the world within us
the human microbiome
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair’s Report</td>
<td>2</td>
</tr>
<tr>
<td>Clinical Programs</td>
<td>4</td>
</tr>
<tr>
<td>Faculty Affairs</td>
<td>6</td>
</tr>
<tr>
<td>Veterans Affairs</td>
<td>8</td>
</tr>
<tr>
<td>Research</td>
<td>12</td>
</tr>
<tr>
<td>Patient Care</td>
<td>28</td>
</tr>
<tr>
<td>Education</td>
<td>38</td>
</tr>
<tr>
<td>Outreach</td>
<td>52</td>
</tr>
</tbody>
</table>
Welcome To Our New Report
You may notice in the coming pages that we have undertaken a new format for our annual report to better represent the full scope of our department. Instead of being segmented by divisions, it now highlights the topic areas of research, patient care, education, and outreach to give a broader view of the interlacing activities of the department and how our divisions interact and complement one another. We have chosen the overall theme of “the human microbiome” for 2010 to reflect the many exciting new developments taking place in the department. Several of these are highlighted in the research section on page 12.

This past year was my first, full year as Chair. Some of our department highlights included:

NEW APPOINTMENTS
Eric Fearon, MD, PhD, accepted the position of Division Chief of Molecular Medicine and Genetics in November. He brings an impressive record of colon cancer genetics research to this leadership position and holds joint appointments in the Departments of Human Genetics and Pathology as well as being the Deputy Director of the U-M Comprehensive Cancer Center.

RESEARCH
The U-M Health System was ranked fourth in the U.S. for National Institutes of Health funding in 2010. This is a testament to both the individual and collaborative research done here. Most notably, Dean Brenner, MD, from hematology & oncology was awarded an $11 million NIH SPORE (Specialized Program in Research Excellence) focused on gastrointestinal cancers and a $7.5 million multi-disciplinary award for the Microbial Systems Science Center initiative was given to Vincent Young, MD, PhD, in infectious diseases (page 14).

In 2010, tangible programming by department faculty started to take place in the new North Campus Research Complex. This included the Health Services Research Institute that includes general medicine and VA faculty, the Center for Arrhythmia Research Center, and the initiation of a translational oncology program.

Internal Medicine also made some key recruitments over the past year to enhance our research and clinical programs. Several of these individuals are highlighted in this report.

In October, Internal Medicine took the lead with UMHS on creating a Joint Institute with Peking University where we will be exchanging ideas, information, and data on new research projects in cardiovascular medicine, gastroenterology, and pulmonary diseases (page 24).

Our faculty continue to be recognized for research excellence by election into honorary societies and national awards. We gained three American Society for Clinical Investigation members and two Association of American Physicians members in 2010 (page 61).

PATIENT CARE
In the realm of patient care, we are currently undertaking steps to improve and strengthen cardiovascular medicine, and the initiation of a translational oncology program.
primary care in the ambulatory setting by evaluating our approach to clinical excellence recognition. In this report, we highlight two initiatives that strengthen and exemplify clinical excellence for patients by expanding on the concept of the Patient-Aligned Care Team (page 30) and by the new developments in vaccination recommendations made by our Food Allergy Program (page 35).

EDUCATION
Internal Medicine continues to play a major role in teaching at the U-M Medical School and in our training of 280 residents and fellows. This past year, we were a key participant in the Liaison Committee on Medical Education accreditation process for the medical school.

OUTREACH
Despite all of the challenges we face because of healthcare reform, NIH budget woes, and increased competition in the community, our department and faculty continue to adjust and create new opportunities for achieving our missions of research, clinical, and educational excellence. In fact, we are national leaders in innovation when it comes to meeting all of these challenges. Many of our faculty are even on the forefront of change, acting as advisors in the political arena (page 58).
The momentum of our clinical programs continued in 2010. We grew in ambulatory care and outpatient services in both the number of patient visits as well as the number of procedures provided. Our outpatient facilities throughout Ann Arbor (Brianwood and Domino’s Farms) as well as Livonia and Brighton are also performing well. The planning efforts to establish additional facilities in the Livonia area are still underway. We continue to strive to meet our patients’ needs and the growing demands for our services.

**CONTINUED GROWTH**

Meanwhile, we are working on improving our physical spaces within Taubman Center as we move forward with the expansion of our gastroenterology, pulmonary and nephrology programs. With the space that will be opening up due to pediatric clinics moving into the new Mott Children’s Hospital in November 2011, we will also be seeing new opportunities for growth. There are plans for an exciting new solid organ transplant center to occupy the first floor of Taubman Center. This will, in turn, open up more space on the third floor for expansion.

**NEW PROGRAMS**

Our efforts to create a new musculoskeletal program combining the specialties of rheumatology, orthopaedic surgery, and physical medicine have proven to be a successful collaboration. We found the presence of three specialties in one location allowed patients to have same-day appointments with better continuity of care. This obviously provides a great benefit to our patients but we also found that it made our clinicians happy to offer more efficient care as well. We eventually hope to expand this concept to a new facility that will house the combined programs, resulting in the creation of a center for the...
treatment of musculoskeletal disorders as part of the Livonia plan.

We also saw the continued success of our existing multispecialty centers such as the Comprehensive Cancer Center and the Cardiovascular Center and the many collaborations that go on there. Our department is also well represented in the U-M Health System Destination Programs that were introduced in 2010. They represent a concerted effort by UMHS to better attract and serve specialty care patients in areas including specific cancers and heart disease. The Department of Internal Medicine is currently involved in seven of these programs: the Heart Rhythm Center, Michigan Sensitized Candidate Program, Multidisciplinary Adrenal Cancer/Endocrine Oncology Program, Multidisciplinary Aortic Program, Multidisciplinary Interstitial (Fibrotic) Lung Disease Program, Multidisciplinary Liver Cancer Program, and the Multidisciplinary Pancreatic Cancer Program.

Through the many exciting developments of the U-M Health System this past year and into the future, the Department of Internal Medicine continues to find new opportunities for our divisions to thrive, collaborate, and provide the best patient care possible.
The Department of Internal Medicine continues to recruit and cultivate very talented clinicians, educators, and investigators. The research activities of our faculty are thriving despite the increasing challenges presented by the contraction in available research funds. With clinical care and teaching demands steadily increasing, the department has seen its greatest expansion in the clinician/educator portion of our faculty.

**INTERDISCIPLINARY RECRUITMENT**

As you will see in this year’s report, many of our department’s exciting research initiatives like the Microbial Systems Science Center profiled on page 14 are helping to attract promising new talent to U-M. Four new interdisciplinary hires were made under the University’s junior faculty cluster-hire initiative in the area of microbial ecology in human health and disease. This cluster hire is part of a university-wide initiative to recruit scholars whose work crosses boundaries and opens new pathways to explore significant questions or address complex problems. The goals of this program are to enhance the university’s ability to engage emerging research opportunities and to increase tenure-track faculty involvement in U-M’s teaching mission. This new center is also recruiting additional faculty to study microbe-host interactions.

**PROMOTING SUCCESS**

In 2009, we started working with the U-M ADVANCE Program on an extensive evaluation of our department’s academic environment for faculty in recruitment, retention, climate, and leadership. We surveyed our faculty and then used that data to help us design new programs and initiatives to better address their needs. One of the main objectives of this effort is to identify key areas where we can help women and underrepresented minorities advance their
careers within the department. To date, we have strengthened two robust systems to help evaluate faculty performance in order to guide and improve individual success, as well as to ensure the overall success of the department:

A Curriculum Vitae Review Committee closely evaluates junior faculty members’ career accomplishments and provides detailed feedback to individual faculty, their mentors, and division chiefs on their current progress toward promotion and how to improve or alter their direction if needed.

A Faculty Performance Review Committee monitors each faculty member’s contributions to the broader missions of the Department of Internal Medicine in research, education, outreach, and patient care to ensure we continue to excel and provide leadership in these areas.

Department of Internal Medicine faculty continue to have a strong presence and impact throughout the health system and medical school. Our research, education, and clinical care efforts continue to be highly regarded, nationally recognized, and awarded for their excellence.
The VA Ann Arbor Healthcare System continued to experience a significant increase in both outpatient and inpatient activity in 2010. There was an 11 percent increase in total unique patients seen, a 12 percent increase in outpatient visits, and a 3.5 percent rise in the number of patient admissions. While we want to be able to serve more patients, we want to do so in the best way possible given our current capacity. As our admissions rise, we’ve been successfully focusing on decreasing lengths of stay and reducing readmission rates.

**VISN 11 RECOGNITION**

Both the VA Ann Arbor’s tremendous growth and quality of care were recognized by the Veterans Integrated Service Network (VISN 11) this year. VISN 11 is comprised of 7 VA Medical Centers and 22 operating Community Based Outpatient Clinics, which provide comprehensive inpatient and outpatient health care to veterans in central Illinois, Indiana, Michigan, and northwest Ohio. Of this group, the VA Ann Arbor was recognized for experiencing the largest patient growth and providing high-quality, high-complexity care.

**FACILITY IMPROVEMENTS**

From a clinical standpoint, we have been making many improvements to our facilities. Our cardiology clinics were renovated in 2010. We are opening a new chemotherapy infusion center as part of our ER expansion in spring 2011. There are also plans for a new 28-bed unit to be added on our 6th floor.

**NEW FACULTY**

In October, Theodore (Jack) Iwashyna, MD, an Assistant Professor in the Division of Pulmonary and Critical Care joined the VA Ann Arbor faculty as a physician and a researcher in our Center for Clinical Management Research. His research focuses on clinical outcomes in the intensive care unit setting. Also joining our faculty in 2010 were Ernesto Bernal-Mizrachi, MD, an Associate Professor in the Division of Metabolism, Endocrinology & Diabetes, whose research program in pancreatic islet cell function and regulation is focused on better understanding diabetes, and Jason Taylor, MD, a Lecturer from the Division of Gastroenterology, who supports our advanced endoscopy program.

**ON THE FOREFRONT OF PATIENT CARE...**

Caroline Blaum, MD, Professor and Associate Chief of the Division of Geriatric Medicine, C. Leo Greenstone, MD, Associate Chief of Staff for Ambulatory Care and an Assistant Professor in the Division of General Medicine, and Eve Kerr, a Professor in the Division of General Medicine are lead investigators of an ambitious project titled the “Patient-Aligned Care Team (PACT) Demonstration Lab”...
(profiled on p. 30). In collaboration with other VA faculty, they are evaluating an innovative patient-centered program designed to decrease health risks, promote healthy behaviors, and manage chronic health conditions.

... AND RESEARCH
James Beck, MD, VA Medical Intensive Care Unit Director and an Associate Professor in the Division of Pulmonary and Critical Care Medicine is part of the new U-M Microbial Systems Science Center that was developed in 2010 (see page 14). This new multidisciplinary center is promoting cutting-edge research by providing resources and bringing researchers together who are interested in microbiome issues.

It’s the amazing talent and strong commitment of our faculty that has allowed VAAAHS to have another successful year of growth and to continue to provide the best in high-quality, innovative medical care for area veterans.
DEPARTMENT OF INTERNAL MEDICINE DIVISION CHIEFS

Front row (left to right): David Pinsky, MD (Cardiovascular Medicine); Chung Owyang, MD (Gastroenterology); John Carethers, MD (Chair of Internal Medicine); Powel Kazanjian, MD (Infectious Diseases); and Peter Arvan, MD, PhD (Metabolism, Endocrinology & Diabetes). Back row (left to right): David Fox, MD (Rheumatology); James Baker, Jr. MD (Allergy and Clinical Immunology); Kathleen Cooney, MD (Hematology & Oncology); Jeffrey Halter, MD (Geriatric Medicine); Galen Toews, MD (Pulmonary & Critical Care Medicine); Eric Fearon, MD, PhD (Molecular Medicine & Genetics); Laurence McMahon, Jr. MD, MPH (General Medicine); and Frank Brosius III, MD (Nephrology).
DEPARTMENT OF INTERNAL MEDICINE CHIEF MEDICAL RESIDENTS

John Carethers, MD, Chair of Internal Medicine (center) with Chief Medical Residents (l to r): Geoffrey Barnes, MD; Michael Howe, MD; Rupal Parekh, MD; and Nathan Houchens, MD.
research
The story starts in the laboratories of Gary Huffnagle, PhD, a Professor in the Divisions of Pulmonary and Critical Care Medicine and Microbiology & Immunology, and Galen Toews, MD, Professor and Division Chief of Pulmonary and Critical Care Medicine. “We had a graduate student interested in the idea that antibiotics could alter the immune response,” says Toews. “So we designed experiments to test the idea in a mouse. The result was stunning. A single dose of antibiotics completely shifted the mouse’s immune response from an adaptive, TH1 response (which would help clear out bacteria and fungi) to one that resembled asthma.”

For Huffnagle, this was perhaps the first of two “aha” moments that would culminate in 2010 with the go-ahead for a new U-M Microbial Systems Science Center. Discovering this antibiotic-induced allergic response in mice cemented his belief in the critical role of the microbiome—the community of microbes that live on and in us—in maintaining human health. “It’s interesting,” says Huffnagle, “germ theory has been critical to public health. We learned how germs caused disease and could be passed from person to person, and we developed antibiotics. But somewhere in the 60s and 70s, the pendulum swung too far, and we decided that the only good germ was a dead germ. Suddenly, we started to stomp on bacteria we actually needed to live. And we’re starting to discover that the rise in chronic diseases—like asthma, inflammatory bowel disease, autoimmune diseases, even obesity—may be due in large part to this war on our microbiome.”

Huffnagle’s second “aha” moment came with his introduction to the researcher who would offer him the key to studying the microbiome in all its complexity. While Huffnagle was busy in his lab, Vincent Young, MD, PhD, now an Associate Professor in the Divisions of Infectious Diseases and Microbiology & Immunology, was at Michigan State University building up a formidable expertise of his own. “I’ve always worked on bacteria that cause disease in the gut,” says Young. “For a long time, this was with cell cultures, then in my post-doc with mice. One day, I said to my boss, ‘We look so hard at this one bad bug, but aren’t there trillions of other bacteria in the gut—and don’t they do something?’” He said, “People have thought about that, but until now we haven’t...
had great ways to study it.” So I came to MSU to collaborate with people working on these really complicated microbial communities in the soil and other places to see how their techniques could be applied to my research.”

The short story is that Huffnagle attended a talk Young was giving on helicobacter, and sparks flew. “Vince was looking at bacteria through this field I’d never heard of—microbial ecology,” says Huffnagle. “I thought, that’s it! If we’re going to study host function, we’ve got to take an ecological approach. That started a collaboration and friendship that would lead to recruiting Young to U-M and ultimately setting up the center.”

The Microbial Systems Science Center is truly an outgrowth of the partners’ complementary expertise. As such, it aims to support researchers studying microbes from a variety of angles. This could mean, as in Huffnagle’s case, examining how a host’s microbiome mediates immune function. It could also mean studying microorganisms the way Young does—through the lens of bacterial pathogenesis and clinical medicine. But it also incorporates the research on microbial communities in soil, drinking water, and undersea thermal vents that introduced Young to the ecological perspective in the first place.

“For a long time, microbiologists have studied pathogens in a largely reductionist manner,” says Young. “An example is one of the gastrointestinal pathogens I study, Clostridium difficile. Researchers have looked at things like how its genes function and what signals make it form a robust spore that can be easily spread. However, they wouldn’t necessarily study transmission from person to person, how it sticks to hospital surfaces, how healthcare delivery could change it, how the pathogen interacts with the microbiome, or how differences in people’s genetic makeup or immunology could influence the disease. That’s a systems science approach; that’s what we’re trying to do. We want to make use of the huge
resources we have at U-M in terms of clinical material and interdisciplinary expertise to connect these micro and macro aspects of biology.”

That’s why the center will serve researchers not just in Internal Medicine but throughout the university (see chart): medical departments such as pediatrics and microbiology & immunology; LSA departments such as ecology and evolutionary biology, geology, and molecular, cellular and developmental biology; programs in the School of Public Health; and departments in the College of Engineering.

THE CENTER’S FUNCTION

Though initially catalyzed within the Department of Internal Medicine, the center is gathering financial support from both departmental and school-wide sources. “Internal Medicine has contributed the most in terms of start-up costs, administration time, and faculty effort in getting it off the ground,” says Huffnagle. “Our goal is planting the seed; from there it will bloom.”

The center will bloom, he asserts, because of the invaluable resources it will offer. While the details of its location and final structure are still being ironed out, several things are clear. First, it will be a gathering point for campus-wide researchers interested in these issues. “The center will help us share research approaches and protocols so we aren’t reinventing the wheel,” says Young. “It will also help us do genuine team science,” says James Beck, MD, Associate Professor of Pulmonary and Critical Care Medicine, who is collaborating on grants with Huffnagle and Young. “The problems we’re working on are too complicated for any one person or lab. My research, for example, looks at the impact of HIV and smoking on the lung microbiome. It requires people with backgrounds in pulmonary disease, infectious disease, microbial ecology, and microbiology. The center will help bring us together.”

Second, the center will be a provider of advanced technologies, leading with high-throughput sequencing. “We’re starting with DNA,” says Huffnagle. “We plan to offer a pyrosequencing service that will help researchers determine which microbes are in a given community by doing a census of all the DNA. We can also use the DNA to tell us what types of machinery these microbes have. Are there bacteria that can break down fiber in your diet, make carcinogens, or make molecules that help the immune system? We can get ratios and start to see if the balance is off. We can also do comparative genomics—comparing the genes of two very similar bacteria or viruses to see why one might be more virulent than another and how to target the genes involved with drugs or vaccines. We will add technolo-
gies to measure RNA, proteins, and metabolites, as well.”

Chung Owyang, MD, Professor and Division Chief of Gastroenterology and Professor of Molecular & Integrative Physiology, has been a strong advocate for developing microbiome research at the university. He adds, “The specialty of gastroenterology will be affected profoundly by the ability to modify the gastrointestinal microbiota through the rational deployment of antibiotics, probiotics, and prebiotics.” High-throughput sequencing technology will offer a first step toward this goal.

Turning technology into insight, of course, requires bioinformatics. “One of the most important services the center will provide is the bioinformatics expertise to analyze this unbelievable mountain of data,” says Harry Mobley, PhD, Professor and Chair of the Department of Microbiology & Immunology. “We’ll have people thinking about this on a daily basis and constantly improving these techniques.”

In addition to these resources, the center’s final value-added piece is its ability to attract new faculty and funding. “Centers like this act as magnets to bring in people studying microbial problems from different perspectives,” says Victor DiRita, PhD, Professor of Microbiology & Immunology and Associate Dean for Graduate and Postdoctoral Studies. “Those of us already here will come together in new ways, and the center will help us attract faculty and graduate students around this new area of investigation.”

EARLY RESULTS: NEW RECRUITMENTS, FLAGSHIP GRANT

In terms of attracting faculty and funding, the center is already paying dividends. Four new interdisciplinary hires were made under President Mary Sue Coleman’s cluster-hire initiative in the area of microbial ecology in human health and disease. Additional faculty are being recruited to study microbe-host interactions. Young says the center’s formation has been instrumental in eliciting a number of post-doc applications, as well.

In the grant arena, 2010 saw the UH3 renewal of Young’s multi-institution NIH demonstration grant on the role of gut microbiota in ulcerative colitis. And, thanks largely to the center’s creation, the department also won a $7.5 million, five-year NIH grant through the Enterics Research Investigational Network (ERIN). Actually, they more than won it; they knocked it out of the park, scoring a 13 in the NIH’s new scoring system of 10–90, with 10 being the best. “The next closest score we heard of was a 32,” says Huffnagle. “We were so different than any other center; we know we’re on the right track.” Young serves as PI on the grant, which is investigating how C. difficile causes symptoms ranging from diarrhea to life-threatening colon inflammation in some half-million hospital and nursing-home patients in the United States each year. The pathogen tends to invade after a round of broad-spectrum antibiotics wipes out the “good bacteria” normally found in the gut. The grant’s three sections focus on: 1) how genetic variation in the pathogen leads to different disease outcomes (PI: David Aronoff, MD, an Assistant Professor in the Division of Infectious Diseases; 2) how antibiotic-induced changes in the gut’s microbiome leaves patients vulnerable to infection (PI: Young); and 3) how an individual’s immune response impacts disease progression (PI: Huffnagle).

“This is the epitome of microbial systems science,” says Young. “It’s exactly what we’ve geared up to do. We’re using animal models; we’re using patients; we’re doing high-throughput sequencing; we’re doing microbial ecology; we’re doing molecular bacterial pathogenesis; we’re doing sophisticated immunology—and we’re one of the few places in the country positioned to do this.”
### Sampling of U-M Faculty Research Affiliated with the Microbial Systems Science Center

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Affiliation</th>
<th>Center-Related Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vincent Young</strong>, MD, PhD</td>
<td>Infectious Diseases; Microbiology &amp; Immunology</td>
<td>Pathogenesis of enteric bacteria; complex microbial communities in health and disease</td>
</tr>
<tr>
<td><strong>Gary Huffnagle</strong>, PhD</td>
<td>Pulmonary &amp; Critical Care Medicine; Microbiology &amp; Immunology</td>
<td>Role of the microbiome in host immunity</td>
</tr>
<tr>
<td><strong>David Aronoff</strong>, MD</td>
<td>Infectious Diseases; Microbiology &amp; Immunology</td>
<td>Comparative genomics in GI, reproductive tract, and lung pathogens</td>
</tr>
<tr>
<td><strong>Galen Toews</strong>, MD; <strong>James Beck</strong>, MD; <strong>Jeffrey Curtis</strong>, MD; <strong>Margaret Gyetko</strong>, MD; <strong>Fernando Martinez</strong>, MD, MS; <strong>Bethany Moore</strong>, PhD; <strong>Eric White</strong>, MD</td>
<td>Pulmonary &amp; Critical Care Medicine</td>
<td>Impact of HIV, smoking, and infection on lung microbiome; role of the microbiome in COPD, pulmonary fibrosis and sarcoidosis</td>
</tr>
<tr>
<td><strong>Chung Owyang</strong>, MD; <strong>Peter Higgins</strong>, MD, PhD, MSc; <strong>John Kao</strong>, MD; <strong>Juanita Merchant</strong>, MD, PhD; <strong>Ellen Zimmermann</strong>, MD</td>
<td>Gastroenterology</td>
<td>Role of the gut microbiome in GI neural innervation, host immunity, and mucosal inflammation</td>
</tr>
<tr>
<td><strong>Harry Mobley</strong>, PhD; <strong>Phil Hanna</strong>, PhD; <strong>Nicole Koropatkin</strong>, PhD; <strong>Eric Martens</strong>, PhD; <strong>Mary O’Riordan</strong>, PhD; <strong>Patrick Schloss</strong>, PhD; <strong>Christiane Wobus</strong>, PhD</td>
<td>Microbiology &amp; Immunology</td>
<td>Bacterial pathogenesis, comparative microbial genomics, microbial ecology and metabolism, bioinformatics, norovirus pathogenesis</td>
</tr>
<tr>
<td><strong>Victor DiRita</strong>, PhD; <strong>Kathryn Eaton</strong>, DVM, PhD; <strong>Yongqun (Oliver) He</strong>, PhD</td>
<td>Unit for Laboratory Animal Medicine; Microbiology &amp; Immunology</td>
<td>Bacterial pathogenesis, comparative microbial genomics, bioinformatics</td>
</tr>
<tr>
<td><strong>John Lipuma</strong>, MD</td>
<td>Pediatrics</td>
<td>The microbiome in cystic fibrosis</td>
</tr>
<tr>
<td><strong>Blaise Boles</strong>, PhD; <strong>Matthew Chapman</strong>, PhD; <strong>Gregory Dick</strong>, PhD; <strong>Paul Dunlap</strong>, PhD; <strong>Deborah Goldberg</strong>, PhD; <strong>George Kling</strong>, PhD; <strong>Donald Zak</strong>, PhD</td>
<td>Molecular, Cellular &amp; Developmental Biology; Ecology &amp; Evolutionary Biology; Geology</td>
<td>Bacterial biofilms &amp; metabolism; environmental microbiology; acid mine drainage</td>
</tr>
<tr>
<td><strong>Betsy Foxman</strong>, PhD; <strong>Carl Marrs</strong>, PhD; <strong>Alex Rickard</strong>, PhD</td>
<td>Epidemiology</td>
<td>Bacterial pathogenesis and epidemiology, wound microbiology</td>
</tr>
<tr>
<td><strong>Xiaoxia (Nina) Lin</strong>, PhD; <strong>Lutgarde Raskin</strong>, PhD; <strong>Jeremy Semrau</strong>, PhD</td>
<td>Chemical Engineering; Civil &amp; Environmental Engineering</td>
<td>Environmental microbiology, bioremediation, acid mine drainage</td>
</tr>
</tbody>
</table>

Names in orange highlight Department of Internal Medicine faculty.
That is precisely what is happening in the Department of Internal Medicine as researchers apply their expertise in genome-wide association studies (GWAS) and metabolomics to gain insights into complex genetic disorders. GWAS and metabolomics represent two bookends in what has been called an “omics cascade,” where each field of study focuses on a particular step in gene expression: genomics (DNA), transcriptomics (RNA), proteomics (proteins), and metabolomics (metabolites).

GWAS examine an organism’s instructions—scanning the entire human genome for discrete genetic contributions to disease. Metabolomics looks at the other side—the end-products of all the organism’s metabolic reactions.

“I like to say that metabolomics is the canary of the genome,” says Charles Burant, MD, PhD, Professor of Metabolism, Endocrinology and Diabetes and Director of the Michigan Nutrition Obesity Research Center. “It tells us what the genes, mRNA, and proteins produce and how the proteins are modified, allowing us to make inferences about what’s going on in a cell regarding health or disease.”

By using GWAS and metabolomic analysis, faculty in the Department of Internal Medicine are working to identify potential disease biomarkers, model the functional mechanisms at play in disease progression, and discover potential drug targets. In so doing, they’re moving closer to the goal of personalized medicine, where treatments are matched to patients’ genetic and metabolic profiles.

THE GENOME AND THE CANARY: How Genome-Wide Association Studies and Metabolomics Are Combining to Move Researchers Closer to a Goal of Personalized Medicine
GENOME-WIDE ASSOCIATION STUDIES

“The Department of Internal Medicine is ground zero for GWAS of complex traits,” says Stephen Gruber, MD, PhD, MPH, Professor of Molecular Medicine and Genetics and Associate Director for Cancer Prevention and Control for the U-M Comprehensive Cancer Center (UMCCC). He is the principal investigator on a $12 million National Cancer Institute consortium grant to study colorectal cancer. Awarded in 2010, the grant involves nine research groups in the United States, United Kingdom, and Australia, who will study some 50,000 cases and 50,000 controls.

“The first step in the grant is a meta-analysis of the existing GWAS,” says Gruber. “The second step is to fine-map the regions of interest to determine their function, and the third component is to create clinically relevant models of risk factors. Our goal is ultimately to capture all the risk factors for colorectal cancer.”

Another set of cancer-related GWAS are under the direction of Kathleen Cooney, MD, Professor and Division Chief of Hematology & Oncology and Associate Director for Faculty Affairs for the UMCCC. Her team is looking for genetic variants associated with early-onset prostate cancer, defined as cancer diagnosed before age 65. She recently completed stage one of her study, which involved genotyping a sample of early-onset patients enrolled in the UMCCC’s Prostate Cancer Genetics Project.

“Our early findings suggest that these younger men are ‘genetically enriched’ for the common variants associated with regular prostate cancer—that is, cancer diagnosed after age 65,” says Cooney. “In addition, there seem to be some novel variants, which we will look at in greater detail in phase two of our study in a large sample of young men with prostate cancer from Johns Hopkins. This data will be contributed to a large National Cancer Institute-sponsored consortium for prostate cancer GWAS research, and our U-M team...
will lead the consortium analysis of variants associated with early-onset disease.”

Cooney and Gruber both cite the strength of the Cancer Center with facilitating their research. Gruber also values the close collaboration with the Center for Statistical Genetics in the School of Public Health, and credits such resources with attracting what he calls some of the “rising stars in GWAS.” One of these, Elizabeth Speliotes, MD, PhD, MPH, Assistant Professor of Gastroenterology, is using GWAS to unravel the genetics of obesity and non-alcoholic fatty liver disease.

As a lead author and a strong contributing author to two studies published during 2010 in Nature Genetics, Speliotes reported finding 18 new loci associated with body-mass index (BMI) and another 14 associated with fat distribution in the body. Both obesity and fat distribution are implicated in the development of non-alcoholic fatty liver disease. “Many genes associated with obesity seem to work through the central nervous system, regulating appetite through the hypothalamus,” says Speliotes. “Among our really exciting findings were variants pointing to genes that may work outside of the central nervous system to affect obesity. One of these genes encodes for the GLP-1 receptor in the pancreas that receives signals directly from the gut and affects insulin secretion. We’re hoping this work will help us subclassify individuals as to what is causing their obesity so we can make tailored recommendations to them.”

Another rising GWAS star is Cristen Willer, PhD, Assistant Professor of Cardiovascular Medicine, who was also a co-first author on the Speliotes BMI study. In 2010 Willer built upon two of her previous GWAS on lipid levels with a paper she co-authored in Nature, which was one of the largest GWAS to date with more than 100,000 individuals. The team identified 95 regions of the
genome that were associated with lipid levels in the blood, two-thirds of which were novel. “This was exciting,” says Willer, “because follow-up functional studies in mice showed when these genes were disrupted, it had a drastic effect on lipid levels. This means, first, that GWAS are working and, second, that some of the genes we found might be good drug targets.”

**METABOLOMICS**

The other high-throughput technology-enabled discipline that aims to help diagnose disease and identify tailored responses to it is metabolomics. This work at U-M got a major boost in 2010 with the launching of the NIH-funded Michigan Nutrition Obesity Research Center, one of only 13 federally funded centers that focus on studies related to diet and metabolism. The center, whose infrastructure is available to all researchers in the Department of Internal Medicine, features cores in human research/phenotyping, animal research/phenotyping, bioinformatics, and metabolomics.

“The center provides metabolomics infrastructure to anybody in the department who wants to use it,” says Center Director Burant. “We’ve supported more than 25 grant applications to the NIH. These include people trying to understand how cancer cells utilize nutrients differently and how that might be exploited to change the growth of cancers. We’re working with people trying to understand how changes in the microbiome—the gut flora—might change metabolism. And we’re using it to study how losing weight changes one’s metabolic profile and may actually signal the brain, even in obese people, that they are calorie-deprived and need to eat.”

Subramaniam Pennathur, MBBS, Assistant Professor of Nephrology, directs the metabolomics core and is using the platform to identify potential metabolite biomarkers for diabetic complications and their response to drug treatment. He is working with his nephrology colleagues Matthias Kretzler, MD, and Frank Brosius, MD, to combine metabolomics with transcriptome data to identify pathways unique to diabetic nephropathy for diagnostics and drug development.

“This platform is really well-suited to generating breakthroughs,” says Pennathur, “because, first, it’s comprehensive. In a typical clinical setting, we measure some 50 metabolites. The platform we’re developing aims to reliably measure 500–1,000 of them. Second, it’s one of the few centers that integrates information from the various ‘omics’ disciplines. When you’re looking at hundreds to thousands of genes, proteins, and metabolites, you need a platform that can model what is happening in the organism as a whole. So, if a particular metabolite is altered, you want to know if the change in the metabolite causes the disease or if the problem is really at the protein or gene level. That’s one of our major strengths at Michigan—cutting-edge bioinformatics in a systems biology framework.”
It was another record-breaking year for U-M Medical School research funding with more than $368.7 million in National Institutes of Health (NIH) research funding in federal fiscal year 2010. This achievement reflects the incredible talents and efforts of our physicians and scientists in a particularly competitive funding environment. The University, our Health System, and our research programs all benefit greatly from this recognition. It reinforces our outstanding reputation and helps us attract and retain top-notch researchers and faculty. Funding from NIH and other sources is also crucial to support and sustain the innovative work we do at Michigan.
When Joseph Kolars, MD, Senior Associate Dean for Education and Global Initiatives and Professor of Gastroenterology, began talking to officials from Peking University Health Science Center (PUHSC) about a formal research collaboration, he knew the idea had merit. What he didn’t expect was how eagerly the Chinese would respond. “We were trying to shape this new platform, this new way of collaborating institution to institution rather than just lab to lab,” he says. “What surprised us was that our colleagues in China came forward and said, ‘We like this idea so much we want to put $7 million into it; will you match it?’ There are plenty of examples where the U.S. has put money into a partnership, but none where China has led with an investment at this level.”

 UMHS did match the investment, and in October 2010, Ora Hirsch Pescovitz, MD, Executive Vice President for Medical Affairs, signed an agreement with her Chinese counterpart, Yang Ke, MD, PhD, Executive Vice President of PUHSC, creating the UMHS-PUHSC Joint Institute.

The institute is uniquely designed to foster innovation in clinical and translational research. It features unprecedented collection and sharing of biomedical data; joint research projects and clinical trials; symposia; and an exchange program for faculty, residents, fellows, and students.
Each side had been interested in partnering for some time. “We are a leading medical school with a strong reputation around the world for advancing medical research,” says Eugene Chen, MD, PhD, Professor of Cardiovascular Medicine and co-lead of the Joint Institute’s Cardiovascular Program. “Peking University is the number one medical school in China with the best students and the largest patient resources. There is real potential for us to advance medicine together.” Both universities have a history of collaborating with each other; they also share similar organizational structures, with strong links between their medical schools and hospitals.

Once UMHS and PUHSC confirmed they were a good fit, they just had to work out the details. “Our goal,” says Kolars, “was to set up a synergistic platform that would allow each partner to accomplish something they couldn’t alone.” Initially this means providing UMHS access to PUHSC’s large patient population for clinical trials and providing PUHSC access to U-M’s expertise in conducting these trials.

“In terms of research,” says Kolars, “one of the biggest advantages for us is the opportunity to work on clinical volume. For every patient we have, they have about 10. When you’re working on a disease breakthrough, you need clinical trials. You need patients and disease sets. PUHSC has them.”

But because the initiative was conceived as a genuine win-win proposition, PUHSC stands to gain as well. “China is working hard to modernize everything they do,” says Margaret Gyetko, MD, Professor of Pulmonary and Critical Care Medicine, Associate Dean for Faculty Affairs, and co-lead of the Joint Institute’s Pulmonary Program. “There is tremendous interest at the major universities in raising their standards for scientific work and publication. Our colleagues are interested in being exposed to highly developed research techniques and applying them to the health problems facing China.”

The three areas of research the initiative will initially spearhead are liver, heart, and lung disease (see table on p. 27). The idea is to start with areas that represent a large global disease burden and offer opportunities for comparative studies and translational impact.

“But because their patient population is so different from ours,” says Gyetko, “there are opportunities for comparative studies we couldn’t do alone. Lung disease is the leading cause of death in rural China. We plan to look at the microbial composition of the lung and its influence on the progression of lung disease.” Comparing the two populations will allow her team to examine how different genetic profiles, environmental factors (like air pollution), smoking behavior (some 70–75 percent of men in China smoke), and diet impact the microbial profile of the lungs. They can then assess whether particular profiles correlate with more progressive disease and whether such profiles can be altered.

There are similar possibilities for liver disease. “We know that individuals of Asian ancestry develop obesity-related metabolic diseases at lower levels of body-mass index than individuals of European ancestry, who have been most studied genetically to date,” says Elizabeth Speliotes, MD, PhD, MPH, Assistant Professor of Gastroenterology and principal investigator of one of the initiative’s flagship liver grants. “In terms of non-alcoholic fatty liver disease, we’d like to see if there are differences in how currently identified gene variants affect this new population as well as whether there are new variants that contribute to the disease in Asian populations. We’re also interested in developing interventions tailored to these genetic determinants.”

In addition to clinical volume and comparative potential, there are other benefits to the plat-
form such as the cost efficiencies of working in China and strong positioning for large-scale grants. “More and more RFAs coming out of the NIH and various foundations are asking for U.S.–China collaboration,” says Chen. “Our faculty can now point to a collaborative platform that is ideal for these grants.”

These benefits come with risks. “There are a lot of people rushing to work with China, and some 90 percent of those joint ventures fail,” says Kolars, who himself worked in China for several years. “It’s not for lack of good ideas or because people aren’t working at it. They haven’t been able to figure out how to collaborate across different norms, expectations, communication patterns, and hierarchies.”

The Joint Institute aims to address these risks through several unique features. First is its structure. In addition to its three research emphases, there are three thematic “cores”—human subject protection, biorepositories and biomedical informatics, and the science of collaboration. Each program and core is co-led by a representative from UMHS and PUHSC between whom there is constant contact, planning, and coordination.

In addition, the thematic cores are designed to explicitly address issues of trust and synchronization. The human subject core will ensure that all research collaborations meet the human protection standards in place at both universities. The biorepositories and biomedical informatics core aims to ensure shared standards for clinical data and biological sample collection; it also provides a robust technical infrastructure for data analysis. Finally, the collaboration core aims to identify potential stumbling blocks—such as differing notions of intellectual property—and to develop norms, management structures, and communication processes that favor success.

Another important structural component lies in the joint symposia and faculty exchanges. The former will allow researchers to collaborate intensively on their joint research with rich input from a number of outside speakers, while the latter will provide researchers with the fresh perspective that comes with a new context. “What we are finding is that when people work in unfamiliar settings, it breeds innovation,” says Kolars; “This model is capitalizing on that.”

In doing so, the platform is generating enthusiasm in academic circles. Members of the Joint Institute Executive Committee have been asked to speak to the Academic Health Consortium, a group of national leaders at the health-provost level.

The ceremonial vase that was presented to UMHS by the Peking University Health Science Center to commemorate the Joint Institute agreement.
### University of Michigan Health System – Peking University Health Science Center Joint Institute
#### Round One Translational and Clinical Research Projects

<table>
<thead>
<tr>
<th>PROGRAMS</th>
<th>TOPICS</th>
<th>FACULTY INVOLVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiovascular</strong></td>
<td><strong>Goal:</strong> Prevention and treatment of cardiovascular disease</td>
<td><strong>Co-Lead:</strong> Eugene Chen, MD, PhD</td>
</tr>
<tr>
<td></td>
<td><strong>Grant 1:</strong> Dysfunctional HDL and cardiovascular disease</td>
<td><strong>PIs:</strong> Eugene Chen, MD, PhD and Subramaniam Pennathur, MBBS</td>
</tr>
<tr>
<td></td>
<td><strong>Grant 2:</strong> Genetics of blood pressure and hypertension</td>
<td><strong>PI:</strong> Santhi Ganesh, MD</td>
</tr>
<tr>
<td><strong>Liver</strong></td>
<td><strong>Goal:</strong> Prevention and treatment of hepatitis, liver cancer, and fatty liver disease; optimization of liver transplantation</td>
<td><strong>Co-Lead:</strong> Chung Owyang, MD</td>
</tr>
<tr>
<td></td>
<td><strong>Grant 1:</strong> Predictors of hepatitis C progression</td>
<td><strong>PI:</strong> Anna Lok, MD FRCP</td>
</tr>
<tr>
<td></td>
<td><strong>Grant 2:</strong> Genetic, environmental, and metabolomic studies of non-alcoholic fatty liver disease</td>
<td><strong>PI:</strong> Elizabeth Speliotes, MD PhD, MPH</td>
</tr>
<tr>
<td><strong>Pulmonary</strong></td>
<td><strong>Goal:</strong> Prevention and treatment of COPD</td>
<td><strong>Co-Lead:</strong> Margaret R. Gyetko, MD</td>
</tr>
<tr>
<td></td>
<td><strong>Grant:</strong> Role of the microbiome in lung inflammation and chronic lung disease</td>
<td><strong>PI:</strong> Margaret R. Gyetko, MD</td>
</tr>
</tbody>
</table>

Joint Institute first-round grant RFPs issued in November 2010 and recently awarded.

“We’re getting some real mileage from this model,” says Kolars. “People looking for stories of innovation are turning their attention to Michigan.”
patient care
"We’re truly building a ‘medical home,’" says Greenstone. "The idea is that as a patient you’d feel there’s a small group of people who are intimately involved in your care, helping you navigate this big, busy, intimidating medical center and making it feel smaller and more accessible—more ‘homey.’"

The concept of the patient-centered medical home as a team-based approach to providing comprehensive, coordinated health care is, of course, not new. In fact, a parallel medical home project is being implemented at the University of Michigan Health System (UMHS) and is a key component of the successful Medicare Physician Group Practice Demonstration, led by another of the co-PIs on the VA medical home project. Caroline Blaum, MD, MS, Professor and Associate Chief of Geriatric Medicine and Research Scientist at the VAAAHS’ Geriatric Research, Education and Clinical Center, has helped demonstrate that the medical home can help achieve “high-value care”—that is, improved quality of care and health outcomes at reduced cost.

When most of us think of a sprawling, high-tech hospital, we’d be forgiven if the words “homey” and “intimate” aren’t the first ones that spring to mind. But that is exactly what C. Leo Greenstone, MD, Associate Chief of Staff for Ambulatory Care at the VA Ann Arbor Healthcare System (VAAAHS) and Assistant Professor of General Medicine, is aiming for.

As one of three co-PIs, he’s leading the implementation of the patient-centered medical home concept at the VAAAHS.

The medical home concept being pioneered at the VAAAHS will build on practices in place at the UMHS model, but with adaptations to the different system as well as a test bed of innovative features and a built-in evaluation component—all spearheaded by VA researchers and clinical experts who are also Internal Medicine faculty.

A UNIQUE NAME
As a testament to its patient-centered philosophy, the model’s very name was changed within the VA to reflect patient
preferences. When veterans indicated that the “medical home” label conjured up images of nursing homes, the initiative was relabeled the Patient-Aligned Care Team (PACT). And there’s more that’s new than just the name.

“Nationwide, the VA has funded a standard set of medical-home practices within PACT,” says Blaum. “What’s distinctive here is that we’re one of only five ‘demonstration laboratories’ across the country funded by the VA to extend that concept and evaluate it. That means we’re testing innovative features over and above regular PACT programming that are unique to our site. In addition, we have a rigorous evaluation component.”

The standard PACT model includes improvements in practice design, access to care, case management, and care coordination. This translates into a number of key features, among them a small-team approach to care. “We were already team-based before PACT,” says Greenstone. “But when we started, every patient team had a primary care provider, a rotating pool of registered nurses, various clerks, and other personnel. Under PACT, we’re breaking into smaller ‘teamlets’ with a provider, one registered nurse, one clerk, and a licensed practical nurse. Patients get a card with their teamlet’s names and contact information—and instead of serving 4,000 patients, each teamlet will serve 1,000. So we’re really trying to personalize our care.”

The teamlet’s job is coordinating patients’ care throughout the medical center. “That means getting patients into specialty care, connecting them with social workers, or helping them utilize our clinical pharmacists and pharmacy—even coordinating with outside providers if they’re involved in a patient’s care,” he says.

Adam Tremblay, MD, speaks with one of his patients at the VA Hospital.
Another important feature is improving the transition between the inpatient and outpatient settings. “We’re working to ensure that referring physicians know when their patients are admitted or discharged and that there’s appropriate input and follow-up,” says Sanjay Saint, MD, MPH, Professor of General Medicine and member of the PACT Demonstration Lab Steering Committee. “The metaphor I use is the ceiling of the Sistine Chapel, where God is reaching out to touch Adam. The gap between their fingers is like what happens between these settings. We’re trying to close that gap.”

A DISTINCTIVE MODEL
On top of these changes is a series of evidence-based innovations unique to the VAAAHS. The first is a population-based patient registry. The system will help the team identify their highest risk patients and flag those with complex conditions requiring special attention.

“The second innovation is a completely new tool we’ve developed through PACT called the Patient Navigator System,” says Eve Kerr, MD, MPH, Professor of General Medicine, Director of the VA Center for Clinical Management Research, and the third co-PI of the Demonstration Lab. “Once we’ve used the registry to identify high-risk patients, we’ll use the Navigator to match those patients—by their associated risks, needs, and preferences—with the menu of programs we’ll be offering.”

“An important aspect of this is making sure patients are accessing all the services that can help their specific issue,” says Adam Tremblay, MD, Assistant Professor of General Medicine and member of the PACT Lab Leadership Team. “So, for patients with diabetes, their doctor can prescribe medications and tell them to eat right and lose weight—but then they leave. That’s not nearly as optimal as also being enrolled in our diabetes education class, our nutrition clinic, our telehealth...
services, or any of the additional resources we’re offering as part of the Lab that are tailored to patients’ needs, including where they live and what kind of support they have. Our goal is to use that time between visits to prevent complications and treat disease in a truly comprehensive way.”

The third major innovation is a unique set of technology-facilitated patient self-management programs being offered through the VAAAHS PACT Lab. The various programs will use technologies such as telephone, interactive voice response, and secured messaging to enhance patient self-care. They’ll address issues ranging from medication adherence to hospital discharge follow-up.

One such program is CarePartners, developed by John Piette, PhD, Professor of General Medicine and member of the PACT Lab Leadership Team. “CarePartners links patients and their informal caregivers—a spouse, a child, even a friend living far away—so they can help support patients in their own self-management,” says Kerr. “It also has the ability to alert clinical staff if a patient is getting more ill or has needs beyond what the caregiver can support.”

Likewise, a Peer-to-Peer program uses both telephone interactions and face-to-face visits to connect veterans living with similar conditions so they can provide one another with emotional support and strategies for successful self-care.

“We’re really interested in improving patients’ outcomes by improving their ability to manage their own conditions,” says Kerr. “We also hope this will result in cost savings through decreased use of face-to-face visits and hospitalizations.”

**MEASURABLE RESULTS**

To test whether this will indeed be the case, Kerr is leading her team in a rigorous evaluation. “We’re using a mixed-methods, quasi-experimental approach with staged
in research on quality assessment and improvement to the PACT Lab. “The whole point of health services research is to develop methods and tools to improve the quality, efficiency, and safety of patient care,” she says. “To do that, we have to take it to more than just publication; we have to take it to implementation. The PACT Lab is the perfect way to do that.”

Greenstone agrees. “This is an ambitious project—creating a medical home that utilizes the phenomenal resources the VA has offered,” he says. “We are fortunate to be leveraging the strong research and clinical resources in the VA and the relationship we have with U-M and the Department of Internal Medicine to develop and evaluate an innovative program that is on the cutting edge of patient-centered medical home implementation.”

Kerr says it is exciting to apply the lessons she and her colleagues have learned in research on quality assessment and improvement to the PACT Lab. “We have four VAAAHS sites; two are early implementation sites and two are later ones. These late-implementation sites will initially serve as controls so we can compare improvements between the two types of sites. The mixed methods part means we’re using both quantitative and qualitative techniques to assess needs and test how well the innovations work.”

Members of the Peer-to-Peer program discuss their action plan for diabetes with a VAAAHS nurse.
Now the American Academy of Allergy, Asthma & Immunology (AAAAI) and the Joint Task Force for Practice Parameters (JTFPP) recommends that anyone with a history of suspected egg allergy should first be evaluated by an allergist or immunologist but can probably receive the vaccination. This is due in great part to the work of Matthew J. Greenhawt, MD, MBA, the Director of Research for U-M’s Food Allergy Program and an Assistant Professor in the Division of Allergy and Clinical Immunology and Georgiana Sanders, MD, MS, an Assistant Professor in the Division of Allergy and Clinical Immunology and in the Department of Pediatrics and Communicable Diseases. Greenhawt and Sanders led studies last year that examined the safety of the H1N1 Influenza vaccine and the seasonal Trivalent Influenza vaccine in egg allergic recipients, showing both vaccines were well tolerated even among those with a history of anaphylaxis to egg. These studies were the first research projects conducted by the Food Allergy Center at the University of Michigan, and were two of four North American studies that re-examined the issue of influenza vaccine safety in the egg allergic individual during last year’s global pandemic. Along with James T. Li, MD, PhD, Chair of the Division of Allergic Diseases at the Mayo Clinic and a study collaborator with the U-M investigators, Dr. Greenhawt co-authored the AAAAI guidelines and JTF-PP practice parameters based on these recent studies, which recommend a major shift in policy surrounding influenza vaccination.

In the past, people with egg allergy were told not to get the influenza vaccine because it contained egg protein and could potentially trigger an allergic reaction. Research in the past year showed that influenza vaccines contain only tiny amounts of egg protein. “It’s actually shockingly low,” adds Greenhawt, who noted that the four clinical studies conducted during the global pandemic have shown that the vast majority of persons with egg allergies did not experience a reaction when immunized with the influenza vaccine.
TAKING A SECOND LOOK
The safety of administering egg-containing immunizations to egg-allergic children and adults received renewed interest during the recent global pandemic of the H1N1 Influenza A virus in 2009–2010. An added concern to this discussion is that up to a third of food-allergic children also have asthma or allergic rhinitis.

“This is one group that truly benefits from vaccinations,” explains Carol Chenoweth, MD, Professor of Infectious Diseases. “They are at a higher risk for complications, including having a severe case of influenza, a severe asthmatic reaction, or even developing pneumonia. There is ample evidence that the influenza vaccine provides protection to patients with underlying respiratory disease. This is really a significant finding for that group,” she adds.

In fact, there are actually immeasurable benefits in providing extra protection to this population, and U-M has a long track record with such a practice. “The Division of Allergy and Clinical Immunology has been at the forefront of providing the influenza vaccination to egg-allergic children. We wanted to highlight this through our research in order to recognize and legitimize this approach,” explains Greenhawt.

PROVIDING NEW GUIDELINES
The H1N1 Influenza A vaccine (H1N1), like the seasonal Trivalent Influenza vaccine (TIV) is grown on embryonated chicken eggs, which led to concerns that residual vaccine lot contamination of ovalbumin, the major egg allergen, could provoke allergic reactivity in people with egg allergies.
Even though a contraindication has been historically recommended in administering influenza vaccine to egg-allergic individuals, previous experience suggested that many people with diagnosed or suspected egg allergy could receive influenza vaccination successfully, if they were evaluated by an allergist/immunologist and precautions were followed. Examples of such precautions included vaccine skin testing, using a two-step graded dose (10 percent, followed by 90 percent of the age appropriate dose after a brief observation period), or stepwise desensitization. The U-M studies conducted during the pandemic directly challenged and refuted the necessity of these practices.

According to the new guidelines and practice parameters, Greenhawt and Li emphasize that widespread avoidance of influenza vaccines on account of one's egg allergy is no longer indicated. Furthermore, the practice of skin testing to the seasonal Trivalent Influenza vaccine (TIV) or more than a two-step graded dose challenges for administration of the vaccine are no longer recommended, although either of these precautions may be useful as an extra level of caution in cases where the patient has a documented history of a past allergic reaction to the TIV. Moreover, they specify that either a single dose or two-step graded dose for administration of the vaccine are sufficient, and that most, if not all egg allergic individuals should be able to receive the vaccine safely through one of these two methods.

“Our recommendations provide two flexible approaches to vaccination. Each is backed with recent evidence that it is safe. Most allergists should be able to identify with one of our recommended approaches and be able to vaccinate their egg-allergic patients with confidence,” explains Greenhawt.

A few concepts are still in need of further research, such as the safety of these vaccines in individuals with a severe egg allergy. Greenhawt and Sanders are currently the lead investigators on a multi-center follow-up study reviewing the vaccine’s safety specifically in severely egg-allergic patients. Though their work from the study performed at U-M during the pandemic did suggest that both TIV and H1N1 were safe to administer to such patients, their conclusion requires further validation across larger patient numbers.

“I’m hoping through these findings that providers will no longer withhold the vaccine on account of a patient’s egg allergy and will feel comfortable selecting the precautionary strategies for administering the influenza vaccine. This change will help protect the health of these populations for years to come,” he adds.

Due to these developments, Dr. Greenhawt has been asked to work with the Centers for Disease Control and Prevention Advisory Committee for Immunization Practices on revising their policies, and is the co-chair of the Egg Sensitivities sub-group of the American Academy of the Allergy, Asthma, and Immunology Adverse Reactions to Foods Committee.
education
Residents training in the Clinical Simulation Center
As technology and medicine have been evolving rapidly, so has the way the Department of Internal Medicine trains its residents. “When I was a fellow here in the early-1980s, it was a different world to say the least,” says John Del Valle, MD, Professor of Gastroenterology, Senior Associate Chair for GME, and Director of the Internal Medicine Residency Program.

Residents had grueling schedules of 100 hours a week or more and there were many inefficient administrative and information-sharing procedures. Inpatient orders were carbon copies of handwritten notes sent by pneumatic tubes throughout the hospital. Training was literally “hands-on” at that time. “You’d watch your senior resident perform a procedure. Then the next time they’d have you try it. Soon after that you’d be training the next resident. That wasn’t safe,” he explains.

**ADJUSTING DUTY HOURS**
Approximately 10 years ago, concerns about patient safety began to drastically change the face of residency training. In 2000, the Institute of Medicine (IOM) issued a report titled *To Err Is Human: Building a Better Health System*, which called for measures to reduce medical errors and improve the quality of U.S. health care. Estimates of patient deaths due to medical errors ranged as high as 98,000 per year at the time. In July 2003, the Accreditation Council on Graduate Medical Education (ACGME), acting on growing public concerns about the safety of patients being cared for by overworked doctors and based on recommendations in the IOM report, restricted the duty hours of residents. A limit of 24 hours was imposed upon continuous duty, with up to 6 additional hours allowed for transition of care and instructional activities. Ten hours of rest was required between duty periods.

In 2008, an IOM report brought up concerns regarding the number of consecutive hours a resident would work without sleep. This has resulted in further recommendations that will go into effect in July 2011 that require an intern to spend no more than 16 hours on continuous duty.

Residency program leaders across the country, including Del Valle, have expressed some concerns with the new restrictions, outlining that they may result in limited learning by interns as well as in an increase of information being handed off—changes that could lead to a whole new set of patient safety issues. On the other hand, Del Valle adds “Duty hour limits do make a difference. I’ve really noticed a positive change in the overall well-being and attitudes of our residents. The old way was just too difficult to maintain.”

**IMPROVING COMMUNICATION**
This was just the beginning of the residency programs transformation because issues of patient safety went deeper than adjust-
ing training schedules. Problems still needed to be addressed regarding the keeping of patient records, the transfer of information, and making sure all residents were trained consistently. This is where new technology has made a world of difference in health care and is helping to make the transition to less duty hours go more smoothly.

As computers became a regular part of the landscape at both work and home, they also were integrated into health care settings. First used in operating rooms they soon spread rapidly throughout clinical care, education, and research settings. At the U-M Health System CareWeb is used to provide online access to patient records and the CareLink system allows caregivers to order tests, procedures, and medications; maintain work lists and medication documentation; record information about drug interactions and patient allergies; and speed the ordering process by connecting caregivers online.

These electronic medical records provide access to the same information by all members of a care team and improve the transition of care between day and night teams. “Technology has helped facilitate the process of safe, efficient care,” Del Valle says, “contributing an infrastructure that assists training programs in meeting their duty hour restrictions. It gives you the ability to access information when you’re not at the hospital—you’re at the VA, in another clinic, at home—you can access data and keep things moving along. Moreover, technology plays an important role in facilitating transfer of information between members of the health care team in a timely manner.”

In addition to improving the effectiveness and efficiency of patient records and information sharing, technology is also providing options that allow for more consistency in residents’ training. Due to hectic schedules, many residents and faculty are not always able to attend conferences such as grand rounds, so these are streamed via the Web for viewing in real time at different locations—or later, when individual schedules allow. Everyone has access to the same information.

**SAFER TRAINING METHODS**

Advances in technology have also helped to make learning procedures much safer. Residents now first access a Web-based curriculum that provides full instructional content, complete with a pre- and post-test. Then they move on to “hands-on” training with a mannequin in the Clinical Simulation Center. Michigan opened the Sim Center, as residents call it, in 2004. It was one of the first of its kind in the country.

Davoren Chick, MD, Internal Medicine’s Associate Residency Director and an Assistant Professor in the Division of General Medicine, worked with faculty members in our simulation center to provide a model for trainees to learn invasive procedures before their first patient encounter. Within circumstances
 Residents are taught, under close supervision, everything from informed consent to utilizing the equipment and completing the procedure. “Residents have a chance to learn and experience a standardized procedure in simulation before they have to perform it in real time, minimizing the likelihood of an adverse event,” explains Del Valle.

**MEETING PATIENT NEEDS**

While technology has played an important role in improving safety and providing standardized training, it simply can’t replace caring for the patient in front of you. “Residents will always need hands-on experience talking to, examining, and caring for patients in a supervised setting. You can’t become a good physician if you don’t have that real world experience. It’s our obligation as a training program to make sure that those elements of patient care which embrace compassion and professionalism are taught and upheld,” stresses Del Valle.

Even with the very best training methods, how will the Department of Internal Medicine be able to meet the growing patient demands for its services when its residency program is capped and with even stricter duty restrictions? Thankfully, the U-M Health System started an innovative program of hospital-based physicians known as hospitalists in 2002, directed by Scott Flanders, MD, a Professor from the Division of General Medicine, who are helping to fill in the gap. “This model of hospitalist-based patient care did not exist when I started as program director in 2000. The Health System has been extremely supportive of this approach and it’s now thriving,” says Del Valle, “the hospitalist program can grow to accommodate our patient care needs. This has been and will be vital to allowing the Department of Internal Medicine’s residency training program to meet ACGME requirements while still serving the expanding needs of the community. We have been very fortunate to have Vikas Parekh MD, Assistant Professor of General Medicine, as an Associate Director of the training program. His expertise in hospitalist medicine as well as in education have greatly facilitated the development of inpatient models that will allow us to meet the new duty hour restrictions. In addition, Dr. Parekh is the Associate Director of the hospitalist program working closely with Dr. Flanders in the development of novel models of inpatient care and education.”
IMPROVING QUALITY OF LIFE:
Training Physicians in Hospice and Palliative Care

A NEW FIELD

The term “hospice” (from the same linguistic root as “hospitality”) is traced back to medieval times when it referred to a place of shelter and rest for weary or ill travelers on a long journey. The word was first applied to specialized care for dying patients in 1967 by physician Dame Cicely Saunders, who founded the first modern hospice in London, England. She first introduced the idea to the United States during a 1963 visit to Yale University. Even though the concept had been around for some time, hospice was not formally recognized as a part of the health care continuum in the United States until 1983 when Congress approved the Medicare Hospice Benefit.

Hospice care is provided to patients who have a terminal diagnosis and are usually no longer responding to curative treatment. It focuses on relieving symptoms and supporting patients who are approaching the last stages of life. As hospice care became more established, clinicians soon realized that seriously ill patients, even when not facing death, could benefit from better pain and symptom management and other palliative care services.

Today, hospice care is considered to be at one end of the palliative care spectrum. But while hospice is generally offered to people who are expected to live six months or less, palliative care is provided to a broader population that could benefit from receiving this type of care earlier in their illness or disease process while seeking curative treatment. The goal is to improve quality of life for patients and their families—whatever the prognosis. Palliative care focuses on pain management and symptom control while supporting a patient’s psychosocial and spiritual needs.

“In addition to providing comfort and improving patients’ well-being,” explains Marcos Montagnini, MD, FACP, Director of U-M’s Hospice and Palliative Medicine (HPM) Fellowship Program and an Associate Professor of Geriatric Medicine, “palliative care may actually help extend patients’ lives as well, according to recent research.” A study published last year in the New England Journal of Medicine found that lung cancer patients who received...
palliative care enjoyed better quality of life, were less depressed, and lived longer than those receiving standard care.

A GROWING NEED
Due to rapid advances in both technology and medicine, patients with a serious illness or disease are now living a lot longer than in the past. “In today’s world, our patients and their families are faced with a lot more decisions about treatment. This has increased the need for providing help with relieving symptoms or side effects, improving communication, and coordinating care with a multidisciplinary team over the course of an illness,” explains Caroline Vitale, MD, Assistant Professor of Geriatric Medicine and an HPM Fellowship faculty member. This has resulted in the rapid growth of the demand for training and support in the field of hospice and palliative care. The Center to Advance Palliative Care reports that while only a handful of palliative care programs were in existence five years ago, today more than 1,100 hospitals in the U.S. provide palliative care services to their patients. “This field has really evolved over the last 10 to 15 years; this has resulted in more and more interest among physicians and trainees in this type of care,” explains Jeffrey Halter, MD, Professor and Chief of the Division of Geriatric Medicine.

A major step forward for the field came in 2006 when it was legitimized by the American Board of Medical Specialties (ABMS). The Board approved the establishment of an ABMS-recognized certification in Hospice and Palliative Medicine that is administered through the American Board of Internal Medicine. During a five-year grandfathering period from 2008 through 2012, physicians who meet specified eligibility criteria may obtain certification by applying to their respective primary board and taking a certifying examination. After that, all candidates will need to complete a full one-year fellowship (following their primary board certification) in an approved hospice and palliative care fellowship program to be eligible for the examination.

U-M’S HOSPICE AND PALLIATIVE MEDICINE FELLOWSHIP
In response to these many developments, U-M’s Division of Geriatric Medicine recruited Montagnini, a former U-M geriatric medicine fellow who had gone on to develop a palliative care program at the Medical College of Wisconsin, to direct a new HPM fellowship and to lead the palliative care program at the VA Ann Arbor Healthcare System. Just two short years later, in 2009, U-M’s HPM Fellowship became one of the first programs nationally to receive accreditation by the Accreditation Council for Graduate Medical Education.

Through the program that Montagnini developed, three fellows are provided with a comprehensive, one-year curriculum that covers pain management and symptom control at the end-of-life as well as psychosocial and spiritual support, bereavement support for families, control of complications and comorbidities that can cause life-threatening illnesses, optimizing function for quality of life, development of communication skills, working with interdisciplinary teams, as well as the ethical and legal aspects of end-of-life care. The learning objectives of the fellowship program are met through several clinical rota-
tions, didactics sessions, elective rotations, research experiences, and self-study.

The fellows rotate through the VA Ann Arbor Healthcare System, University Hospital, Mott Children's Hospital, and Arbor Hospice, a community-based hospice care facility. The VA rotation includes palliative care consultations for inpatients, outpatients, and those receiving home-based care. Fellows also participate in quality improvement initiatives and scholarly activities throughout the year.

“The sheer breadth of the experiences and clinical mentoring provided to the fellows is a very unique and vital part of this fellowship that really makes it stand out from any other program in the Midwest,” explains Anjanette Stoltz, MD, Assistant Professor of Geriatric Medicine, Senior Medical Director of Arbor Hospice, and an HPM Fellowship faculty member.

“In addition to the wide variety of training locations, fellows also have access to U-M’s extensive resources and faculty experts to cultivate their research interests as they are mentored through the design and completion of a scholarly research project,” adds Stoltz.

After that year of training, fellows have the necessary skills and background to go on to start a palliative care program at a hospital or health system or lead a hospice care program (see Former Fellows Update on page 49). Those who choose to pursue further research can continue their work during a second year.

A MULTIDISCIPLINARY APPROACH

One aspect that truly sets hospice and palliative care apart from other subspecialties is its highly collaborative approach, and the fellowship itself also reflects this quality. “While the Division of Geriatric Medicine provides leadership and administrative support for the HPM Fellowship, the program is made possible by contributions from many other divisions within Internal Medicine and throughout the health system,” explains Halter. Trainees from various backgrounds work closely with U-M faculty from numerous departments and disciplines, including internal medicine, oncology, nephrology, geriatrics, surgery, family medicine, pediatrics, social work, psychology, and chaplaincy to hone their clinical and leadership skills.

In addition to Drs. Montagnini, Vitale, and Stoltz, the other Department of Internal Medicine faculty that contribute to the program include:

Robert Hogikyan, MD, MPH
Associate Professor of Geriatric Medicine

Maria Silveira, MD, MPH
Assistant Professor of General Medicine

Richard Swartz, MD
Professor Emeritus of Nephrology

Susan Urba, MD
Professor of Hematology & Oncology
Professor of Otorhinolaryngology
Medical Director of the U-M Comprehensive Cancer Center’s Symptom Management & Supportive Care Clinic
Francis Wordén, MD  
Assistant Professor of Hematology & Oncology

Given that hospice and palliative medicine is recognized as a subspecialty under 10 ABMS core specialties, the fellows also represent a wide range of areas. “Hospice and palliative medicine is critical in hematology & oncology. One of our division fellows, Kathleen Bickel, MD will be taking part in the HPM Fellowship program next year,” explains Kathleen Cooney, Professor and Chief of the Division of Hematology & Oncology. Vitale adds, “The current fellows come from internal medicine, medicine-pediatrics, and emergency medicine backgrounds.”

Looking Forward

Thanks to the support of the Department of Internal Medicine, the fellowship program is quickly gaining visibility both at U-M and nationwide. The number of applications has been consistently increasing. All three fellowship recruits for 2011-2012 are from U-M. “But we still need more physicians prepared to care for these patients and to be able to respond to the needs of their families. Many studies show that there is still a lack of physician preparedness for palliative and end-of-life care. This fellowship is working toward reversing that trend,” says Montagnini.

“Over the years, I’ve really noticed an increase in awareness and acceptance about hospice and palliative care among cancer patients overall. There’s much more openness to exploring what’s really best for patients and their families. But at the same time there’s a strong ‘survivor’ mentality among many cancer patients, so giving up the fight can be challenging. I’ve had patients tell me they felt like they were ‘letting me down’ by stopping treatment. Having physicians from various backgrounds specialized in this area is extremely important. We need to be able to help patients switch focus and transition with proper support into the last stage of their life,” adds Cooney.

“Nobody wants to take away hope,” says Vitale. “The earlier palliative care can be integrated into the process, the better it is for patients and their families. We’re really here to help them articulate their values, goals, and preferences. This has been found to result in less depression, less stress, and less burdensome treatments overall.”

Stoltz concludes, “Quality of life wasn’t much of a concept among the lay population thirty years ago. As the Baby Boom Generation grows older, they want to know about all of their healthcare options. They’re highly educated consumers. I think that’s a good thing. That’s what we’re here for—to help patients and their families make informed decisions about care. With this cultural shift, the need for hospice and palliative care physicians is only going to continue to grow.”
### Current Fellows

#### 2010-2011 Hospice and Palliative Medicine Fellows*

<table>
<thead>
<tr>
<th>FELLOW</th>
<th>BACKGROUND</th>
<th>INTERESTS</th>
</tr>
</thead>
</table>

*This year a third fellow is being supported by the U-M Palliative Care Program, which is funded through University Hospitals and Health Centers. Two fellowship positions are funded by the VA Ann Arbor Health Care System.*
**FORMER HPM FELLOW UPDATES**

**2009-2010**

**Irene Connolly, MD**
Dr. Connolly is currently a fellow in hematology oncology at East Carolina University. Upon graduation from her current program, Dr. Connolly plans to combine medical oncology and hospice/palliative medicine in a community practice. She presented a poster on “Managing Pain in Patients with a History of Illicit Drug Use” at the 2011 Annual Assembly of the American Academy of Hospice and Palliative Medicine in Vancouver.

**Malathy Kilaru, MD**
Dr. Kilaru is currently working as the Medical Director for Henry Ford Hospice in Detroit, MI. She presented a poster on the “Management of Hyperthrophic Pulmonary Osteoarthropathy” at the 2011 Annual Assembly of the American Academy of Hospice and Palliative Medicine in Vancouver. Her poster was selected for an award at the conference.

**Noel Javier, MD**
Dr. Javier is pursuing an academic career in geriatric medicine and palliative medicine. He is a Clinical Assistant Professor of Medicine in the Division of Geriatric Medicine at the Warren Alpert Medical School of Brown University. He is also the Associate Medical Director at the Home and Hospice Care of Rhode Island Providence, RI.

Dr. Javier received a Junior Investigator Award at the 2010 Annual Assembly of the American Academy of Hospice and Palliative Medicine meeting for his work on “Rehabilitation of the Hospice and Palliative Medicine Patient.” He also co-authored a paper with Dr. Montagnini on the same topic which was published in the *Journal of Palliative Medicine* in May 2011.

**Brandon Walters, MD**
Dr. Walters is an Associate Medical Director at the Hospice of Western Reserve in Cleveland Heights, OH. He is also involved in teaching medical students, residents, and fellows rotating in hospice/palliative care at the Cleveland Clinic, University Hospital/Case Western Reserve School of Medicine, and Ohio University College of Medicine.

Dr. Walters co-authored a paper with Dr. Montagnini on “Current Concepts in the Management of Opioid-Induced Constipation” which was published in the *Journal of Opioid Management* in November/December 2010.

**2008-2009**

---
Four Department of Internal Medicine faculty were awarded with the U-M Provost’s Teaching Innovation Prize sponsored by the Office of the Provost, the Center for Research on Learning and Teaching, and the U-M Library. **John Del Valle**, MD, **Michael Lukela**, MD, **Rajesh Mangrulkar**, MD, and **Vikas Parekh**, MD were recognized for the Patient Safety Learning Program, a longitudinal, multi-faceted educational intervention for internal medicine residents.

This program pursues a three-pronged curricular approach to improving the medical culture with respect to patient safety. A foundational seminar series introduces conceptual models for analyzing and addressing adverse events. Medical residents use e-portfolios to reflect on and analyze their own experiences and near misses. Teams of residents participate in Patient Safety Improvement Projects by diagramming causes and effects of actual adverse events and designing solutions that can be implemented immediately. Residents praise the program for effectively addressing a topic that is not discussed in most training hospitals; residents believe that the program will save lives and make them better clinicians.
The Galens Medical Society awards Bronze Beepers to house officers who they feel have been exemplar in their teaching duties towards medical students. This year, three were awarded to three house officers in Internal Medicine: Geoffrey Barnes, MD; Michael McNamara, MD; and Javier Valle, MD.

Rajesh Mangrukar, MD, received the Kaiser-Permanente Award for Excellence in Teaching for clinical teaching. The Kaiser Award is the highest teaching award at the Medical School, recognizing faculty for dedication to quality teaching, enthusiasm, and efforts to improve the experience of each student.

Adam Tremblay, MD, earned the Richard D. Judge Award for Excellence in Medical Student Teaching, which is the highest award the Internal Medicine Department bestows for teaching.

Rajesh Mangrukar, MD, received the Special Recognition for Contributions to the Medical Student Teaching Program Award.

Carol Kauffman, MD, Professor of Infectious Diseases, was honored with a Lifetime Achievement in Medical Education award from the Medical School. Through her 33-year career at U-M, we can think of no one more suited for recognition of continuous broad and significant achievements in medical education than Dr. Kauffman.
outreach
LEADING THE WAY

Continuing medical education (CME) at Michigan has just boldly gone where no one has gone before: On January 1, 2011, the U-M Medical School stopped accepting any industry funding for its CME offerings. As with any new daring decision or “first,” there are a lot of legitimate concerns about what this all means and what the consequences will be. Much of the discussion has revolved around the role that the medical center has in offering CME for UMHS practitioners and other clinicians in the state and region.

All practicing physicians in the state of Michigan must complete 50 hours of continuing medical education a year to maintain certification. U-M has been the state’s leading provider of CME opportunities and, not surprisingly, the Department of Internal Medicine has traditionally offered the most CME course offerings.

U-M has a long history of providing leadership in medical education for practicing physicians. As far back as the 1860s, the Medical School used to invite community physicians to bring in their most difficult cases for review and discussion. The earliest version of what is now known today as the Office of Continuing Medical Education was founded in 1927.

When it opened in 1969, U-M’s Towsley Center was the first building in the country dedicated to community medical education. Due to increased requirements for physicians, CME offerings began to grow into the 1990s. Then in the late 90s there was a dramatic increase in both CME activities and corporate funding: Nationally CME activities almost doubled while corporate support more than tripled—eventually accounting for 61 percent of all CME funding. This was due to the fact that the manufacturers of widely used drugs and medical devices began to sponsor CME events as a marketing strategy to directly reach and to help educate physicians. They also started reaching out directly to the medical community through speakers’ bureaus, consultancies, major exhibits at medical conventions, and gifts.

Of course, these dramatic developments in the field started to raise some red flags. Many people were deeply concerned about the potential for conflict of interest. The Office of Inspector General of the U.S. Department of Health and Human Services issued guidance to the pharmaceutical industry, detailing acceptable practices in 2003. This was followed by the Accreditation Council for Continuing Medical Education publishing Standards for Commercial Support to ensure the independence of CME activities.

To date, no evidence of systematic bias in independently developed CME activities that receive commercial support has been established. Those who argue against commercial support for CME do not believe that any rules or regulations can adequately mitigate the
potential for conflict of interest. The U-M Medical School decided to make a pre-emptive, bold statement against the use of industry funding before any formal recommendations were made. Most other CME providers and academic medical centers are waiting for a report by the Conjoint Committee for CME that is due to be released in the spring of 2011, which is being coordinated by the Council of Medical Specialty Societies, before making any major decisions.

In a recent article in Medicine at Michigan, Medical School Dean James Woolliscroft, who is also a Professor in the Division of General Medicine and an internationally recognized medical educator, explains why the Medical School took action when it did:

The archives are filled with erudite volumes that have been put together by expert committees and haven’t made a whit of difference. It’s a little different when a school or college comes together and says this is where we’re going, because then you actually do something. In areas where we can have direct impact and leadership, we should do so.

A COSTLY DECISION
Physicians like Robert Lash, MD, a Professor in the Division of Metabolism, Endocrinology, and Diabetes (MEND) who was the CME program director for the Internal Medicine Annual Update for seven years, are concerned that both the community and the health system may suffer as a result. “External sponsors have never been involved in content development or speaker selection. We had a very separate relationship, and worked very hard to avoid even the perception of a conflict of interest. Our summer update course has been self-supporting, and any additional funding from industry was used to help bring in grand rounds speakers during the academic year. I’m concerned that these changes will result in less CME activity both at UMHS, and throughout the region, and I think that would be a loss for everyone involved,” he explains.

At U-M, the loss of industry funding has already resulted in a major reduction in the number of CME events for community physicians offered by the Medical School. In 2010; there were 54 course offerings (38 of which were provided by the Department of Internal Medicine). For 2011, that number has already dropped by nearly 50 percent to 28 total (20 of which are provided by the Department of Internal Medicine).

LOSING A VALUABLE OPPORTUNITY
Even with the loss of industry funding resulting in fewer U-M events, there are still plenty of CME options available for practicing physicians to maintain their licenses. They can accumulate credits from a wide variety of activities including reading, audiotapes, self-study in journals, online, podcasts, etc. This isn’t any consolation to many CME program directors who are concerned about losing valuable face-to-face interaction and discussion, as well as the strong ties they’ve
developed through working directly with community physicians over the years.

Robert Fontana, MD, a Professor in the Division of Gastroenterology and a CME program director for almost 15 years explains, “With the funding change, I’m concerned that average costs will rise and both attendance and course offerings will drop and thus reduce our overall community exposure.” One of his most popular offerings is the GI-Liver Wrap Up: A Comprehensive Clinical Review of Professional Society Meetings for the Practicing Physician. At this event, U-M faculty report on key clinical points and presentations from recent conferences, summarize the data, and help translate what new developments mean and how to implement them. Thus, this event helps community physicians update their clinical practices. “We’ve established a formula that really works. The providers come back year after year; it’s an annual tradition for them. There is a great loyalty among our participants to attend our courses and it is a wonderful opportunity to reach out and promote U-M’s faculty expertise in delivering state-of-the-art care. An online course can’t accomplish this. Michigan needs to be proactive. We need to let people know who we are and what we do. A physician will be much more comfortable calling you or sending a referral to you if they know or have met you in person. The majority of patients cared for in our hospital and clinics are referrals from other physicians,” he explains.

Dr. Lash agrees, “At U-M, access to the clinical expertise is just a short walk down the hall, and it’s very easy to forget what a privilege this is. If you’re a physician in a small town, or working by yourself, this usually isn’t the case. Our CME courses provide that friendly face, that real connection to U-M that promotes good will and referrals.”

James Froehlich, MD, MPH, an Associate Professor in the Division of Cardiovascular Medicine, who will be taking the reigns of the Internal Medicine Annual Update course for the first time this year adds, “I really see our course as a review for practicing internists of what they can do. It gives them the tools needed to manage their patients without consulting specialists. By empowering them to manage what they can, they will feel more comfortable consulting specialists when needed. Our CME programs provide the unique opportunity to directly interact and ask questions of U-M faculty in person. It puts a face with a name. It would be detrimental to both Michigan and the community to lose that connection.”
FINDING A BETTER WAY

In the wake of this decision both the medical school and the individual departments are reexamining their approach to CME. Which courses provide the greatest educational impact? How do we assess that impact? How can we continue to provide those courses? What is the role of the Health System? In some cases, the departments or divisions are stepping up to help fund courses and the Medical School is matching half of the budget. The Department of Internal Medicine has recently started an endowment to support CME programming but it will take years to build. In several cases, program directors are cutting costs by hosting courses locally at area hotels instead of at far away, fancy resorts. There is still the potential that participant fees may have to be increased in some cases.

“’We’re now entering a phase that calls for a complete re-evaluation of why and how we offer CME—its purpose, its funding, and its structure. There’s going to have to be a lot more valid research and evaluation to prove ‘Did this course actually change physicians’ practices?’ There’s a whole separate ‘science’ to evaluating teaching—the science of medical education. We may have to completely redesign our approach,” explains Froehlich.

“I feel very passionate about the mission of CME in our medical center. Whatever happens, I hope we can find a way to continue to do it in the best way possible. As a medical educator, researcher, and clinician devoted to improving the care of patients throughout the state and region, the expertise, knowledge, and experience of our faculty needs to be disseminated and shared with practicing doctors through CME venues. If we reduce our CME offerings, there will likely be ripple effects in the quality of care offered to patients throughout the region. I think it’s in all of the stakeholders interests (CME providers, community physicians, patients) to have a robust offering of CME programs that includes face-to-face meetings and courses, webinars, print media, podcasts, and other electronic venues to meet the current and future educational needs of our constituency as medicine rapidly moves forward in the Information era,” adds Fontana.
The promise of ACOs

Included in the Patient Protection Affordable Health Care Act that President Obama signed into law in March of 2010, ACOs are a new model for delivering improved quality of care to Medicare beneficiaries at a reduced cost. More specifically, an ACO is a network of providers (including primary care physicians, specialists, and hospitals) that shares responsibility for meeting the health needs of patients. If an ACO saves Medicare money while also meeting certain quality measures, it receives a portion of the savings. Because of the possibility of greater reimbursement, ACOs have a strong incentive to cooperate (e.g., share information), participate in wellness programs, invest in health care technology, and pursue other programs that keep down costs while improving performance.

On the National Stage:

Internal Medicine faculty play an advisory role in the health-care reform debate

When Nancy-Ann DeParle, Director of the White House Office of Health Reform, and Donald Berwick, Director of the Centers for Medicare & Medicaid Services (CMS), convened open forums in 2010 to discuss successful models for reforming Medicare, they invited a group of internal medicine faculty physicians from U-M to participate. The reason? U-M's Faculty Group Practice is one of only two out of the 10 large physician groups participating in the Medicare Physician Group Practice (PGP) Demonstration Project that had saved Medicare money each of its five years. The success of U-M's PGP Demonstration Project caught the attention of federal officials, because these projects are recognized as the prototypes of Accountable Care Organizations (ACOs), and many view ACOs as the best hope for the future of health care.

THE PROMISE OF ACOs

Included in the Patient Protection Affordable Health Care Act that President Obama signed into law in March of 2010, ACOs are a new model for delivering improved quality of care to Medicare beneficiaries at a reduced cost. More specifically, an ACO is a network of providers (including primary care physicians, specialists, and hospitals) that shares responsibility for meeting the health needs of patients. If an ACO saves Medicare money while also meeting certain quality measures, it receives a portion of the savings. Because of the possibility of greater reimbursement, ACOs have a strong incentive to cooperate (e.g., share information), participate in wellness programs, invest in health care technology, and pursue other programs that keep down costs while improving performance.

Though some ACO-type groups have already formed, the ACO initiative is scheduled to launch in January of 2012. To prepare for this event, DeParle and Berwick invited leaders of successful Medicare physician groups such as U-M's to Washington, D.C., to learn from them what works and what doesn’t. The U-M contingent comprised David Spahlinger, MD, Associate Professor of Internal Medicine, Senior Associate Dean for Clinical Affairs, and Executive Medical Director of the U-M Faculty Group Practice; Caroline Blaum, MD, Professor and Associate Chief of Geriatric Medicine, and a Research Scientist at the VA Ann Arbor Healthcare System; Steven Bernstein, MD, MPH, Associate Professor of General Medicine and Associate Research Scientist, Department of Health Management and Policy; and Kathleen Ward, MPA, Clinical Information Analyst Staff Specialist, UMHS Quality Management Program.
U-M’S MODEL
During the meetings, faculty shared information on the steps the U-M physician group had taken to improve quality of care while reducing costs. Some of the most important of these were: improving coordination of care, reaching out to patients to ensure they understood hospital discharge information and treatment plans, launching a palliative care program, and installing geriatricians in the role of nursing home medical directors. “When patients left the hospital, we called them to make sure they were well-aware of the plan of care physicians had established for them,” explains Spahlinger. “This approach resulted in reduced hospital readmission rates, especially for patients with chronic conditions such as obstructive pulmonary disease and congestive heart failure. In addition, we reduced the hospitalization rate of nursing home residents by increasing the number of geriatricians in nursing home medical director roles. Geriatric doctors do a better job of managing changes in the condition of residents and thereby help to reduce the number of avoidable hospitalizations.”

“One of our primary focuses recently has been trying to protect National Institutes of Health (NIH) funding from budget cuts. The field is virtually dependent on NIH funding for research.”

“Implementing these reforms resulted in a significant reduction in hospital admission and readmission rates,” added Spahlinger. “And since hospitalizations account for 44 percent of Medicare spending, they resulted in decreased Medicare costs.” In fact, U-M saved the Medicare program more than $35 million on the cost of Medicare care over the five performance years reported and received bonus payments totaling $17.6 million. Further, U-M met 30 of the 32 quality measures established by CMS for performance year 5. U-M is using the bonus payments received from CMS to fund additional programs and improvements in the delivery of health care to Medicare patients.

Representing Rheumatology
In November 2010, Timothy Laing, MD, Senior Associate Chair for Clinical Affairs in the Department of Internal Medicine and Associate Professor in the Division of Rheumatology, was named Chair of the American College of Rheumatology’s (ACR) Committee on Government Affairs.

The U-M Faculty Group Practice, which comprises U-M’s 1,600 faculty physicians, cared for nearly 20,000 Medicare recipients. When asked if ACOs are a good idea, Spahlinger responded, “I think that ACOs are worth trying because they hold physicians accountable for care and encourage them to work together to meet the health needs of patients.”
support agencies, congressional members and staff, and organizations concerned with public policy aspects of health-care delivery and health-care financing, and monitors not-for-profit issues of concern to ACR.

“One of our primary focuses recently has been trying to protect National Institutes of Health (NIH) funding from budget cuts. The field is virtually dependent on NIH funding for research,” he explains.

In addition to the committee’s lobbying efforts, Dr. Laing has been busy representing ACR at many important meetings in Washington, D.C. In November, he met with the CMS Administrator Donald Berwick, M.D., to discuss various issues related to the rheumatologist’s role in the Patient Centered Medical Home and ACOs.

Last December, he attended a White House forum on Delivery System Reforms that was an open dialogue around how providers can make hospitals safer and reduce re-admission rates and how to develop effective accountable care organizations. Dr. Laing spoke about improved outcomes for patients with rheumatoid arthritis who see a rheumatologist early and how rheumatologists can prevent hospital admissions.

In January, he testified before the Medicare Payment Advisory Commission (MedPAC) about the value of cognitive specialties and the impact that CMS’ decision to eliminate consultation codes will have on a workforce in already underrepresented cognitive specialties. Other members of the Cognitive Specialty Coalition testified on the value of these various specialties and requested the MedPAC further review the impact of eliminating the consultation codes.

RELATIVE VALUE RECOMMENDATIONS
In addition to his work with the ACR, Dr. Laing is also a member of the American Medical Association (AMA) Specialty Society Relative Value Scale Update Committee (RUC).

Annual updates to the physician work relative values are based on recommendations from a committee involving the AMA and national medical specialty societies. The AMA formed the RUC to act as an expert panel in developing relative value recommendations to CMS. It represents the entire medical profession, with 23 of its 29 members appointed by major national medical specialty societies including those recognized by the American Board of Medical Specialties, those with a large percentage of physicians in patient care, and those that account for high percentages of Medicare expenditures.

Dr. Laing serves on this committee with three other colleagues from U-M including Samuel Silver, MD, PhD, Professor of Hematology & Oncology; Charles Koopman, MD, Professor of Otolaryngology and of Pediatrics and Communicable Diseases; and Margie Andreae, MD, Professor of Pediatrics and Communicable Diseases.
AMERICAN SOCIETY FOR CLINICAL INVESTIGATION
MEMBERS

Peter Arvan, MD, PhD
Ariel Barkan, MD
Ernesto Bernal-Mizrachi, MD*
George Brewer, MD
John Carethers, MD
C. William Castor, Jr., MD
Kathleen Cho, MD
Kathleen Collins, MD, PhD
Daniel Eitzman, MD
Stephan Fajans, MD
Eric Fearon, MD, PhD
David Fox, MD
Thomas Gelehrter, MD
David Ginsburg, MD
Thomas Glaser, MD, PhD
Stephen Gruber, MD, PhD
Jeffrey Halter, MD
Gary Hammer, MD, PhD
Joel Howell, MD, PhD
Patrick Hu, MD, PhD*
H. David Humes, MD
Mariana Kaplan, MD*
Eve Kerr, MD, MPH
Alissa Koch, MD
Ronald Koenig, MD, PhD
Matthias Kretzler, MD*
Benjamin Margolis, MD
David Markovitz, MD
Laurence McMahon, Jr., MD, MPH
Juanita Merchant, MD, PhD
Fred Morady, MD
Martin Meyers, MD, PhD
Akinlolu Ojo, MD, PhD
M. Bishr Omary, MD, PhD
Chung Owyang, MD
Marc Peters-Golden, MD
Kenneth Pienta, MD
David Pinsky, MD
Bertram Pitt, MD
Pavan Reddy, MD
Bruce Richardson, MD, PhD
Theodora Ross, MD, PhD
Sanjay Saint, MD, MPH
Alain Sattin, PhD
Jim Shayman, MD
Robert Sitrin, MD
Theodore Standiford, MD
Andrea Todisco, MD
Thomas Wang, MD, PhD
Stephen Weiss, MD
Max Wicha, MD
Roger Wiggins, MB, BChir
John Williams, MD, PhD
Xiaochun Yu, MD, PhD*

* New Member in 2010–2011

ASSOCIATION OF AMERICAN PHYSICIANS MEMBERS

Peter Arvan, MD, PhD
John Carethers, MD*
C. William Castor, Jr., MD
Kathleen Cho, MD
Stephan Fajans, MD
Eric Fearon, MD, PhD
David Fox, MD
Thomas Gelehrter, MD
David Ginsburg, MD
Daniel Haynes, MD
H. David Humes, MD
Jose Jalife, MD*
Stevo Julius, MD
Alissa Koch, MD
Ronald Koenig, MD, PhD
Malcolm Low, MD*
Benjamin Margolis, MD
David Markovitz, MD
Juanita Merchant, MD, PhD
Fred Morady, MD
M. Bishr Omary, MD, PhD
Gilbert Omenn, MD, PhD
Chung Owyang, MD
Marc Peters-Golden, MD
David Pinsky, MD
Bertram Pitt, MD
Jim Shayman, MD
Theodore Standiford, MD
Galen Toews, MD
Joel Weinberg, MD
Stephen Weiss, MD
Max Wicha, MD
Roger Wiggins, BChir
John Williams, MD, PhD
For more information about the University of Michigan Department of Internal Medicine, go to:
www.med.umich.edu/intmed

For detailed information about individual divisions, please visit their website:

- **Allergy and Clinical Immunology**: www.med.umich.edu/intmed/allergy
- **Cardiovascular Medicine**: www.med.umich.edu/cvc
- **Gastroenterology**: www.med.umich.edu/gi
- **General Medicine**: www.med.umich.edu/intmed/genmed
- **Geriatric Medicine**: www.med.umich.edu/geriatrics
- **Hematology & Oncology**: www.med.umich.edu/intmed/hemonc
- **Infectious Diseases**: www.med.umich.edu/intmed/infectious
- **Metabolism, Endocrinology & Diabetes**: www.med.umich.edu/intmed/endocrinology
- **Molecular Medicine & Genetics**: www.umich.edu/~mmgmed
- **Nephrology**: www.med.umich.edu/intmed/nephrology
- **Pulmonary & Critical Care Medicine**: www.med.umich.edu/intmed/pulmonary
- **Rheumatology**: www.med.umich.edu/intmed/rheumatology

University of Michigan
Department of Internal Medicine
3110 Taubman Center, SPC 5368
1500 East Medical Center Drive
Ann Arbor, MI 48109
(734) 936-4340
Executive Officers of the University of Michigan Health System
Ora Hirsch Pescovitz, Executive Vice President for Medical Affairs; James O. Woolliscroft, Dean, U-M Medical School; Douglas Strong, Chief Executive Officer, U-M Hospitals and Health Centers; Kathleen Potempa, Dean, School of Nursing

The Regents of the University of Michigan
Julia Donovan Darlow, Ann Arbor; Laurence B. Deitch, Bingham Farms; Denise Ilich, Bingham Farms; Olivia P. Maynard, Goodrich; Andrea Fischer Newman, Ann Arbor; Andrew C. Richner, Grosse Pointe Park; S. Martin Taylor, Grosse Pointe Farms; Katherine E. White, Ann Arbor; Mary Sue Coleman, ex officio

The University of Michigan, as an equal opportunity/affirmative action employer, complies with all applicable federal and state laws regarding nondiscrimination and affirmative action. The University of Michigan is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status in employment, educational programs and activities, and admissions. Inquiries or complaints may be addressed to the Senior Director for Institutional Equity, and Title IX/Section 504/ADA Coordinator, Office of Institutional Equity, 2072 Administrative Services Building, Ann Arbor, Michigan 48109-1432, 734-763-0235, TTY 734-647-1388. For other University of Michigan information call 734-764-1817.

Copyright © 2011 The Regents of the University of Michigan, Ann Arbor, Michigan, 48109

MMD 100499

The Department of Internal Medicine funds this publication. No donor funds are used to produce this report.