

## Personalized Health Care Will Shape the Future of Medicine

"In 25 years, the face of medicine will be considerably different from what we see today," says Fred Sanfilippo, MD, PhD, senior vice president and executive dean for Health Sciences at Ohio State University Medical Center.

"The difference," he adds, "will be brought about by the evolution of personalized health care, which is the integrative practice of medicine and individual support based on a person's unique biological and behavioral characteristics and environment."

Sanfilippo says three phenomena are driving the development of personalized health care: technological advances, an information explosion - particularly through knowledge of the human genome - and consumer demand.



Fred Sanfilippo, MD, PhD

"Personalized health care is not a fad, and I believe that as consumer demand increases, primary care physicians will find themselves on the front line in incorporating these principles into their practices," Sanfilippo says. "The emergence of health coaches or navigators, electronic consultation and paperless patient records will all change how physicians manage their practices."

First, non-physician coaches or navigators will engage patients at the front end of the healthcare delivery system to advise about healthy lifestyles, prevention measures, assessments and screenings.



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"The direct care of primary care physicians and specialists may not be needed at this stage, but access to their expertise will be enhanced by incorporating these paraprofessionals into an individual's healthcare team," Sanfilippo says.

Second, the adoption of electronic consultation, through e-mail or telephone, will enhance patient satisfaction, save

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time for physicians and provide opportunities for multiple health encounters in a patient's history.

Third, as primary care physicians adopt electronic patient records that are linked to health systems in the community as well as nationally, physicians can have much more engagement and interaction with patients who are traveling or require specialist referrals.

"At Ohio State's Medical Center, we've embraced this future in a number of ways," Sanfilippo says. "We created the Ohio State University Center for Personalized Health Care, where we'll continue to explore this reality as we push the boundaries of patient care, education and research."

In addition, the Medical Center is on the forefront of adopting technology tools such as full electronic patient records, automated diagnostic services and computerized patient order entry and results reporting. The Medical Center is entirely paperless and X-ray filmless. Automated patient monitoring through remote sensors that provide real-time

data about insulin levels or cardiac status, for example, will play an important role.

"We're also advancing development of a new financial model for health care by providing financial incentives for prevention and maintenance," Sanfilippo says. "Through our 45,000-member employee health program, we've created a real-time application for development and analysis of the principles of personalized health care."

In addition to instituting the coach/navigator model for employee health and monetary rewards for timely health assessments, OSUMC has developed a HIPAA-compliant e-mail system for physician-to-patient communication. Studies are under way to measure outcomes, cost/benefit and patient satisfaction.

"I believe healthcare providers who are early adopters of personalized health care principles will be the future of medicine," Sanfilippo says.



## PERSONALIZED HEALTH CARE

- Provides the right care for the right person at the right time
- Is tailored for each individual
- Is proactive, not reactive
- Empowers the individual
- Leads to better outcomes and improved satisfaction

### On an Individual Basis

"In the past, scientists would use results from a defined patient group to determine therapies which were then extrapolated to the general population," says Caroline Whitacre, PhD, professor of Molecular Virology, Immunology and Medical Genetics, and associate vice president for Health Sciences Research at Ohio State University Medical Center.

"We now know that findings from cardiovascular studies of 44- to 55-year-old men, for example, may not effectively translate to 65-year-old women," she adds.

Whitacre says remarkable scientific advances, particularly relating to the human genome, allow researchers and clinicians to develop and use genetic testing to provide insight into individual differences that may have a huge impact on therapy.

Whitacre is principal investigator for an Ohio Department of Development Third Frontier-funded study to develop a genetic-based therapy for treating multiple sclerosis (MS). It is estimated that 400,000 Americans have MS, with a disproportionate representation among Caucasians and women.

"Research at Ohio State conducted by Drs. Yang Liu and Kottil Rammohan focused on two versions of the *CD24* gene, which is responsible for making a protein found on immune cells," she explains. "My colleagues found that the two versions differ because of a single nucleotide polymorphism (SNP). Although a minute difference, it is indicative of a unique pattern in the DNA of individuals.

"They also found evidence that there is an approximately twofold increase in risk for MS in individuals who carry one version of the gene," she adds. "This suggests that the protein encoded by the *CD24* gene may very well provide a valuable target for new therapies to treat MS." Results of this study were published in the journal *Proceedings of the National Academy of Sciences*.

"Personalized health care really is the future of medicine, and we're excited about how this one example may improve the lives of thousands of people," she says. "The aim of our current study is to use the information on *CD24* gene sequences with patient clinical information to predict progression of MS. Studies are also under way to block the *CD24* molecule as a potential therapy."



# news briefs

## Applying Robotics to Gynecologic Cancers

Two surgeons at Ohio State University Medical Center are among the first nationwide to perform minimally invasive robotic surgery on patients with gynecologic cancer. Jeffrey Fowler, MD, and David Cohn, MD, use robotics to perform hysterectomies and lymph-node dissections for uterine cancer. Fowler also performs radical hysterectomies and lymph-node dissections for cervical cancer. "With the



Jeffrey Fowler, MD

da Vinci® robotic system, patients have shorter hospital stays and faster recoveries, often within two weeks instead of six," says Fowler. "This is still major surgery, but there is much less blood loss, pain and scarring, and a lower risk of infection."

For more information or to contact Drs. Fowler and Cohn, call 1-800-293-5123.

## Kidney Stone Program Features Lithotripter

Ohio State University Medical Center's Comprehensive Kidney Stone Program features a dual-focus lithotripter that offers physicians one of the most effective ways to eliminate kidney stones. The lithotripter can adapt the focal size of the shock wave to the anatomic conditions of the patient, ensuring greater accuracy. The program gives patients a full range of kidney stone prevention, treatment and management options along with a continuum of care through its metabolic clinic. The clinic helps determine and treat the underlying causes of



Bodo Knudsen, MD

kidney stones and assists patients with long-term management. The program is led by urologist Bodo Knudsen, MD.

To refer a patient, call (614) 293-8155.

## Medical Center is Tobacco Free

In July 2006, Ohio State University Medical Center took an important step in the lives of patients, visitors and staffers by implementing a tobacco-free campus. This impacts patients you refer to the Medical Center and their family members.

Please help us make this initiative successful. When practical, we ask that you prepare your patients by offering tobacco-cessation counseling before hospitalization. If they are not ready to quit, or not far along in the quitting process, the attending physician at the hospital can order nicotine-replacement therapy.

To learn more about our tobacco-free initiative, visit [www.medicalcenter.osu.edu](http://www.medicalcenter.osu.edu).

## National Provider Identifier Required

The Health Insurance Portability and Accountability Act of 1996 requires all healthcare providers to adopt a standard unique identifier effective in May 2007. Providers must apply for and receive this national provider identifier (NPI) number in order to bill Medicare for services. Ohio State University Medical Center will need each referring physician's NPI to submit claims on referred patients. Without this number, much of the paperwork that we are required to complete for each patient will stop. If you haven't filed for an NPI, please do one of the following:

- Apply online at <https://nppes.cms.hhs.gov>;
- Complete a paper application and mail it to the enumerator who assigns the NPI. Applications are available at <https://nppes.cms.hhs.gov>. Or request an application by calling (800) 465-3203
- Authorize an organization to submit your application for you. Any professional association of healthcare providers that employs a physician can submit an electronic file with your information. Once you have your NPI, we ask you to submit it to [mdrelations@osumc.edu](mailto:mdrelations@osumc.edu).

## Readership Survey Winner Announced

Thanks to everyone who answered our readership survey last fall; the response was the best yet. We are compiling your answers, and we take your feedback on magazine content and communication seriously. Congratulations to Curtis Dehmlow, MD, of Marietta, who won tickets to the Ohio State football game with the University of Cincinnati. Again, thanks to all who participated.

## Tailored Treatment: Radiation Medicine



Mario Ammirati, MD, MBA, and Nina Mayr, MD

Similar to a master tailor who makes careful measurements to ensure the best fit, radiation medicine specialists are extremely precise - on a pixel-by-pixel level - in delivering radiation for treatment or diagnosis of disease.

"Through increased computing power, radiation medicine has evolved over the past decade from a rather inaccurate approach relying on plain X-rays, to a highly individualized therapy that allows us to target tumors through high-precision tumor imaging and radiation therapy planning down to the millimeter level," says Nina Mayr, MD, chair of the Department of Radiation Medicine at Ohio State University Medical Center and a member of Ohio State's Comprehensive Cancer Center - James Cancer Hospital and Solove Research Institute.

"Because 60 to 70 percent of all cancer patients require radiation at some point in their battle with cancer, it's important that we now have 'eyes' to see tumors," Mayr adds. "Technological advances have given us multiple modalities - such as CT scan, MRI and PET scan - that allow us to deliver 'personalized' radiation in an extremely focused way so we can destroy tumors or interfere with cancer cells' ability to replicate, while sparing surrounding healthy tissue better than ever before."

She notes that the team approach, bringing multiple areas of expertise together on each case, allows for

customized - or personalized - patient diagnosis and treatment. "Our team meets weekly to determine the best course of treatment for any given patient."

Mario Ammirati, MD, MBA, professor of Neurosurgery and director of Skull Base Neurosurgery, says the team is vigilant about corresponding with referring physicians. "I generally try to make a personal call to discuss which of the different modalities will be employed."

"I generally try to make a personal call (to referring physicians) to discuss which of the different modalities will be employed."

Ammirati says a high degree of customization for each patient is possible not only because of team expertise, but also because of technologies available at Ohio State.

"For example, the Peacock stereotactic radiosurgery and radiotherapy system allows us to deliver fractionated radiosurgery to the brain, skull base, spine and many other lesions," he says. "In this way, we can deliver precise amounts of radiation in multiple sessions. This capability is important because, depending on the type of lesion and its location with respect to normal tissues, multiple smaller doses of radiation (i.e. fractionated stereotactic radiation) may be better than a single large dose of radiation (single-fraction radiosurgery).

"We believe we can provide the best possible clinical outcome when we combine program options," Ammirati adds. "For example, we can use the gamma knife up front to focus radiation beams on the target without cutting the skin. Or, we can take the smallest possible piece of tumor for biopsy by using computer-aided systems employing a very small skin incision and using local anesthesia.

"We can then determine whether it's best to follow with radiosurgery or an open surgical procedure. If radiosurgery is chosen, we can use the gamma knife or the Peacock system, depending on the tumor type and size. This way, we can develop a truly personalized treatment for each patient."

For a full list of diagnostic and treatment modalities, please see: <http://radmed.osu.edu/>.

access

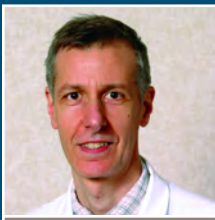
To refer patients to the Department of Radiation Medicine at OSUMC, or to contact Drs. Mayr or Ammirati, call (614) 293-1970.



# research highlights

## Stroke Medication Derived From Bat Saliva

A compound derived from vampire bat saliva is being tested in a multicenter study for its effectiveness in reducing the risk of brain damage after the onset of an acute stroke. If approved, this drug would triple the effective period for initiating emergency stroke treatment. Currently, doctors have just three hours to start treatment with recombinant tissue plasminogen activator (t-PA), the only FDA-approved stroke drug. "But only about 3 percent of stroke victims arrive at the hospital in time to be considered a candidate for this drug," says Andrew Slivka, MD, principal investigator for the study at Ohio State University Medical Center. The study medication, called desmodus rotundus salivary plasminogen activator, or desmoteplase, extends the treatment window to nine hours and appears more effective against clots than t-PA.



Andrew Slivka, MD

For more information or to contact Dr. Slivka, call 1-800-293-5123.

## Studies May Improve Sleep Apnea Treatment

Research from clinical trials of the past 20 years may yield better therapeutic options for patients with obstructive sleep apnea (OSA), according to a review by researchers at Ohio State University Medical Center. The review, published in the journal *Sleep*, revealed practical findings relating to such alternative therapies as weight reduction, drug treatment, supplemental oxygen delivery and positional therapies. "To increase strides toward developing effective pharmacotherapies for sleep apnea, we need a greater knowledge of underlying neurochemical mechanisms that control the patency of the upper airway," says Ulysses Magalang, MD, review co-author and medical director of the Sleep Disorders Center at Ohio State.



Ulysses Magalang, MD

For more information or to contact Dr. Magalang, call 1-800-293-5123.

## New Mouse Strain Aids Leukemia Research

Researchers at the Ohio State University Comprehensive Cancer Center have developed a strain of mouse that should help reveal how a genetic mutation contributes to a deadly form of acute myeloid leukemia (AML). The mutation, a partial tandem duplication (PTD), is in a gene called *MLL* (mixed-lineage leukemia). A PTD occurs when a section of a gene is repeated, like a stutter in the gene's DNA. The new mouse model may help scientists learn how this contributes to AML and could lead to new treatment, diagnosis and prevention strategies. The findings were published in the *Journal of Clinical Investigation*. Michael Caligiuri, MD, is principal investigator.



Michael Caligiuri, MD

To learn more or to contact Dr. Caligiuri, call 1-800-293-5123.

## Research Tower Enhances Personalized Care

Ohio State University Medical Center's new Biomedical Research Tower (BRT), which opened Nov. 3 on the Medical Center campus, provides another avenue for translating basic science discoveries into individualized patient care. The 10-story tower is the largest research facility at Ohio State, housing 264,000 square feet of dedicated research space and nearly doubling the amount of biomedical research space on campus. Labs will be dedicated to experimental therapeutics (cancer), heart and lung disease, neurobiology of disease, imaging, microbial pathogenesis, pharmacogenomics, bioinformatics, diabetes, structural biology and tissue engineering.

For more information, visit <http://www.medicalcenter.osu.edu/research/researchtower>.

## A Tale of Two Patients

“We’ve always known that chemotherapy is more beneficial to some women than others,” says Ewa Mrózek, MD, an oncologist who specializes in breast cancer at Ohio State University Medical Center and who is advancing the principles of personalized health care.

With the advent of a new genetic test that enables customized breast cancer treatments for patients, oncologists can tell which patients stand to gain the most from aggressive treatment and which may be spared the negative side effects. The Oncotype DX™ gene assay, developed by Genomic Health, helps predict how aggressive a particular tumor is and how likely the cancer is to recur.



Ewa Mrózek, MD

Mrózek and colleagues at Ohio State’s James Cancer Hospital and Solove Research Institute recently used the test on the breast tumors of two seemingly homogeneous patients and found that their genes told very different stories: One required chemotherapy and the other did not.

“The test enables us to make treatment decisions based on the biology of the breast cancer rather than solely on the old criteria like tumor size and histological grade,” Mrózek explains.

The test, which is appropriate only for patients with early-stage cancers, measures the activity of 21 genes in the tumor and assigns each patient a recurrence score between 0 and 100. Retrospective studies by Genomic Health have shown that women with a score of 0-17 do not need chemotherapy because they have a low risk of recurrence; those who score 31 or higher should have chemotherapy.



(Stock image: not actual patients)

Ohio State is part of a multicenter clinical trial known as TailorRx that seeks to answer whether women with intermediate scores of 18-30 should receive chemotherapy. Women with scores of 11-25 will be randomly assigned either to receive or not receive chemotherapy as part of their treatment.

“We hope to see which patients will benefit from systemic chemotherapy; this will help us tailor treatment to each patient’s healthcare needs,” Mrózek says.

For a full list of diagnostic and treatment modalities, please see: <http://radmed.osu.edu/>.

### PATIENT A

Early 60s  
 Female  
 Retired elementary school principal  
 Estrogen-receptor-positive breast cancer  
 Stage I C with no lymph-node involvement  
 Low Oncotype DX™ score (6)  
 No mastectomy  
 No chemotherapy

**Comment:** “It’s gratifying to know that the medical profession has something new that enables a better diagnosis and treatment plan.”

### PATIENT B

Early 60s  
 Female  
 Employed  
 Estrogen-receptor-positive breast cancer  
 Stage I C with no lymph-node involvement  
 High Oncotype DX™ score (50)  
 Mastectomy  
 Chemotherapy

**Comment:** “I’m thankful I got a second opinion at The James and had the test, even though it meant I would need more treatment. I knew the treatment plan they made was just for me.”

# new faces



## Christopher Brown, MD

### Specialty:

Dialysis, chronic kidney disease, hypertension and interventional nephrology

### Residency:

Ohio State University Medical Center

### Fellowship:

Ohio State University Medical Center



## David Hauswirth, MD

### Specialty:

Allergy and immunology

### Residency:

Ohio State University Medical Center and Columbus Children's Hospital

### Fellowship:

Duke University, Durham, N.C.



## Bhuvanewari Ramaswamy, MD

### Specialty:

Allergy and immunology

### Clinical Interests:

Diagnosis and management of breast cancer

### Residencies:

Northern General Hospital, Sheffield University, UK; Withybush General Hospital, Wales, UK; Llandough Hospital, University of Wales, UK; Mount Carmel Medical Center, Columbus

### Fellowships:

University Hospital of Wales, Cardiff, UK; Ohio State University Medical Center; Vanderbilt University, Nashville, Tenn.

To contact any of these physicians, please call OSU Care Connection at 1-800-293-5123.

## 2007 Global Diabetes Summit

Conquering Diabetes Frontiers with New Discoveries and Technologies

Thursday, November 29 – Saturday, December 1, 2007

The Hilton at Easton, Columbus

International leaders representing five continents will gather to discuss the global diabetes pandemic and the impact of diabetes on international health care. During the three-day symposium, diabetes experts will present the latest seminal outcomes in diabetes research and formulate an interdisciplinary road map for prevention, detection and treatment of diabetes patients.

For more information or to make a reservation for the 2007 Global Diabetes Summit, visit our Web site at [www.medicalcenter.osu.edu/go/diabetessummit](http://www.medicalcenter.osu.edu/go/diabetessummit)

