surgeon in Salt Lake City as a preliminary measure. He outfitted her with a brace on her left knee and a pair of crutches and sent her home.

After arriving in St. Louis, Tartar headed straight to the Institute's MRI section. She had no hesitation in choosing this diagnostic procedure. In the early years of Tartar's radiologic training, she had worked with numerous injured athletes, administering an unpleasant and often difficult X-ray procedure called an arthrogram that involves

an injection of dye and air through a needle into an already painful joint. Then the traumatized joint is manipulated in order to circulate the dye.

"Even the most physically large athlete would turn a little green when I explained that I had to put a needle into that knee of his that was already causing so much pain," says Tartar.

"Add to that the fact that I then had to push and pull on this

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*"Joints take all the stress and strain of our bodies. It's reasonable that joint injuries are going to be commonplace."*

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person who weighed two times more than I did," she explains. "An arthrogram is exhausting for the patient and the physician."

As Tartar points out, after the patient undergoes this additional stress from arthrography, which can last from 35 to 45 minutes, the downside is that the X ray shows only an outline (from the injected dye) of the knee structure. Arthrography confirms only obvious tears in the anterior cruciate ligaments. Tears or injuries of other ligaments may not be imaged using arthrography.

Totty agrees, "MRI does as well as or better than arthrography in imaging meniscal injuries. It gives a better look at cruciate ligament tears and cartilage surface abnormalities. MRI can clearly define not only those whole groups of abnormalities that arthrography can image but also a large group of abnormalities that arthrography cannot detect, such as subtle fractures, ligament tears, and posttraumatic marrow edema or bone bruise."

"But there will always be a need for arthrography," he adds. "We'll always have those groups of patients who can't have magnetic resonance—those with pacemakers or knee prostheses or people who are claustrophobic."

MRI also has several distinct advantages over X rays as well as computed tomography (CT), a procedure similar to MRI. X rays visualize air, soft tissue, and bone; CT differentiates a few soft tissues such as tendon, muscle, and fluid. MRI, however, distinguishes types of soft tissue even further: muscle, tendon, ligament, articular and fibroid cartilage, fluid, fat, blood, and flowing blood, in addition to bone.

In Marie Tartar's case, a knee coil, which works much like the antenna on your car, was used to obtain the best signal, the highest resolution, and the greatest amount of information from her injury. This coil covers 16 centimeters. A variety of coils are available, like the knee coil, which is matched to the size of the body part being imaged; therefore, there are specific coils to fit the ankle, the knee, the shoulder, the wrist, or the head.



# Joint Effort

The MR scan confirmed that Tartar had torn the major ligament in her knee, the anterior cruciate, which, along with the posterior cruciate, ties the femur and the tibia together and prevents friction between the bones. These cruciate ligaments work in tandem with some shock-absorbing paddlers, the crescent-shaped cartilage called menisci that are positioned between the bones. According to recent studies, the anterior cruciate ligament is the most frequently injured ligament within the knee, accounting for over 70 percent of cases. Oftentimes, a severe tear in one of the two ligaments in the knee also will result in damage to the menisci.

Tartar now had some decisions to make. She could remain in the knee brace and see what evolved

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*Three decades since its inception, MRI is the diagnostic procedure of choice for joint injuries.*

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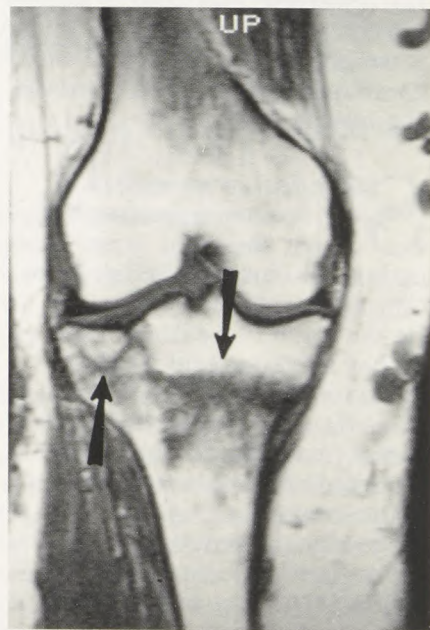
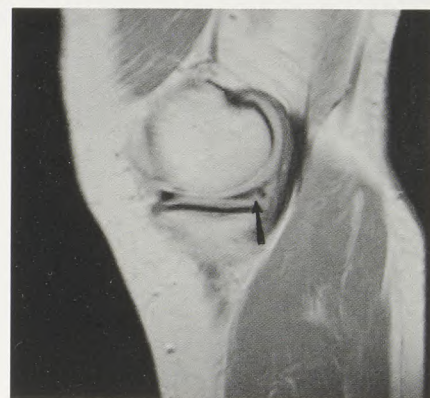
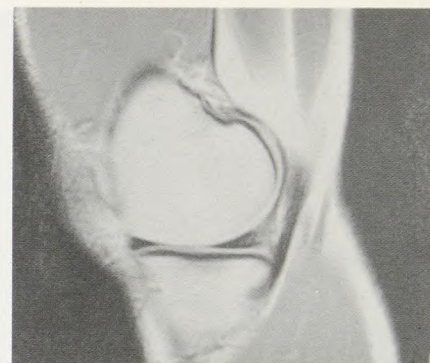
after six weeks of healing, or she could have the torn ligament surgically repaired.

“There was always the chance of needing surgery even if I had kept the brace on for six weeks,” said Tartar. “But I guess my age and high level of activity really steered me toward the surgery. I didn’t like the idea of gearing down physically while still in my twenties.”

Tartar was hospitalized for two days. The surgeon harvested tendon from her patella, tunneling the tendon through the femur and the tibia. She again was fitted with a brace to allow the bone and new ligament to incorporate. The brace went from midthigh to midcalf and kept her leg totally straight. Within a couple of weeks, Tartar graduated to a new brace that allowed limited motion. She wore the brace for six weeks, using crutches at times to relieve some of the stress on the knee.

“The hardest part of the whole ordeal was after the brace came off,” Tartar remembers. “I had lost the normal range of motion in my left knee because of the immobilizing effect of the brace. I underwent one to two hours of physical therapy every day for six weeks, including riding a stationary bike and some aerobic exercises.”

Tartar feels she’s at least 90 percent recovered. She says her knee is not completely as flexible as before the injury but that she has “more than the range of motion needed for her normal activities.” Her diagnosis must be accurate; this winter she plans to hit the slopes once more—hopefully, remaining upright the entire time. □



*The MRI scan on the top shows a normal knee. The scan in the middle shows a medial meniscal tear (as indicated by the arrow). The scan on the bottom shows a fracture (arrows) that was unable to be detected by a routine radiograph.*

# FYI

## THE DIRECTOR'S OFFICE REPORT

### NEW STAFF

**Prabhat C. Goswami, Ph.D.**, research associate, Division of Radiation Oncology

**Harold Perera, Ph.D.**, research associate, Division of Radiation Oncology

**Di Yan, D.Sc.**, research associate, Division of Radiation Oncology

### OFF STAFF

**Kun-San Chao, Ph.D.**, visiting research fellow in radiology, Division of Radiation Oncology

**Marianne Mildenerger, M.D.**, instructor in radiology, Division of Radiation Oncology

**Larry D. Simpson, Ph.D.**, associate professor of radiation physics in radiology, Division of Radiation Oncology

the 13th Annual Course of the Society of Computed Body Tomography, Palm Springs, April 2-6.

**Jay P. Heiken, M.D.**, associate professor of radiology and codirector of body computed tomography, lectured on "CT and MRI of Abdominal Vascular Disease" and conducted a workshop on "Detection of Hepatic Metastases: CT and MRI Techniques and Accuracy" at the 13th Annual Course of the Society of Computed Body Tomography, Palm Springs, April 2-6. He spoke on "Detection of Hepatic Metastases" and "MRI of the Pelvis" at Northwestern University School of Medicine, Chicago, June 20. Heiken and **Joseph K. T. Lee, M.D.**, professor of radiology and director of magnetic resonance imaging, copresented an instructional course on "CT & MRI of the Retroperitoneum" at the 90th Annual Meeting of the American Roentgen Ray Society, Washington, D.C., May 13-18.

**Charles F. Hildebolt, D.D.S., Ph.D.**, research assistant professor of radiology, presented "Bitewing-based Determination of Alveolar Bone Loss" as an invited speaker at the 68th General Session of the International Association for Dental Research/19th Annual American Association for Dental Research, Cincinnati, March 7-11. He lectured on "The Future of Computerized Periodontal Disease Radiography" at the 90th Annual Session of the American Association of Orthodontists, Washington, D.C., May 5-9.

**R. Gilbert Jost, M.D.**, professor of radiology and chief of the Division of Diagnostic Radiology, lectured on "Electronic Radiology in the 1990s" at the Computer in Healthcare Conference and Exposition, Atlanta, May 16-18. Jost, who also served as an organizer as well as the scientific session and tutorial cochairman, presented "Information Management Systems" and a workshop on radiologic workstations at a symposium for Computer Assisted Radiology, Anaheim, June 13-16.

**Joseph K. T. Lee, M.D.**, professor of radiology and director of magnetic resonance imaging, spoke on "Clinical Applications of Fast MR Imaging" at the Annual Computed Body Tomography Society meeting, Palm Springs, April 2. He was a visiting professor at the University of Minnesota, Minneapolis St. Paul, April 9-10; at the University of Michigan, Ann Arbor, April 16; and at Brown University, Providence, Rhode Island, May 7. He lectured on "Chemical Shift Imaging of the Liver" at the International Liver Symposium, Boston, June 25-27.

**Bruce L. McClennan, M.D.**, professor of radiology and director of abdominal imaging, addressed "Standards—What Will They Do For Us? What Will They Do To You?" at the Missouri Radiological Society, while serving as a delegate to the Missouri State Medical Association, Lake Ozark, Missouri, April 5-8. He lectured on "Contrast Material Reactions—Recognition and Response" and "Lithotripsy—Renal to Biliary" at the International

## VISITING PROFESSORS & INVITED LECTURERS

**Bahman Emami, M.D.**, professor of radiology, lectured on "Interstitial Thermo-radiotherapy in the Treatment of Malignant Tumors" at the Second International Brachytherapy and After-loading Symposium and Workshop, St. Louis, April 19-21. Emami presented "Post Operative Radiotherapy in Non-Oat Cell Carcinoma of Lung" and "3-Dimensional Radiotherapy Treatment Planning of Lung Cancer" at the International Association for the Study of Lung Cancer, Brussels, June 17-21.

**Mokhtar Gado, M.D.**, professor of radiology and chief of neuroradiology, lectured on "Sellar and Parasellar Lesions," "Radiology of Infarction," and "Radiologic Manifestations of Demyelinating Diseases" at the 1990 Neuroradiology Review Course, Loyola University, Chicago, April 28-29. Gado presented "CT

of the Lumbar Spine" and "MRI in Lumbosacral Disease" at the Low Back and Sciatic Pain-Evaluation and Treatment Course, Washington University School of Medicine, St. Louis, May 11-12.

**Louis A. Gilula, M.D.**, professor of radiology, presented "Imaging of the Painful Wrist" and "CT, Arthrography and MRI of the Wrist" as the keynote speaker at the combined meetings of the British and German Hand Societies, Stratford-upon-Avon, Warwickshire, England, May 2-5. He also co-organized the 6th International Wrist Investigator's Workshop, Newport Beach, California, May 15.

**Harvey S. Glazer, M.D.**, associate professor of radiology, lectured on "CT of Pulmonary Collapse" and "CT of the Mediastinum—Differential Diagnosis" at

# FYI

## VISITING PROFESSORS & INVITED LECTURERS

*Continued from page 23.*

Special Procedures Course, Chicago, May 9-10.

McClennan also presented a refresher course on "Acute Renal Infections" at the American Roentgen Ray Society, Washington, D.C., May 13-18.

**Stephen M. Moerlein, Ph.D.**, associate professor of radiology, presented two papers at the 137th Annual Meeting of the American Pharmaceutical Association, Washington, D.C., March 10-14: "Establishment of a Clinical PET Facility within a University Teaching Hospital," coauthored with **Michael J. Welch, Ph.D.**, professor of radiology, and **Barry A. Siegel, M.D.**, professor of radiology and medicine and director of the Division of Nuclear Medicine; and "Radiopharmaceutical Production of Fluorodeoxyglucose for Clinical PET Applications," coauthored with **James W. Brodack, Ph.D.**, research assistant professor in radiology; Siegel; and Welch. Moerlein also lectured on "Heavy Radiohalogens in Biomedicine: Focus on Nucleogenic Aspects" to the Division of Nuclear Chemistry and Technology at the 199th American Chemical Society National Meeting, Boston, April 22-27.

**William A. Murphy, Jr., M.D.**, professor of radiology, spoke on "Percutaneous Needle Biopsy for Tumors and Infection in the Lumbosacral Spine" at the Washington University School of Medicine Continuing Medical Education Course, St. Louis, May 11. He was program committee moderator for a session on

"Musculoskeletal Imaging" at the American Roentgen Ray Society Meeting, Washington, D.C., May 14.

**Robert Myerson, M.D.**, assistant professor of radiology, spoke on "Clinical Aspects of Regional Hyperthermia" at the North American Hyperthermia Group, Hyperthermia School, Thomas Jefferson University, Philadelphia, May 14-15. He presented "Prognostic Value of Temperature and SAR Distribution in Superficial and Deep Hyperthermia" at the 5th BSD Users Conference, Rotterdam, Amsterdam, May 18-19.

**Carlos A. Perez, M.D.**, professor of radiology and director of the Radiation Oncology Center, lectured on "Hyperthermia" and "Radiation Therapy Quality Assurance" at the Second Annual Joint Conference of Southern California Radiation Oncology Society, Southern California Chapter AAPM, Southern California Endocurietherapy Society, San Diego, April 6-8. Perez spoke on "Low Dose Rate Irradiation of Uterine Cervix" and "Interstitial Irradiation in Cancer of the Vulva, Vagina, and Female Urethra" at the Second International Brachytherapy and Remote Afterloading Symposium and Workshop, St. Louis, April 19-21. He lectured on "General Principles of Radiation Therapy and Role in Seminoma" at the Surgical Urology Grand Rounds, Barnes Hospital, St. Louis, April 28, and presented "Current Management of Prostate Carcinoma" at the Multidisciplinary Tumor Board Conference, Barnes Hospital,

St. Louis, April 30. Perez spoke on "Multidisciplinary Care of the Patient with Cancer and the Role of Radiation Therapy" at the Centro S. Pio X, Division of Radiation Oncology, Milan, Italy, May 9-10, and "Quality Assurance in Radiation Therapy: Present and Future Aspects," University of Bologna, Italy, May 10. He also spoke on "New Frontiers in Radiotherapy: the Role of Radiation Therapy in Small Cell Lung Cancer" at the Second International Conference on Small Cell Lung Cancer, Milano Marittima (Ravenna), Italy, May 11-12. He presented "Current Status of Local Interstitial in Hyperthermia," St. Luke's Medical Center, Milwaukee, May 24.

**Joseph L. Roti Roti, Ph.D.**, professor of radiology and chief of the cancer biology section, chaired a workshop on "Chromatin Damage and Repair" and a poster discussion on "Hyperthermic Sensitivity and Resistance: General and Thermotolerance and HSP's" as well as presented a poster on "Pulse-Chase, Post-Irradiation Studies of NP170 and Evidence That It Might Be Topoisomerase II" at the Radiation Research Society of the North American Hyperthermia Group, New Orleans, April 7-11.

**Stuart S. Sagel, M.D.**, professor of radiology, presented "CT and MRI of the Hyperfunctioning Adrenal Mass," "CT of the Thymus," and "CT of Abdominal Lymphoma" at the 13th Annual Course of the Society of Computed Body Tomography, Palm Springs, April 2-6.

**Eric Slessinger, M.S.**, instructor in radiation oncology physics, spoke on

"Quality Assurance for Remote Afterloading Devices" and conducted a workshop on "Radiation Safety and Quality Assurance in Brachytherapy" at the Second International Brachytherapy and Remote Afterloading Symposium and Workshop, St. Louis, April 19-21.

**Yvonne C. Taylor, Ph.D.**, assistant professor of radiology, presented "AT Cell Lines Demonstrate an Altered Radiation Response at the Nucleoid Level" at the Radiation Research Society, New Orleans, April 7-11.

**Michael W. Vannier, M.D.**, professor of radiology and director of the image processing laboratory, spoke on "Modern Imaging Techniques for the Assessment of Craniofacial Deformities" at The Development and Treatment of Cranial Deformities Symposium, University of Alberta, Edmonton, Alberta, Canada, April 26. He also lectured on "Three-Dimensional Biomedical Imaging" at an Electrical Engineering Seminar, University of Alberta, April 27. Vannier presented a research seminar, "Three-Dimensional Biomedical Imaging Research," at the Washington University School of Medicine Radiation Oncology Center, Section of Cancer Biology, St. Louis, May 8. He presented the keynote address, "Exploring Today's New Frontiers and Future Projections: Three Dimensional Biomedical Imaging," at the 16th Canadian Medical and Biological Engineering Conference and the 25th Anniversary of the Formation of the Canadian Medical and Biological Engineering Society, Winnipeg, Manitoba, June 10-12.

# FYI

## SYMPOSIA

### THE SOCIETY OF NUCLEAR MEDICINE

*The following Mallinckrodt Institute staff members participated in the 37th Annual Meeting of The Society of Nuclear Medicine, Washington, D.C., June 19-22.*

#### REFRESHER COURSES

**Edward M. Geltman, M.D.**, "Use of Intravenous Dipyridamole and Dobutamine in Lieu of Exercise for Evaluation of Myocardial Perfusion and Metabolic Reserve."

**Andrea H. McGuire, M.D.**, "Radiolabeled Steroid Receptor Ligands in Oncology."

**Stephen M. Moerlein, Ph.D.**, "Recent Developments in PET Radiopharmaceuticals."

**Marcus A. Raichle, M.D.; Joel S. Perlmutter, M.D.; William J. Powers, M.D.**, "The Role of PET in Neurological Research and Diagnosis."

**Henry D. Royal, M.D.**, "Nuclear Accident Management."

**Michel M. Ter-Pogossian, Ph.D.**, "Positron Emission Tomographic Imaging Devices."

#### SCIENTIFIC SESSIONS

##### ORAL PRESENTATIONS

**Susan Madsen, M.A.; Michael J. Welch, Ph.D.; Robert A. Weisman, Ph.D.; Ramunas J. Motekaitis, Ph.D.\*; Arthur E. Martell, Ph.D.\***, "Synthesis and Investigation of N,N,N',N'-Tetrakis-Ethylenediamine: A Potential Generator Produced Tracer for PET Imag-

ing." \*Department of Chemistry, Texas A&M University, College Station.

**Stephen M. Moerlein, Ph.D.; Alan Daugherty, Ph.D.; and Michael J. Welch, Ph.D.**, "Assessment of In-Vivo Lipoprotein Metabolism with Ga-68 and In-111 Labeled Low-Density Lipoprotein."

**Landis K. Griffeth, M.D.; Farrokh Dehdashti, M.D.; Andrea H. McGuire, M.D.; David J. Perry, C.N.M.T.; Stephen M. Moerlein, Ph.D.; and Barry A. Siegel, M.D.**, "PET Evaluation of Soft-Tissue Masses with F-18 Fluorodeoxyglucose."

**Stephen M. Moerlein, Ph.D., and Joel S. Perlmutter, M.D.**, "Evaluation of N-W-F-18-Fluoroethylketanserin for Measurement of In-Vivo S-2 Receptor Binding with PET."

**Dah-Reh Hwang, Ph.D.; Carla J. Mathias, B.A.; Michael J. Welch, Ph.D.; Andrea H. McGuire, M.D.; and Dov Kadmon, Ph.D.\***, "Imaging Prostate Derived Tumors with PET and N-(3-F-18 Fluoropropyl) Putrescine." \*Baylor College of Medicine, Houston.

**Dah-Reh Hwang, Ph.D.; Carla J. Mathias, B.A.; Michael J. Welch, Ph.D.; John Lloyd Ph.D.\*; Edward W. Petrillo, Ph.D.\*; William C. Eckelman, Ph.D.\***, "Synthesis and Biodistribution of F-18-Labeled Angiotensin Converting Enzyme Inhibitor." \*Squibb Institute for Medical Research, Princeton, New Jersey.

**Dah-Reh Hwang, Ph.D.; Carmen S. Dence, M.S.; Carla J. Mathias, B.A.; Zoe A. McKinnon, B.S.; and Michael J. Welch, Ph.D.**, "F-18-Labeled Mus-

carinic Acetylcholine Receptor (mAChR) Ligands. Synthesis and Biodistribution of 2- and 4- F-18 Fluorodexetimide (FDEX)."

**Farrokh Dehdashti, M.D.; Andrea H. McGuire, M.D.; Henry F. VanBrocklin, M.S.; James W. Brodack, Ph.D.; Dorothy P. Andriole, M.D.; Carla J. Mathias, B.A.; Barry A. Siegel, M.D.; Michael J. Welch, Ph.D.; Martyn G. Pomper, B.S.\*; and John A. Katzenellenbogen, Ph.D.\***, "Assessment of Progesterone Receptors in Breast Carcinoma by Positron Emission Tomography." \*Department of Chemistry, University of Illinois, Urbana.

**Carla J. Mathias, B.A.; Michael J. Welch, Ph.D.; Mark A. Green, Ph.D.\*; Claude F. Meares, Ph.D.\*\***, "In Vivo Comparison of Copper Blood Pool Agents: Potential Radiopharmaceuticals for Use With Copper-62." \*School of Pharmacy, Purdue University, West Lafayette, Indiana; \*\*University of California, Davis.

**Mark A. Green, Ph.D.\*; Michael J. Welch, Ph.D.; Carla J. Mathias, B.A.; Steven R. Bergmann, M.D., Ph.D.; Joel S. Perlmutter, M.D.; Marcus E. Raichle, M.D.; Frankee Rubio, Ph.D.\*\*; and Michael Janik, B.S.\*\***, "Copper-62-PTSM: Production and Evaluation of a Generator-Produced Multi-Purpose PET Perfusion Agent." \*School of Pharmacy, Purdue University, West Lafayette, Indiana; \*\*Mallinckrodt Medical Inc., St. Louis.

**Jerold W. Wallis, M.D.**, "Three Dimensional Display in Nuclear Medicine" and "Volume Rendering in the Three-Dimensional Display of SPECT Images."

#### POSTER

##### PRESENTATIONS

**Henry F. VanBrocklin, M.S.; James W. Brodack, Ph.D.; Carla J. Mathias, B.A.; Michael J. Welch, Ph.D.; John A. Katzenellenbogen, Ph.D.\*; James F. Keenan, Ph.D.\*\*; Gerald J. Mizejewski, Ph.D.\*\***, "Age Dependence of the Alpha-Fetoprotein 16-F-18 Fluoroestradiol (FES) Interaction in Female Rat Serum."

\*Department of Chemistry, University of Illinois, Urbana; \*\*New York State Department of Health, Albany.

**Stephen M. Moerlein, Ph.D.**, "N-w- F-18 Fluoroalkylated Flumazenil: Potential Agents for Mapping Cerebral Benzodiazepine Receptors with PET."

**Michael J. Welch, Ph.D.; Mark A. Green, Ph.D.\*; David J. Perry, C.N.M.T.; Andrea H. McGuire, M.D.; Shirley X. Zhu, Ph.D.\*\*; Judy M. Connett, Ph.D.\*\***, "Copper-PTSM Measures Tumor Blood Flow, Too!" \*School of Pharmacy, Purdue University, West Lafayette, Indiana; \*\*Jewish Hospital, St. Louis.

**Robert A. Weisman, Ph.D.; Stephen M. Moerlein, Ph.D.; Julie A. Sahakian, B.S.; Michael J. Welch, Ph.D.; Jill C. Merrill, Ph.D.\*; Albert P. Li, Ph.D.\***, "Metabolism of N-Isopropyl-P-Iodoamphetamine (IMP) by Cultured Rat Liver Cells." \*Environmental Health Lab, Monsanto Company, St. Louis.

##### WORKS IN PROGRESS

**Dah-Reh Hwang, Ph.D.; Jialing L. Gong, Ph.D.; Michael J. Welch, Ph.D.**, "Positron-Labeled Monoamine Oxidase Inhibitors: Synthesis of Fluoropargyline and Propargylamine."

# FYI

## APPOINTMENTS/ ELECTIONS

**Judy Destouet, M.D.**, associate professor of radiology and head of mammography, was appointed chairperson of the Ad Hoc Committee on Women's Issues for the American Association of Women Radiologists

**G. Leland Melson, M.D.**, professor of radiology and chief of diagnostic ultrasound, was appointed to a three-year term as vice president of the Washington University Chapter of Alpha Omega Alpha, a medical honor society.

**William A. Murphy, Jr., M.D.**, professor of radiology, was appointed chairman of Bone Disease V Syllabus for the American College of Radiology's Professional Self-Evaluation and Continuing Education Program.

**Carlos A. Perez, M.D.**, professor of radiology and director of the Radiation Oncology Center, was an appointed examiner for the American Board of Radiology Oral Examination held in Louisville, June 4-8.

**Joseph L. Roti Roti, Ph.D.**, professor of radiology and chief of the cancer biology section, was recently appointed to the North American Hyperthermia Group Advisory Board for the 6th International Congress on Hyperthermic Oncology and also was appointed chairman of the Cyclotron ALARA Subcommittee.

**Barry A. Siegel, M.D.**, professor of radiology and medicine and director of the Division of Nuclear Medicine, was appointed secretary of the American Board of Nuclear Medicine during his sixth and final year as an active member of the Board. He also is chairman of the examination committee for the 1990 Nuclear Medicine certifying examination.

**Michael W. Vannier, M.D.**, professor of radiology and director of the image processing laboratory, was appointed to the editorial board of *Investigative Radiology—A Journal of Clinical and Laboratory Research*, which is the official publication of the Association of University Radiologists, the Society of Chairmen of Academic Radiology Departments and the American Association of Academic Chief Residents in Radiology.

## HONORS/AWARDS GRANTS/FELLOWSHIPS

**Joseph L. Roti Roti, Ph.D.**, professor of radiology and chief of the cancer biology section, is principal investigator for a \$3 million program project grant awarded by the National Institutes of Health (NIH). The five-year study, "Nuclear Determinants of Therapeutic Response," is aimed at unlocking the mechanisms of radiation-induced cell killing at the molecular level. Roti Roti and project leaders **Leonard J. Tolmach, Ph.D.**; **Yvonne C. Taylor, Ph.D.**; and **Andrei Laszlow, Ph.D.**, will focus

on a more effective way to determine how certain cancer cells should be treated and which therapy would be most beneficial in destroying the cancerous cells.

**Henry F. VanBrocklin, M.S.**, graduate student, received an appointment in the Alexander Hollaender Distinguished Postdoctoral Fellowship Program, which is supported by the U.S. Department of Energy, Office of Health and Environmental Research.

## TECHNOLOGIST NEWS

**Cynthia K. Daniels, R.T., B.S.**, assistant program director in radiography, was elected treasurer of the Missouri Society of Radiologic Technologists at the 58th Annual Conference, Springfield, Missouri, May 16-19.

**Michael Hoxsey, Kevin Peterson, and Gordon Wheeler**, MIR radiography students, won first place in the Third Annual Student Bowl Competition while attending the 58th Annual Conference of the Missouri Society of Radiologic Technologists in Springfield, Missouri, May 16-19.

**Johnnie B. Moore, R.T., B.S.**, program director in radiography, and **Cynthia K. Daniels, R.T., B.S.**, assistant program director in radiography, participated in the St. Louis Public Schools' Career Awareness Fair, May 1-2.

**Carolyn J. Offutt, R.T., B.A.**, research technologist, coauthored an article entitled "Volumetric 3-D Imaging of Computerized Tomography Scans" with **Michael W. Vannier, M.D.**; **Louis A. Gilula, M.D.**; **Jeffrey L. Marsh, M.D.**; and **Charles J. Sutherland, M.D.** The article appeared in *Radiologic Technology*, Volume 61, No. 3.

# FYI

## CIC NEWS

**Michael D. Ward, R.T., M.Ed., FASRT**, chief technologist and director of technical education, spoke on "Medical and Legal Aspects of Radiology" at the Jacksonville Society of Radiologic Technologists, Mayo Clinic, Jacksonville, Florida, April 19, and at the Baptist Medical Center, Jacksonville, April 20. He was inducted into Pi Lambda Theta, the national honor and professional association in education, St. Louis University, May 10. Ward presented "Never, Never, Never Give Up Your Dreams" at the 4th Annual Ulysses D. Murray Lecture while attending the 58th Annual Conference of the Missouri Society of Radiologic Technologists, Springfield, Missouri, May 16-19.

The following MIR radiography students received honors in the student exhibit category of the Missouri Society of Radiologic Technologists exhibit competition: **Michael Hoxsey** and **Kevin Peterson** won first place for their entry, "New Attack for Arterial Plaque;" second place went to **Gordon Wheeler** and **Kurt Basler** for their exhibit, "3-D Reconstruction of CT and MRI Scans;" and third place was awarded to **Edith Hartmann**, **Kimberly Frkovich**, **Lisa Hatcher**, and **Melinda Wendle** for "Don't Panic—PET Is Here."

*The Cancer Information Center (CIC) is cosponsored by the Mallinckrodt Institute of Radiology, the Barnard Free Skin and Cancer Hospital, and Barnes Hospital at the Washington University Medical Center.*

### CONTRIBUTIONS

Mary Holtsclaw in memory of Jack Bresnahan  
Rachel S. Harder in memory of Jack Bresnahan  
Mary Ann Gilroy in memory of Clarence R. Delaney  
Lois Brown in memory of Viola Soloman  
Mr. and Mrs. Richard J. Meyer in memory of George Leathers  
Logica Data Architects, Inc. in memory of Paul Dunn  
Mr. and Mrs. Sam Budrovich in memory of George C. Braun  
Mrs. Estelle Wolff in memory of Ralph Laughlin  
Elizabeth Kelledy Dubin and Annora Kelledy Koetting in memory of William L. Farrelly  
Elizabeth B. Spataro in memory of William L. Farrelly  
Dolores J. Kozacka  
Mrs. W. Milner Donovan in memory of William L. Farrelly  
Mrs. Arthur C. Hiemenz in memory of William L. Farrelly  
John T. Dillion in memory of Helen M. Boshard  
Linda S. Penniman in memory of William L. Farrelly  
Dr. and Mrs. William Reinus in memory of William L. Farrelly

John M. Drescher, Jr. in memory of William L. Farrelly

Mr. and Mrs. Thomas R. Remington in memory of William L. Farrelly

Catherine F. Hoopes in memory of William L. Farrelly

Beverly K. Fogelman in memory of William L. Farrelly

Henry, Bernie and Hank Belz in memory of William L. Farrelly

Gretchen H. Ross in memory of Hilda Krieser

Marcel Petrovic in memory of Clarence Brand

Richard W. Hagedorn in memory of William L. Farrelly

Audrey Hixson in memory of Donald "Ed" Baker

Reta Patterson in memory of Donald "Ed" Baker

Mr. and Mrs. Alexander Cornwell in memory of William L. Farrelly

John M. Drescher, Jr. in memory of Edward L. Keyes, Sr.

Barbara Bilgram O'Brien in memory of Nancy Bobbitt Davis

Gloria J. Pemberton

Mrs. Arthur C. Hiemenz, Jr. in memory of Dr. E. Lawrence Keyes

Karen D. Greening in memory of William L. Farrelly

Mary Carolyn Burkemper in memory of William L. Farrelly

Mary Helen Sullivan in memory of William L. Farrelly

Mr. and Mrs. Alexander Cornwell, Jr. in memory of Dr. E. Lawrence Keyes

Staff of 12100—Barnes Hospital in memory of George Gearin

Diana Spener Dicks in memory of William L. Farrelly

Mrs. Frederick Hermann in memory of William L. Farrelly

Mrs. Frederick Hermann in memory of Elizabeth Burns

Mrs. Frederick Hermann in memory of Maie Schlafly

Mrs. Frederick Hermann in memory of Dr. E. Lawrence Keyes

Mrs. Frederick Hermann in memory of Mrs. Duncan Bauman

Mrs. Beulah M. Ursini in memory of Kathryn Shaw

Pam and Jim Bowman in memory of Abbey Kurlander

Mrs. Ruth E. Smith in memory of Helen Cunningham

Mr. and Mrs. Donald Murray in honor of Mrs. Aubuchon

Mr. and Mrs. Bud Stark in memory of Marie Lipka

William Shannahan  
Eula McMurray

Tamara Rhomberg in memory of Esther Bellestri

Shotsy Maylon in memory of Esther Bellestri

Dorothy Tuttle in memory of Helen A. Eichstadt

Mr. and Mrs. Jeffrey C. Larrich in memory of Eunice Wright

Mr. and Mrs. Leon Axley in memory of Betty Schulte

Stephen and Beth Block in memory of Sandy Kahn

Occupational Therapy Club at Meramec Community College in memory of Lorraine Fuhrman

Robert E. Burns in memory of Elizabeth Nolker Burns

Shelly Lindell

Gretchen Ross in memory of May Scofield

# FYI

## CIC NEWS

*Continued from page 27.*

Gladys M. Hogan in memory of Bernice Winheim

Bailey, Banks, and Biddle Store in memory of Mrs. Sandra Kahn

Mr. Frederick Jenkins in memory of Wilma C. Jenkins

Mr. and Mrs. William Phillips in memory of Glenn Moss

Mr. and Mrs. Ed Henry in memory of Glenn Moss

Mr. and Mrs. James Fleming in memory of Monte Strub, Sr.

Mr. and Mrs. Tom DeBenedetti in memory of Mrs. Schlaterbeck

Eleanor Isbell in memory of Bernice Mocere

Mrs. Eghigian

Mr. and Mrs. Joseph Basta in memory of John Kilgalen

Irma and Raymond Scholle in memory of Irma Baugh

First Presbyterian Church—Stephan Ministry

Mr. and Mrs. Stanley Stuart in memory of Elizabeth Johns

Ms. Melba C. Kilian in memory of John Kilgalen

Mr. and Mrs. Ronald Kaiser in memory of Irma Baugh

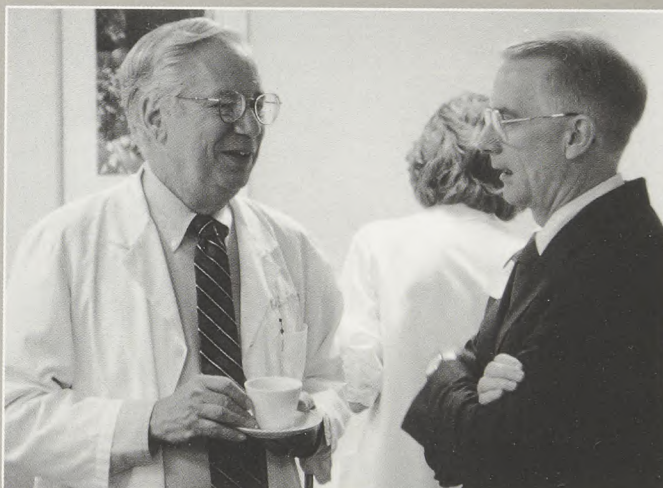
Mr. and Mrs. Harold Garfield in memory of Florence Klayman

Thelma Overall in memory of July Ryan

Mr. and Mrs. Alexander L. Keyes in memory of Dr. E. L. Keyes

Mr. and Mrs. Leonard H. Eatherton in memory of Marshall Fisk

Ethel Sharon Johnson



Norman Henne

## MIR's Breast Center Holds Open House For Referring Physicians

*Ronald G. Evens, M.D., director of the Institute, (right) welcomes Virgil Loeb, Jr., M.D., past president of the American Cancer Society, to the Breast Diagnostic Center Open House on May 8, 1990.*

## CALENDAR

**August 4-8, 1990**  
3rd Annual Northern Imaging Meeting  
Winnipeg, Manitoba, Canada

**August 4-5; October 6-7, 1990**  
Complete Breast Imaging for the Technologist  
Rochester, New York

**August 5-9, 1990**  
American Healthcare Radiology Administrators  
Washington, D.C.

**August 18-24, 1990**  
Society of Magnetic Resonance in Medicine  
New York City

**September 10, 1990**  
19th Annual Wendell C. Scott Lecture  
Mallinckrodt Institute of Radiology  
St. Louis



Norman Henne

**September 17-21, 1990**  
MR Imaging Fellowship  
Magnetic Resonance Imaging Education Foundation  
Cincinnati

**September 19-21, 1990**  
Interventional Radiology/  
2nd Marmara Medical Days  
Istanbul

**September 21-27**  
American College of Radiology  
Nashville

*Judy Destouet, M.D., (left) and Dorothy P. Andriole, M.D.*

**September 23-30, 1990**  
12th Annual International Radiology Congress  
Eastbourne, Sussex, England and Brussels, Belgium

**September 27-28, 1990**  
American Board of Radiology Written Examinations  
Scarpellino Auditorium  
St. Louis

**October 1-5; December 3-7, 1990**  
Postgraduate Workshops in MR Imaging  
Baylor College of Medicine  
Houston

# FYI

## ALUMNI NEWS



Norman Hentle

*Judy Destouet, M.D., head of mammography, explains the workings of the Breast Diagnostic Center's stereotaxic fine needle biopsy system.*



Norman Hentle

*Michaele Gold, director of public relations and marketing (right), was on hand to greet William Berman, M.D., and Kathy Poole, administrative coordinator of Midwest Breast Care Center.*

**October 5-8, 1990**  
5th Annual Imaging Seminar  
University of Vermont  
Stowe

**October 6-13, 1990**  
15th Annual International  
Body Imaging Congress  
Kauai

**October 11-14, 1990**  
4th Annual American  
Lithotripsy Society Meeting  
San Diego

**October 14-19, 1990**  
Society for Radiation  
Oncology Administrators  
Miami Beach

**October 15-19, 1990**  
American Society for  
Therapeutic Radiology and  
Oncology  
Miami Beach

**October 15-20, 1990**  
Association of Residents in  
Radiation Oncology  
Miami Beach

**November 2-4, 1990**  
ACR Symposium on  
Mammography  
Boston

**November 25-30, 1990**  
Radiological Society of  
North America  
Chicago

Please help us locate the following alumni. If you have an address or phone number for anyone on this list, drop us a line at the Office of Public Relations and Marketing, Mallinckrodt Institute of Radiology, 510 South Kingshighway, St. Louis, Missouri 63110 or call (314) 362-2866.

Dr. Roger Adams  
Dr. Ellen G. Archer  
Dr. Robert G. Armbruster  
Dr. Raghavan Balachandran  
Dr. Robert G. Bartsch  
Dr. Carole Benbassat  
Dr. Robert L. Bevier  
Dr. David Bookin  
Ms. Sherry S. Breaux  
Dr. Amy L. Bronson  
Dr. Terrance A. Brown  
Miss Nancy Jo Caston  
Dr. Tze-Chun Chiang  
Dr. Ben D. M. Chen  
Mrs. Maria Chraplyvy  
Mr. David C. H. Chung  
Dr. Stanley Cohen  
Dr. R. A. Collet  
Mr. Dean M. Coulter  
Dr. Hollace L. Cox, Jr.  
Dr. Adrian H. Dahl  
Dr. Andrzej Demidecki  
Dr. Erich J. Diamant  
Dr. Rafael Ducos  
Dr. Mark Edelstein  
Dr. Robert M. Evans  
Dr. Patricia Ann Farih  
Dr. Dagmar Flentje  
Dr. Michael Flentje  
Dr. Ernest Franklin  
Dr. H. W. Fulbright  
Dr. John C. Georgian  
Dr. Howard Gest  
Mr. John Glover  
Dr. Mark Green  
Dr. Otto H. Grunow



# FYI

## ALUMNI NEWS

*Continued from page 29.*

Dr. Corrado Gurgo  
Ms. Kathryn A. Hackman  
Dr. Sheri D. Henderson  
Dr. Robert M. Hochmuth  
Dr. Chi Soon Im  
Mrs. Somlak Intarasupht  
Dr. William Ittner  
Dr. Katherin A. Jacobs  
Ms. Janet A. Johnson  
Dr. Terence Jones  
Dr. Tu-Shan Jung  
Dr. Bruni O. Junnila  
Dr. Herman Kalckar  
Dr. Suk Hee Kim  
Dr. Walter J. Kopecky, Jr.  
Mr. Ken Krippner  
Dr. Kenneth Krohn

Dr. Stephen J. Kuo  
Dr. Daniel J. Landiss  
Dr. Alexander S. Langsdorf  
Dr. Jae Mun Lee  
Dr. Ori Lerman  
Mr. Rudolfo Velasco Lezama  
Dr. Duan Liang  
Ms. Judith Arlene Lifton  
Dr. Bo-Qi Liu  
Mr. Chi-Ching Lo  
Mr. John F. Lontz  
Dr. Delmar H. Mahrt  
Dr. Benedict P. Mariano, Jr.  
Dr. Alfredo Mauri-Crespo  
Dr. Bert Maxwell  
Dr. Gaellan McIlmoyle  
Dr. Abbe D. Mendlowitz  
Dr. Juan Monge  
Dr. Anthony Morrissey  
Dr. Teresa Murrillo  
Dr. Yuzuru Nakamura  
Dr. Jack W. Newton  
Dr. David Oliver

Dr. Judith G. Olson  
Dr. Ralph Overman  
Dr. Kalman Palmer  
Dr. Sivarajan Pandian  
Dr. Timothy B. Patrick  
Dr. Robert A. Phillips  
Dr. Platt  
Dr. Wilburg Pokorny  
Dr. Stanley L. Ranson  
Captain Glen Reeves  
Dr. Huibert S. Reinhold  
Mr. Cabrera Jose Enrique Rivena  
Dr. Ernesto H. Roesler  
Dr. Sanford Rudman  
Dr. Indulal Rughani  
Dr. James E. Russell  
Dr. Giovanni R. Santelli  
Dr. Vythialingam Sathiaselalan  
Miss Aleene K. Schneider  
Dr. James D. Schroering  
Ms. Joanne Schott

Dr. Giles A. Sexton  
Dr. Kay E. Shumate  
Dr. Ellen Evans Smith  
Dr. Arkady Smolin  
Dr. Y. C. Soo  
Dr. William W. Stanbro  
Dr. Steven Stokes  
Dr. Eugenio Suarez  
Dr. Stephen Szeep  
Mr. Kazuhiro Takahashi  
Dr. Chang-Shih Tai  
Dr. John D. Tarling  
Dr. Peter D. Thomas  
Dr. Robert L. Thornton  
Ms. Sandra Jean Tolen  
Dr. Bernardus Van der Zeijst  
Dr. Leo P. Vernon  
Ms. Sally J. Wagner  
Dr. Richard F. Wallin  
Dr. B. W. Wieland  
Dr. Harry William Wiese  
Dr. Shing-Erh Yen  
Ms. Miaosheng Zhu

### Mallinckrodt Institute Alumni

*We want to hear from you so we can share your news with your colleagues and friends. Please take a moment to fill in the form below and return it to Mallinckrodt Institute of Radiology, Public Relations and Marketing, 510 South Kingshighway, St. Louis, Missouri 63110.*

### ALUMNI NEWS

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

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HERE IS THE NEWS I WANT TO SHARE:  
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# REFLECTIONS

RONALD G. EVENS, M.D., DIRECTOR

After serving a two-year term as Washington University's vice chancellor for financial affairs, Ronald Evens returned full-time to MIR on June 1. We welcome him back knowing full well he'll be off and running again. In fact, he's taken on five new appointments in the last six months in exchange for his "retirement" from the University's financial affairs. The National Institutes of Health (NIH) has appointed him to two positions: as an evaluator of radiology research for NIH and to the executive committee for a consensus conference on low osmolality contrast media. Evens also was appointed to the executive committee for the National Science Foundation's symposium on PACS. In addition, he was appointed a member of the board of directors of IMCERA, the parent company of Mallinckrodt, Inc., and to the editorial board of JAMA.

Widely regarded as an authority in the field of socioeconomics in medicine, Evens often is called upon for his expertise by medical centers, universities, governmental organizations and private industry.

The following article, published in the June 1990 issue of *Radiology Today*, is an excerpt from Evens' discussion, called "The Need for Cost/Benefit Analysis in Diagnostic Imaging," at the National Conference on Advances in Cancer Imaging.

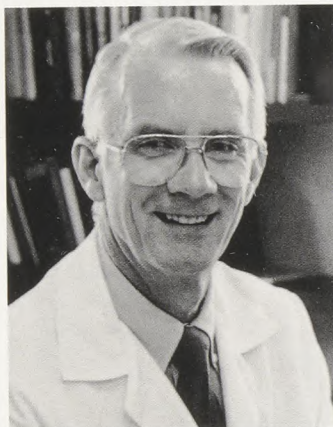
—Michaele Gold, Executive Editor

••••

In today's complicated world, nothing is excluded from economic evaluation, including politics, religion, education, and most aspects of an individual's life. Why should medicine be any different?

Resources are limited, diagnostic and treatment procedures are often expensive, and financial planning is essential to most successful projects. During the 1980s, economic evaluation of medical care has become more sophisticated, more scientific, and more valuable.

Cost/benefit analysis is an effective model for economic research. However, defining



Herb Weitman

costs and benefits is not easy in practice. I would suggest that both terms have three tiers of analysis, with each higher level being more specific, more useful, and more difficult to study.

## DEFINING "BENEFIT"

On the benefit side of the equation, the first tier is an evaluation of patient safety: how safe is a new procedure, and how does its safety compare to currently available diagnostic or therapeutic procedures?

Standard procedures are available to evaluate the safety of a new technology. Today it is highly likely that, when a new technology is accepted for clinical use, it is "safe," meaning that its risk is reasonable in comparison to currently available procedures. Credit goes to many individuals and organizations in setting high standards for patient safety.

The second tier of patient benefit is one of function: does the procedure work as it is supposed to work?

Again, the state of the art is quite good; for most technologies, there are standard mechanisms and methods to answer this question that are well known to academicians. Appropriate protocols may be costly in time and money, but we can answer the question with confidence.

The third tier of benefit analysis addresses efficacy: is the procedure useful?

Pretty pictures are not necessarily useful; a new contrast agent may identify the kidneys, but may not be more efficacious than other agents. There are many examples of technologies that perform as expected, but are not medically useful. For instance, in breast imaging we have thermography and diaphanography, which give us colorful images of anatomy and physiology, that are not useful because they do not differentiate benign from malignant lesions nor satisfactorily detect small lesions. Unfortunately, we are not very good at defining efficacy.

## DEFINING "COST"

On the other hand, the first tier of cost analysis answers the question of straight expense: how much does it cost?

This is the equivalent of the first-tier question of benefit: is it safe? It is the first level of economic evaluation and a relatively straightforward analysis. Whether focusing on a specific procedure (e.g., CT) or its application to a specific disease (e.g., CT of lung cancer), we are reasonably confident in analyzing the variables that are important to cost, such as procedure, volume and geographic location.

The second, more serious cost analysis tier is cost-effectiveness. This tier raises contingent issues such as the social impact of a disease. Cost-effectiveness analysis should measure the net cost of providing a service (expenditures minus savings) in terms of dollars, and compare this cost to a unit of benefit (e.g., number of cancers found, five-year survival rate, or quality adjusted life years of survival).

While a single procedure may be subjected to cost-effectiveness research, the analysis becomes more powerful when comparing

## REFLECTIONS

alternative procedures or programs. Ideally, cost-effectiveness analysis should be used to study final outcomes, such as years of life saved. However, in many cases it is impossible to measure final outcomes, and intermediate health outcomes (e.g., diagnoses made or cancers found), or other methods to translate intermediate results into longer range outcome analysis may be substituted.

The third and highest tier of cost analysis is cost/benefit itself: given the net cost of a particular outcome, is the outcome worth the cost?

In order to make this decision, both the cost and the benefit ideally should be measured in the same units, usually dollars. Thus, the benefit or outcome (such as breast cancers found, lives saved, or quality years of life added) must now be translated into dollar terms. How valuable in dollars is finding a breast cancer or extending a life for five years?

Economic studies at this level of sophistication have rarely been performed with diagnostic radiology or radiologic therapeutic procedures. There are many reasons for not performing this third tier of analysis, including the complexity of the analysis, the difficulty in translating outcomes to dollars, and the sensitivity of the contingent social and political issues.

### THE USE OF COST/BENEFIT ANALYSIS

If the results of cost/benefit analysis were available, then important medical policy decisions could be made across medical disciplines and diseases. For example, should limited resources be spent on trauma patients, or patients with cancer, or patients with AIDS?

Cost/benefit analysis could also be used to answer certain

“guns or butter” decisions. For example, if we have sizable reductions in defense spending over the next decade, should this money be utilized to reduce the national debt, support medical research, provide diagnostic and therapeutic resources for cancer patients, or be spent on other important social issues (e.g., crime prevention or homelessness)?

Unfortunately, satisfactory cost/benefit data are not available for most issues. We are fortunate if data is available to determine that a procedure is safe, works as expected, costs a certain amount, and is cost-effective. Only a limited number of procedures have undergone a true cost/benefit analysis.

### SHALL WE?

Is it worth the time and effort to perform cost/benefit analyses for diagnostic procedures? There is a double cost to such analysis: time and money. The potential advantage is improved patient care at reasonable cost. However, beyond improving the medical care of a particular primary cancer or use of a diagnostic procedure, the goal should be establishing rational public policy for the 1990s. The percentage of our gross national product and total dollars available for medical care have some limit, and scientists and clinicians should be interested in developing a rational approach for spending this money wisely.

The uses of specific diagnostic procedures in specific cancers are major cancer care issues, for example, but broader public policy questions will ultimately be more important. Such public policy issues for cancer care are:

- apportioning funds for research versus screening versus patient management

- apportioning funds for cancer versus other diseases
- selecting the site for screening: hospital versus physician's office versus “center”
- using a single modality versus multiple modalities.

All clinicians should be interested in efficacy, whether in screening, diagnosis/staging, or follow-up. D. M. Eddy has shown how a cost/benefit analysis can identify when a longer time between repeat procedures (Pap smears for cervical cancer) can reduce cost without any reduction in benefit. He shows that an annual Pap smear can be changed to a study every second or third year with only minimal reduction in cancer detection (from 100% to 97%). Similar reductions in ordering diagnostic imaging procedures could save millions of dollars.

However, even when appropriate cost/benefit data are available, are medical practitioners willing to listen and act? Medical practice patterns are difficult to change; physicians are interested in providing “the best” care for their individual patients, and they resist compromising what they believe to be “the best” on the basis of data derived from studies that show some (perhaps little) benefit despite high cost.

Increasing concern about medical cost and increasing use of cost/benefit analysis will make it more likely that future technologies will have evaluation prior to routine use. Money does talk, and it will talk with an increasingly louder voice. In order to influence medical care, the clinical and scientific community must be willing to support and require appropriate cost/benefit analysis research. Physicians have been suspicious of cost/benefit analysis. It is time to change; such analysis can be a valuable resource. □

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**Focal Spot** magazine is published three times a year by the Mallinckrodt Institute of Radiology at the Washington University Medical Center at 510 South Kingshighway, St. Louis, MO 63110.

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