

UNIVERSITY *of* MARYLAND
MEDICINE

The Power *of* Partnership

2016

ANNUAL REPORT





The **Power of Partnership** allows our two organizations to provide compassionate, discovery-based care and conduct the research and training that improve the health of the individuals and communities we serve.

“Can I see my room?”

asked Camron Hyatt, 9, of Elkridge, during a follow-up visit in the outpatient clinic of the UM Children’s Heart Program. He asked to go visit “my nurse” and others who cared for him a week earlier in the Pediatric Intensive Care Unit, to show them how much better he felt since surgery for a congenital heart and vascular defect. (See more on page 27.)



2016

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The University of Maryland School of Medicine (UMSOM) and the University of Maryland Medical System (UMMS) share a vision that the power of our partnership continues beyond healing patients when they're in the hospital. Our vision, already coming to fruition, extends to helping people stay healthy and manage their conditions, spending as little time as possible in the hospital — or staying out of it altogether.

A Shared Vision

Together, our faculty and staff meet the health care needs of Maryland and the region while developing a global model of an integrated health system and medical school. We offer more office-based and ambulatory care than ever before, a physician network that covers most of our state, and programs around the world that train health care providers in underserved communities.

Our two organizations each have specific missions, as well as a mission in common — to provide a full range of health care services to diverse patient populations across the region, to conduct innovative research, and to teach future health care practitioners. For the patients who rely on us, we are a seamless team working side by side or in sequence, at the bedside, in the laboratory and in the community.

During FY 2016, we had worldwide impact with the first HIV/AIDS vaccine trial in humans and a new therapy for essential tremor and Parkinson's disease. We also received national recognition in organ transplant, cardiac care, trauma and critical care. Our cancer center earned the National Cancer Institute's highest designation. These are just a few of the achievements we feature in this combined annual report.

Improving the health of our population continues to be the guiding principle behind national health care reform, and our two organizations strive to meet the needs of the community with the resources available to us. Maryland hospitals have a unique arrangement with the federal government, in which hospitals' revenue growth is capped. This provides incentive to actively manage each patient's care outside

the hospital walls, improve quality, and partner with communities to reduce acute-care hospitalization.

University of Maryland Medicine has achieved top-tier status as a national leader in clinical and academic medicine and biomedical research. Our success contributes greatly to the well-being of our patients and communities and the economic health of our nation. We have sustained this level of leadership by adopting a nimble approach that is both strategic and opportunistic in order to maximize our academic yield and continue to thrive in challenging times.

A RESOURCE TO THE REGION

In partnership with the UMSOM, UMMS is increasing the capacity and accessibility of non-hospital-based medical care in communities across Maryland. Physicians across the region rely on our flagship academic medical center, the University of Maryland Medical Center (UMMC), to refer their patients for specialized care. This year, our own Maryland ExpressCare facilitated 9,615 referrals for urgent patient transfers from community hospitals.

All attending physicians at UMMC are UMSOM faculty members. UMMC is a hospital of choice throughout the Mid-Atlantic for its expertise in the delivery of time-sensitive critical care. In September 2015, UMMC's new Neonatal Intensive Care Unit, part of the University of Maryland Children's Hospital (UMCH), opened its doors to Maryland's smallest patients and their families. The UMCH last year treated nearly 40,000 children, from newborns to young adults, through hospital and outpatient services.

UMSOM faculty physicians provide care or consult with local physicians at all health centers in the UMMS network, providing care at more than 50 different locations throughout the state.

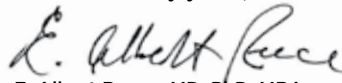
INCREASING ACCESS TO CARE

The UMSOM's new Primary Care Track has generated more interest than ever among our medical students, exposing them earlier to primary care in underserved rural and urban communities with faculty mentors.

Working together, we identify where physician and health care professional shortages exist and work with the community and our hospital partners on solutions. Residents throughout Maryland now have more access than ever to our world-renowned transplant specialists, neurosurgeons, cardiologists and pediatricians. The University of Maryland Cancer Network provides access to cancer services and clinical trials across the region.

Despite the fiscal challenges faced by the health care industry nationwide, we continue to demonstrate strong performance through responsible stewardship across our organizations.

In relentless pursuit of excellence, we remain sincerely yours,



E. Albert Reece, MD, PhD, MBA

Vice President for Medical Affairs, University of Maryland
John Z. and Akiko K. Bowers Distinguished Professor and
Dean, University of Maryland School of Medicine



Robert A. Chrencik, MBA, CPA

President and Chief Executive Officer
University of Maryland Medical System

SPEAKER'S MEDALLION AWARDED IN 2016

In February, Dr. Reece and Mr. Chrencik were awarded the Speaker's Medallion, the highest honor given to the public by the leader of the Maryland House of Delegates.

"We are recognizing Dean Reece and Mr. Chrencik for their contributions to our statewide health care network and world-class trauma system," House Speaker Michael E. Busch said when presenting the award.



We envision improving the health of our Baltimore communities with greater access to primary care, as well as a world that is free of malaria — and we're taking the steps to make such things happen.

A YEAR OF GROWTH FOR THE MEDICAL SYSTEM AND SCHOOL OF MEDICINE

UMMS is a regional health system with physicians and care teams dedicated to delivering world-class care. We employ more than 24,000 people at our academic, community and specialty medical centers. Along with the UMSOM, we are vital parts of the communities we serve.

Last year, UMMS established University of Maryland Community Medical Group, a network of more than 300 primary care physicians, specialists and advanced practice providers at more than 75 practices in Maryland. In addition, UMMS formed the UM Quality Care Network, contracting with independent primary care medical groups to deliver high-quality care to commercial health plan members.

In January, UMMS and Saint Agnes Healthcare formally affiliated to share resources and create a regional, clinically integrated system of care to improve the health of the communities they serve. Also in January, UMMS renewed its management services agreement with Union Hospital in Elkton.

Our strategic growth will offer greater value to patients. In October 2015, UMMS acquired Riverside Health Inc., which operates a 25,000-member Medicare and Medicaid managed care organization, and launched a new Medicare HMO plan, University of Maryland Health Advantage, in January 2016.

The UMSOM, founded in 1807, has more than 3,000 faculty members dedicated to training the next generation of physicians, research scientists and allied health professionals.

As the health care environment changes, and the need for discovery-based medicine intensifies, the UMSOM continues to rise as one of the preeminent biomedical research institutions in the nation, and as an expanding leader in clinical care.

In FY 2016, the UMSOM advanced two major capital projects that place its medical and research facilities among the most advanced in the nation and the world:

- a new \$305 million, 450,000 square-foot research building, and
- the completion of the Maryland Proton Treatment Center.

In research, the UMSOM continued to rebound in total grants and contracts, despite federal and state budget cuts. Significantly, grants and contracts increased for the second year in a row. This exemplifies how undaunted our faculty members are in the face of new challenges. Overall, according to the Association of American Medical Colleges, we are now ranked 8th among all 86 public medical schools and 25th among all 144 public and private medical schools nationwide in research grant and contract expenditures.*

*AAMC Medical School Profile System, Institution-Level Data Table, as of 9/26/16. Table last updated 9/23/16.

MEDICAL SYSTEM

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"The extraordinary team at the University of Maryland Medical System collaborates across a network of hospitals, outpatient centers, physician practices and health insurance plans, to deliver the highest caliber of care to the people of Maryland. Anchored by our academic medical center, and in partnership with the UM School of Medicine, we provide the health care patients need, when they need it, in the communities where they live and work. Our connected health system delivers excellence to the great state of Maryland and beyond."

— Stephen A. Burch, Esq., Chair, UMMS Board of Directors





“The partnership between the School of Medicine and the Medical System is a powerful model for academic medicine. This report illustrates the many ways that these two great institutions come together to make a difference in people’s lives every day through discovery-based medicine. In each aspect of our mission — research, education and clinical care — we benefit greatly from this partnership. We are advancing new cures and treatments for the most debilitating diseases because we are grounded in scientific research. We are providing the most effective medical education programs through our expansive clinical and research opportunities for students and residents. Our faculty of leading physician-scientists and surgeons are on the front lines to take care of our neediest patients when life is on the line. Indeed, the School of Medicine’s Board of Visitors is proud to be a part of this tremendous collaboration.”

— Michael E. Cryor, Chair, SOM Board of Visitors



SCHOOL OF MEDICINE Board of Visitors

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**Alumnus - UM School of Medicine

The Power of Partnership 2016



After more than a decade of planning, the **Maryland Proton Treatment Center (MPTC)** treated its first patients in February. Among them was Phoebe Melling, 6, who has a rare pediatric cancer and traveled with her family from Melbourne, Australia, for care at University of Maryland Children's Hospital.

The \$200 million, 110,000-square-foot MPTC, located in the University of Maryland BioPark in West Baltimore, is the first proton treatment facility in the Baltimore-Washington area. The University of Maryland School of Medicine and its Department of Radiation Oncology operate and manage the center.

MPTC is affiliated with the **University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center**, which earned the National Cancer Institute's highest designation this year.

Turn the page to learn more. >>>





The news came in May — our prestigious cancer center achieved the National Cancer Institute (NCI) top designation as a “comprehensive cancer center,” recognizing its high caliber of scientific leadership and robust programs in basic, clinical and population science research. To reflect the new designation, the center is now known as the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center (UMGCCC), one of only 47 NCI-designated comprehensive cancer centers.

C Stands for Comprehensive



COMMUNITY OUTREACH

A strong program in community health was key to the new designation. **Shana O. Ntiri, MD, MPH**, assistant professor of family and community medicine, directs the Baltimore City Cancer Program, which has provided more than 32,000 screenings since 2001 to underinsured city residents.

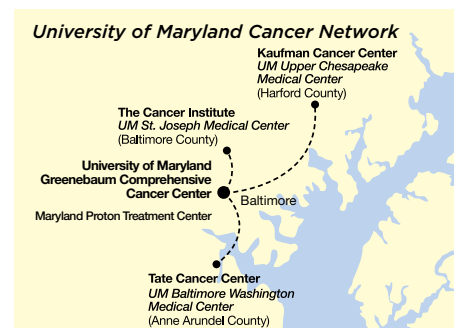
UMGCCC was first granted an NCI designation in 2008 and applied in 2015 to achieve the higher “comprehensive” level. NCI awarded the new designation after a rigorous review, which included a three-day site visit by 22 NCI reviewers in late February. The reviewers rated its programs “outstanding.”

“This designation is a tremendous achievement for our entire team and will significantly enhance our ability to translate discoveries in the laboratory into better treatments for cancer patients in Maryland and beyond,” said **Kevin J. Cullen, MD**, the Marlene and Stewart Greenebaum Distinguished Professor of Oncology and director of UMGCCC.

As a result of the new designation, the cancer center’s federal grant will increase 50 percent, to \$1.5 million a year for five years, and the center will be eligible for additional funding from the NCI and other public and private sources.

UMGCCC is committed to making cancer care accessible to underserved populations. Nearly 33 percent of patients who participate in clinical trials at UMGCCC are African-American, which matches the percentage of UMGCCC patients who are African-American. Nationally, the rate of African-American participation in clinical trials is less than 2 percent.

Through the Medical System’s University of Maryland Cancer Network, residents throughout Central Maryland have access to the national experts, treatments and promising clinical trials at UMMS hospitals in their own communities.



Richard L. Eckert, PhD, the John F.B. Weaver Professor and chair of biochemistry and molecular biology, and associate director for basic research at the UMGCCC, and **Edward A. Sausville, MD, PhD**, professor of medicine, and deputy director and associate director for clinical research at UMGCCC, lead research programs that are gaining international recognition for their discoveries.





Kevin J. Cullen, MD



HOGAN STRONG!
Maryland Governor Larry Hogan, who was treated at UMGCCC in 2015, was instrumental in addressing the survey team evaluating the center for designation as a comprehensive cancer center.

NCI

**Comprehensive
Cancer Center**

A Cancer Center Designated by the
National Cancer Institute

**Go to umgccc.org/NCI to
learn more.**

UMGCCC RESEARCH PROGRAMS AND FACULTY LEADERS

EXPERIMENTAL THERAPEUTICS

- **Maria R. Baer, MD**, professor of medicine

HORMONE RESPONSIVE CANCERS

- **Amy Fulton, PhD**, professor of pathology
- **Arif Hussain, MD**, professor of medicine

MOLECULAR AND STRUCTURAL BIOLOGY

- **Ronald Gartenhaus, MD**, professor of medicine
- **David J. Weber, PhD**, professor of biochemistry and molecular biology

POPULATION SCIENCE

- **Joanne Dorgan, PhD, MPH**, professor of epidemiology and public health
- **Cheryl Holt, PhD**, professor of behavioral and community health at the University of Maryland School of Public Health at College Park

TUMOR IMMUNOLOGY AND IMMUNOTHERAPY

- **Eduardo Davila, PhD**, associate professor of microbiology and immunology
- **Aaron Rapoport, MD**, Gary Jobson Professor in Medical Oncology

The UM School of Medicine established the Institute for Global Health (IGH) last year to bring together decades of faculty research, treatment and vaccine development around the world, and expand the School of Medicine's platform as the premier center for global health research, treatment and prevention. The institute is primarily focused on vaccine development and malaria research, and houses the reconfigured Center for Vaccine Development (CVD), as well as a newly formed Division of Malaria Research (DMR).

Outsmarting a Global Threat



"This is truly a landmark initiative for the School of Medicine," said E. Albert Reece, MD, PhD, MBA, dean of the School of Medicine. "As a result of the tireless work of these doctors and others, we have continued to grow our global presence now in 35 countries around the world, including research and treatment facilities in Mali, Chile, Malawi, and now emerging in Myanmar. This new institute will enable us to leverage all of the tremendous work that has been done, and will have a powerful and lasting impact on global health."

For the past 40 years, the CVD has conducted a wide range of research relating to the development of vaccines for a variety of diseases, including cholera, typhoid fever, paratyphoid fever, non-typhoidal *Salmonella* disease, shigellosis, *Escherichia coli* diarrhea, malaria, and other infectious diseases, including influenza. The CVD also developed new delivery systems, as well as public health and vaccine policy around the world, including Africa, Asia and Latin America.

DMR will focus on the prevention and treatment of malaria, which infects 200 million people a year and kills more than half a million, mostly children in Africa. The center will develop and deploy

innovative tools for malaria treatment, prevention and surveillance. Working both in Baltimore and in the field in Africa and Asia, DMR scientists will lead clinical trials of drugs and vaccines, and will investigate a wide range of topics related to the disease, including drug resistance. DMR will also collaborate with local physicians and scientists to build research capacity in malaria-endemic countries.

One of the primary goals for IGH is to develop a collaborative and integrated synergy with all vaccine work and related basic, translational and clinical research in the School of Medicine. This approach will build upon each program's individual strengths in a coordinated and collaborative manner.

Their current challenge is the Zika virus. **Monica McArthur, MD, PhD**, assistant professor of pediatrics in the Center for Vaccine Development, is leading one of the first human clinical trials for the Zika virus vaccine developed by the National Institutes of Health. This early-stage study is evaluating safety and the vaccine's ability to induce an immune system response. The study is an important step towards developing a commercially available vaccine.



FIGHTING ZIKA

Monica McArthur, MD, PhD, is leading one of the first clinical trials on patients for the Zika virus.



Kathleen Neuzil, MD, MPH, professor of medicine, was recruited to UMSOM to become director of the CVD and deputy director of IGH.

Dr. Neuzil, who also directs worldwide vaccine access and delivery at PATH, an international nonprofit global health organization based in Seattle, is one of the world's most influential scientists and advocates for vaccine development and public policy.

Christopher Plowe, MD, MPH, FASTMH, the Frank Calia, MD, Professor of Medicine, is the founding director of the IGH and director of the DMR. Dr. Plowe has dedicated his career to eradicating malaria around the world, training young scientists and clinical investigators and building research capacity in countries where malaria is common.





Richard Colgan, MD, discusses medical records with a patient while medical student Jimmy Comotto observes as part of his training in the Primary Care Track.

Together, the Medical System and the School of Medicine are addressing a nationwide shortage by increasing the number of primary care physicians in Maryland — and beyond.

On the Front Lines in Population Health

Russell Lewis Jr., MD, clinical assistant professor of family and community medicine, is the medical director for University of Maryland Primary Care. UM Primary Care, founded 20 years ago as UniversityCare at Edmondson Village, also includes several locations in West Baltimore to give greater access to coordinated care in a true family-practice setting. Primary care staff manage patients for wellness and sick visits, reducing the need for emergency care or hospitalization, and refer to University of Maryland specialists when appropriate.



University of Maryland Medical Center (UMMC), at both the University and Midtown campuses, is reducing health disparities through myriad community outreach efforts in Baltimore, as well as suburban counties. Coordinators work one-on-one with the most vulnerable patients even before they are discharged, to make sure they can get needed medications and follow-up care despite financial, transportation and mobility challenges.

As medical schools continue to look for ways to **address the severe shortage of primary care doctors in the US, the School of Medicine this year graduated its first class of students** who participated in an innovative program that encourages medical students to become primary care doctors.

The program was founded four years ago by the departments of Family and Community Medicine, Medicine, and Pediatrics, and is funded by a grant from the US Health Resources and Services Administration. It enables medical students to choose a **Primary Care Track (PCT)** and work directly in Maryland areas that have the greatest need for doctors.

In the first two years, students spend a half day per month with one of 50 on-campus or 61 off-campus primary care faculty members. The pairings are coordinated by three Maryland Area Health Education Centers in Western Maryland, the Eastern Shore and Baltimore City. In their first summer, students work 80 hours with a doctor in one of several underserved areas in the state.

"The shortage of primary care doctors is a serious national issue," said the program's co-founder, **Richard Colgan, MD**, professor of family and community medicine, who leads the program along with **Linda Lewin, MD**, and **Adam Spanier, MD**, both associate professors of pediatrics, and **Nikkita Southall, MD**, assistant professor of medicine.

"We are really pleased that our program has generated so much interest among our students," Dr. Colgan said. *"Our efforts have the potential to improve the situation in Maryland, particularly in those places where the shortages are most severe."*

Since its inception, a total of 193 students have enrolled in the PCT. More than 75 percent of the PCT students who graduated in 2016 were planning to go into a primary care specialty.

"This program has been everything I hoped it would be, and my mentors are all family physicians, people I hope to emulate in the future," said third-year medical student **Donique Parris**. *"I've realized that in family medicine, I'll have the opportunity to really get to know my patients and to work with them over the long term to improve their overall health. That's exactly what I was looking for in a career in medicine."*



SERVING NEEDS, ELIMINATING DISPARITIES

Although African-Americans comprise about 13 percent of the American population, they represent 34 percent of the patients waiting for a donor kidney, according to the US Department of Health and Human Services. High rates of diabetes and high blood pressure are among the factors that make them especially vulnerable to end-stage kidney disease, for which organ transplant is considered the gold-standard long-term treatment.

UMMC's Division of Transplantation performed more kidney transplants on African-American patients in 2014 than any other medical center in the country. The 128 patients who received these transplanted kidneys represent just under half of the 270 total kidney transplants performed at UMMC that year, said **Jonathan Bromberg, MD, PhD**, professor of surgery and head of the Division of Transplantation. The achievement reflects the division's surgical innovation as well as its commitment to serving patients in the Baltimore-Washington area and beyond.



Lenox Trams, a police officer in Easton, was able to undergo a lifesaving kidney transplant in March at UMMC when Jill Garvey, his coworker of 15 years in the Easton Police Department, volunteered to donate one of her kidneys. Trams was able to visit the transplant clinic at **University of Maryland Shore Regional Medical Center at Easton** for most of his pre- and post-surgical care.

To see a video about Lenox Trams and Jill Garvey, go to umm.edu/lenoxtrams



If asked to name a neurological condition that causes trembling, many would say Parkinson's disease. Yet eight times more common than Parkinson's is an unrelated disorder known as essential tremor, which can lead to similarly debilitating symptoms that may prove resistant to drug therapy.

Advanced Therapy for Neurodegenerative Diseases

Groundbreaking clinical trials at the University of Maryland Medical Center (UMMC) could change the future for patients with the most severe cases of essential tremor, as well as in some cases of Parkinson's disease.

MRI-guided focused ultrasound uses two advanced technological tools: Focused ultrasound waves are transmitted through the skull — without an incision — to kill a targeted group of cells. An MRI scanner helps doctors visualize the brain to guide and continuously monitor treatment.



FOCUSED RESEARCH

Graeme F. Woodworth, MD, investigates the delivery of therapeutic nanoparticles and drug formulations augmented by MRI-guided focused ultrasound and convection.

Howard M. Eisenberg, MD, the Raymond K. Thompson, MD, Chair in Neurosurgery, is UMMC's principal investigator on the multi-center clinical trials. He is working in collaboration with **Paul Fishman, MD, PhD**, professor of neurology, and **Graeme Woodworth, MD, BS**, associate professor of neurosurgery and director of the Brain Tumor Treatment and Research Center.

Kimberly Spletter, of Frederick, was the first participant in the Parkinson's disease trial at UMMC in 2015. Her symptoms of trembling and shaking subsided almost immediately, but doctors were unsure how long the relief would last. More than a year after her treatment, many of Mrs. Spletter's symptoms have continued to diminish.

To discuss the developments from the clinical trials, Dr. Eisenberg and Mrs. Spletter both were invited to speak in front of the Congressional Caucus on Parkinson's Disease, which is made up of members from both the House and Senate who seek to increase awareness on Capitol Hill about Parkinson's disease issues.

BRAIN SCIENCE RESEARCH ACROSS THE DISCIPLINES

Alzheimer's and Parkinson's disease are the two most common neurodegenerative disorders worldwide, causing millions of patients and their

families to suffer. Treatments for these diseases are limited, and no cures exist. However, a May 2016 study from the School of Medicine described an innovative strategy that reverses symptoms in these neurodegenerative diseases in fruit flies genetically altered to model the diseases.

"The novel approach we used has significant translational implications," said one of the lead authors, **Robert Schwarcz, PhD**, professor of psychiatry, of the UM School of Medicine's Maryland Psychiatric Research Center. *"If we can duplicate these effects in patients, we could benefit a lot of people."*

Multidisciplinary research on neurodegenerative diseases is a focus of the Brain Science Research Consortium Unit (BSRCU) within the Department of Psychiatry. Based on a series of group and individual discussions, the BSRCU identified three scientific areas that carry strong potential to spur the desired caliber of research. The following themes are supported by working groups, each comprising 15-30 members from across the School of Medicine:

- Non-invasive focused ultrasound for therapeutic and neuromodulatory purposes
- Neuroinflammation
- Neuropsychiatric and substance abuse disorders



Kimberly Spletter, the first Parkinson's disease patient in the focused ultrasound clinical trial, is shown at right with Dr. Eisenberg and her neurologist, **Paul S. Fishman, MD, PhD**, professor of neurology, after a successful follow-up visit. She enjoys spending time in downtown Frederick, and can now also enjoy one of her favorite activities — bicycling.



IMAGING EXPERTS

Elias Melhem, MD, the Dean John M. Dennis Endowed Chair in Radiology, is a senior collaborator in the clinical trials.

The vision of an integrated health system goes far beyond community hospitals referring patients to a flagship academic medical center. Across the University of Maryland Medical System (UMMS), FY 2016 was marked by sharing of best practices for excellent care at all 12 hospitals through collaboration between faculty physicians from the University of Maryland School of Medicine (UMSOM) and community physicians.

Clinical Excellence Through Collaboration Across the State



Richard Ferraro, MD

The UMMS Clinical Performance Improvement Council includes UMSOM faculty physicians, community physician leaders at UMMS hospitals and nurse executives. The co-chairs of the council are **Walter H. Ettinger Jr., MD, MBA**, clinical professor of medicine and chief medical officer of UMMS, and **Stephen T. Bartlett, MD**, the Peter Angelos Distinguished Professor in Surgery and chairman of the Department of Surgery, and surgeon-in-chief and executive vice president of UMMS. The project manager for the council and its multiple work groups is **Patricia Ercolano, BSN, RN, MBA**, vice president for quality management at UMMS.



More than a dozen work groups are focused on specific services, such as spine care, hospitalist care and interventional cardiology and orthopaedic joint replacement. The resulting standards should establish UMMS as a high-value provider of key clinical services. Data are expected to continue showing improved population health outcomes, excellent “experience of care” for the patient and family, and lower health care costs per capita.

Several clinical areas are in an advanced stage of developing best practices. The Sepsis Work Group is led by **Richard Ferraro, MD**, medical director of the Emergency Department at **University of Maryland Charles Regional Medical Center (UM CRMC)**.

Dr. Ferraro was chosen by UMMS medical leadership to head this committee after he led an effort reducing sepsis at UM CRMC, which as a result won the statewide patient-safety Minogue award in 2014. This innovative project improved patient outcomes hospital-wide by coordinating and intensifying the treatment of life-threatening infections. UM CRMC has presented the project to other hospitals across the state.

The Total Joint Network Work Group is led by **Andrew N. Pollak, MD**, the James Lawrence Kernan Professor and Chair of the Department of Orthopaedics, and system chief of orthopaedics for UMMS. He is working closely with **David F. Dalury, MD**, clinical professor of orthopaedics at UMSOM and chief of orthopaedics at **University of Maryland St. Joseph Medical Center**. The Total Joint Network has been studying patient outcomes and cost of each joint surgery case at UMMS hospitals to determine best practices and to optimize patient outcomes across all UMMS hospitals.



A VOICE FOR NURSING AT THE SYSTEM LEVEL

In FY 2016, UMMS added a senior nursing voice at the system level for strategic planning, nursing workforce development and continuous clinical improvement initiatives. **Lisa Rowen, DNSc, RN, CENP, FAAN**, was named system chief nurse executive for UMMS. She also serves as senior vice president and chief nursing officer for University of Maryland Medical Center and is an associate professor at the University of Maryland School of Nursing.





Deborah Stein, MD, MPH, was invested as the first R Adams Cowley Professor in Shock and Trauma, Department of Surgery. Dr. Stein is also chief of trauma and medical director of the Neurotrauma Critical Care Unit at the R Adams Cowley Shock Trauma Center.

The R Adams Cowley Shock Trauma Center is known internationally for its pioneering role in trauma research and clinical practice. This year, television viewers got a close-up look inside the Trauma Resuscitation Unit and inpatient trauma units through the Discovery Life Channel unscripted TV series *Shock Trauma: Edge of Life*.

A National Spotlight on Shock Trauma

Produced by Academy Award-winning documentary filmmaker **Susan Hadary** and **John Anglim** of the UM School of Medicine's MedSchool Maryland Productions, the six-part series first aired in January and February. The filmmakers followed a team of physicians, nurses, patient care technicians and specialists as they provided lifesaving medical care at the first and highest-volume trauma center of its kind in the United States. Each episode captured in dramatic detail the fight to save lives when every second counted. Viewers witnessed patient stories ranging from automobile collisions and frostbite to gunshot wounds and severe brain trauma.

Shock Trauma: Edge of Life shows the important work that the staff does day in and day out. Since its inception more than

50 years ago, Shock Trauma has provided world-class treatment for the region's most critically ill and injured patients. Each year, the Shock Trauma team cares for approximately 8,000 patients.

Shock Trauma is also the birthplace of the “**golden hour**,” a term coined by Dr. Cowley to describe the evidence-based concept that the sooner traumatic injury patients reach definitive care (within the first 60 minutes of injury), the better the chances of survival.

To view full episodes of the series *Shock Trauma: Edge of Life*, go to www.discoverylife.com or check with your cable or satellite provider.



“Injury is a disease that has no age, gender, social, economic or racial boundaries. These are people who get up each day, leave their home for work or school ... and end up at Shock Trauma.”

— **Thomas M. Scalea, MD, FACS, MCCM**, the Honorable Francis X. Kelly Distinguished Professor in Trauma Surgery, physician-in-chief of the Shock Trauma Center at University of Maryland Medical Center, and UMMS system chief for critical care services



A NATIONAL BEACON FOR EXCELLENT CRITICAL CARE NURSING

The Multi-Trauma Intermediate Care Unit 6 was awarded a Silver Beacon Award for Excellence in 2015. The unit staff was recognized by the American Association of Critical-Care Nurses for its dedication to learning and implementing systems for optimal patient care. **Vanzetta James, MS, RN, CCRN**, is the nurse manager.

Samuel Tisherman, MD, FACS, FCCM, professor of surgery, is preparing to begin a clinical trial for patients suffering cardiac arrest induced by penetrating trauma, for which the survival rate is usually around 5 percent. The trial, Emergency Preservation and Resuscitation for Cardiac Arrest from Trauma (EPR-CAT), investigates whether rapidly cooling patients' bodies will buy precious time for surgical repair of the injury and lead to a better chance of survival.

Dr. Tisherman is director of the Center for Critical Care and Trauma Education (CCCTE), which includes a state-of-the-art Simulation Center for training critical care and trauma providers.



The internationally recognized R Adams Cowley Shock Trauma Center at UMMC is now also known as a national model for quickly providing treatment to critically ill non-trauma patients.

An Innovative Model for Critical Care Resuscitation

The novel Critical Care Resuscitation Unit (CCRU), a 6-bed, short-stay ICU in the Shock Trauma Critical Care Tower, is staffed 24/7 by a team of physicians and nurses from an array of subspecialties. Based on the Trauma Resuscitation Unit (TRU) model, subspecialists at the CCRU are prepared for the most critically ill patients in the region. Like their counterparts in the TRU, the CCRU staff coordinate with referring hospitals and transport teams to prepare for each incoming patient and provide lifesaving treatment on arrival.

Data published February 23, 2016, in the *Journal of the American College of Surgeons* show that in the CCRU's first year, the number of transfer admissions increased by 1,000 patients. Patients also arrived much faster than in previous years (129 vs. 234 minutes) and the percentage of lost admissions among selected subspecialties decreased (25.7 vs. 14 percent).

"When we built the CCRU, we envisioned a unit mid-way between an emergency department and intensive care unit, similar to our Trauma Resuscitation Unit but for non-trauma patients," said lead author **Thomas Scalea, MD, FACS**, the Honorable Francis X. Kelly Distinguished Professor of Trauma Surgery, physician-in-chief of the Shock Trauma Center, and system chief of critical care services for the University of Maryland Medical System.

"Adding just six beds and borrowing practices we had honed in the Shock Trauma Center made our entire system more efficient," said senior author **James O'Connor, MD**, professor of surgery and chief of trauma critical care at Shock Trauma.

The CCRU was put to the test when triathlete Doug Wetzel suffered severe heatstroke during the cycling portion of the course. He was taken first to **University of Maryland Shore Medical Center at Chestertown**. Seeing signs of organ failure, the medical team in Chestertown knew Mr. Wetzel needed immediate specialty care and transferred him to UMMC. Doctors placed him on a liver dialysis machine (MARS) upon arrival in the CCRU to prepare for a liver transplant.

Rolf Barth, MD, associate professor of surgery, performed the transplant and credits Wetzel's survival to the coordinated effort between staff from critical care, transplantation,

nephrology, surgery, hepatology and Shock Trauma, as well as **UM SMC at Chestertown**. Five years ago, Dr. Scalea said, before the formation of critical care units like the CCRU, a patient arriving in Mr. Wetzel's condition would not have survived. Mr. Wetzel continued his rehabilitation at **University of Maryland Rehabilitation & Orthopaedic Institute**.



"We've discovered a new niche for resuscitation medicine," said **Lewis Robinson, MD, PhD**, associate professor of medicine and medical director of the CCRU. *"It's a paradigm change but easily adaptable for other academic medical centers."*

Although there is no substantiated data that the CCRU reduces mortality, the staff in this innovative unit expect continued research to support this premise.





Doug Wetzel, executive chef at Gertrude's Restaurant at the Baltimore Museum of Art, has all the evidence he needs that this coordinated system saved his life. Soon after his transplant, he continued his recovery at **University of Maryland Rehabilitation & Orthopaedic Institute**, where occupational therapy involved regaining his skills in the kitchen.

Watch a series of videos about Mr. Wetzel and his road to recovery at www.umm.edu/DougWetzel



Congenital heart disease can appear in conditions so serious that infants require surgery right after they're born, or go undetected until later in life, even striking athletes in adulthood.

The Best Shot at a Healthy Heart



MANAGING HEART DISEASE IN ADULTS

Stacy Fisher, MD, associate professor of medicine and director of the Women's and Complex Heart Diseases Program, and **Geoffrey Rosenthal, MD, PhD** are among just 190 physicians nationwide certified in Adult Congenital Heart Disease.

The Children's Heart Program, part of the University of Maryland Heart and Vascular Center as well as the University of Maryland Children's Hospital, is conducting a clinical trial that uses **stem cells to treat hypoplastic left heart syndrome (HLHS)**. The syndrome is a congenital heart disease marked by an underdeveloped left ventricle and other defects. Pediatric cardiac surgeon **Sunjay Kaushal, MD, PhD**, associate professor of surgery, is one of the lead investigators, and this summer **enrolled the study's first patient, infant Khylee Douglas**.

This Phase I trial, the first of its kind in the United States, involves injecting allogeneic mesenchymal stem cells into an infant's heart muscle to strengthen the right side of the heart, which must work harder to make up for the lack of a left ventricle. The extra work eventually takes its toll on the right side of the heart.

The trial is investigating whether a stem cell injection will strengthen the right ventricle over time, improving the function of the heart and the patient's quality of life.

"I hope that Khylee's heart gets stronger," said her mother, Jazmine Price. *"I just want her to live the most normal life as possible, and even if this process doesn't cure her, I hope it leads the way for better chances for other babies in the future."*

Patients with HLHS must undergo three intricate surgeries, the first just days after birth. Dr. Kaushal and his team injected the stem cells during Khylee's second surgery, when she was 4 months old.

"The premise of this clinical trial is to boost or regenerate the right ventricle, the only ventricle in these babies, to make it pump as strongly as a normal left ventricle," Dr. Kaushal said. *"We're hoping this therapy will be a game-changer for these patients, but also for other types of congenital heart disease, such as dilated cardiomyopathy."*



Jazmine Price and her daughter, Khylee Douglas

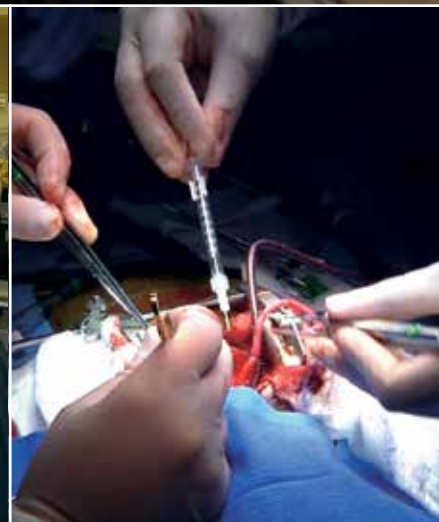
THE UNIVERSITY OF MARYLAND HEART AND VASCULAR CENTER

At the University of Maryland Heart and Vascular Center, cardiologists and surgeons treat patients of all ages, with all types of heart and vascular diseases. The Heart and Vascular Center is led by physicians from adult cardiology, pediatric cardiology, cardiac surgery and vascular surgery. This multi-disciplinary approach has made it a top center in the region. The cardiac surgery team, which also treats patients at University of Maryland St. Joseph Medical Center, treats more patients than any other program in Maryland. **Rajabrata Sarkar, MD, PhD**, the Barbara Baur Dunlap Endowed Professor in Surgery and head of the Division of Vascular Surgery, is an expert in treating blood vessel disorders and a nationally known researcher in blood vessel growth and development.





Sunjay Kaushal, MD, PhD,
holding the type of stem
cells injected during surgery.



David Zimrin, MD, associate professor
of medicine and head of the Division
of Cardiovascular Medicine, **James
Gammie, MD**, professor of surgery and
head of the Division of Cardiac Surgery,
and **Geoffrey Rosenthal, MD, PhD**,
professor of pediatrics, head of the
Division of Pediatric Cardiology.





Robert C. Gallo, MD, is the Homer & Martha Gudelsky Distinguished Professor of Medicine and director and founder of the Institute of Human Virology at the UM School of Medicine.

Since the earliest days of the AIDS crisis, **Robert C. Gallo, MD**, has been among the leading scientists in the world discovering what causes the disease, how to test for it, how to treat it and, now, how to vaccinate people against it. Because there are so many strains of HIV, a potential vaccine has eluded scientists.

A New Phase in AIDS Prevention



In October 2015, the Institute of Human Virology (IHV) at the University of Maryland School of Medicine **launched its Phase 1 clinical trial of a novel HIV vaccine candidate**. The candidate immunogen was developed by a research team led by Dr. Gallo with his IHV colleagues **George Lewis, PhD**, professor of microbiology and immunology and director of the Division of Vaccine Research, and **Anthony DeVico, PhD**, professor of medicine. They are joined by **Tim Fouts, PhD**, at Baltimore-based Profectus Biosciences Inc., a spinoff company of IHV.

“Our HIV/AIDS vaccine candidate is designed to bind to the virus at the moment of infection, when many of the different strains of HIV found around the world can be neutralized,” said Dr. Gallo, who discovered the first human retroviruses and is co-discoverer of HIV as the cause of AIDS, as well as the developer of the HIV blood test.

The candidate immunogen, denoted as a “full-length single chain” (FLSC), is distinguished by its potential ability to induce broad antibody responses to HIV-1. These antibodies bind to common HIV regions that are exposed when the virus attaches to target cells, rather than to

the specific characteristics of the HIV envelope protein that may not be present in all virus strains. Previous vaccine candidates responded to a narrower range of HIV strains.

This study is the first time the FLSC vaccine candidate will be tested in humans. Funding for the development comes from the Bill & Melinda Gates Foundation, the US Army, the National Institute of Allergy and Infectious Diseases and other sources.

IHV continues to extend its global reach. The US President’s Emergency Plan for AIDS Relief (PEPFAR) awarded IHV a five-year, **\$24.5-million grant to partner with Botswana** to demonstrate that comprehensive treatment programs can stop the epidemic.

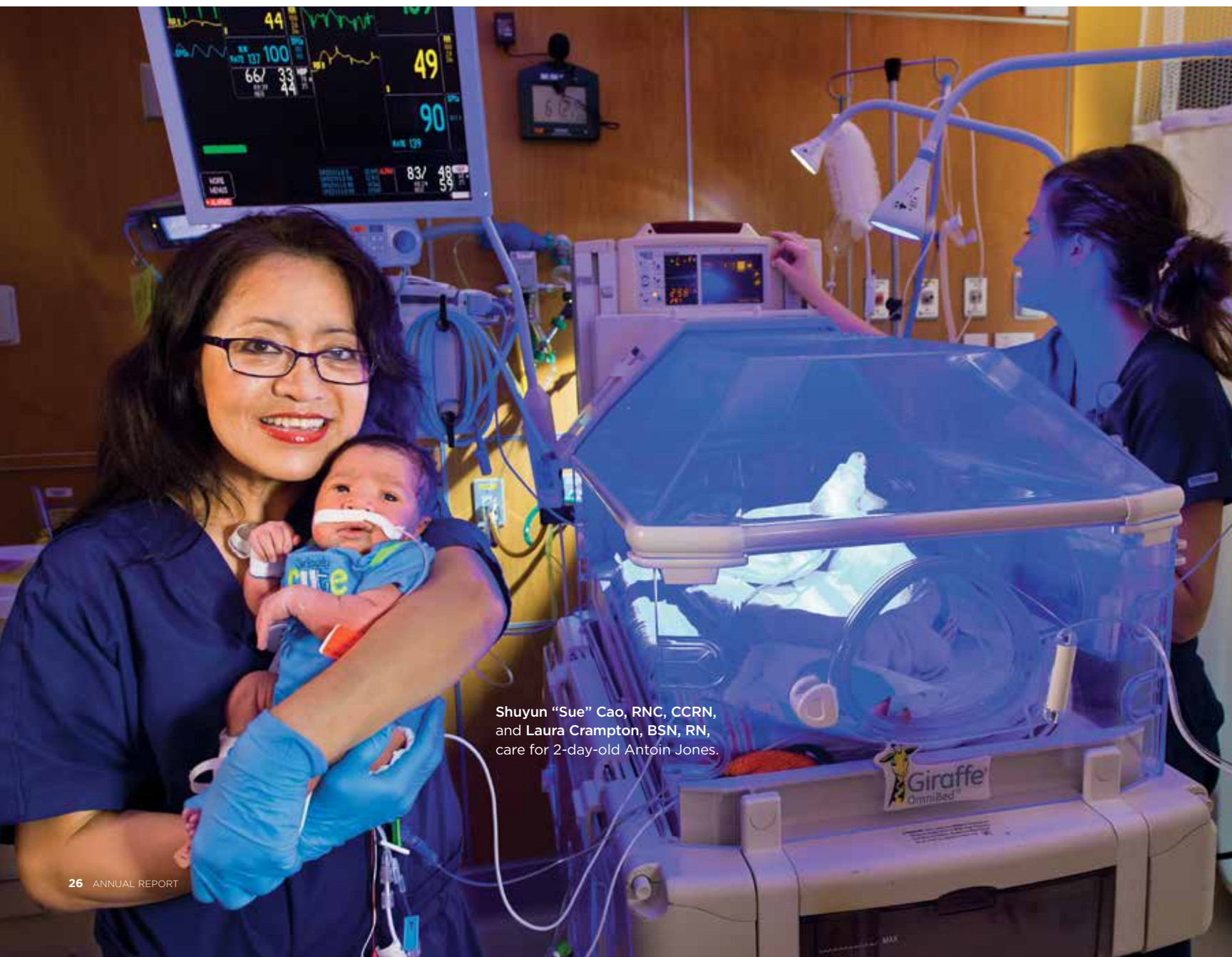
“This new partnership with the government of Botswana is a credit to the work IHV’s Clinical Division carries out internationally under the leadership of my fellow IHV co-founder, Dr. Robert Redfield,” said Dr. Gallo. *“We look forward to partnering with Botswana, as we have done in nine other nations through PEPFAR funding, to continue putting the first real dent in the global AIDS pandemic.”*

Robert R. Redfield Jr., MD, professor of medicine, associate director of IHV and director of the Division of Clinical Care and Research at IHV, has led clinical advances in HIV patients around the world. Here in Baltimore City, where 1 in every 43 people over the age of 13 is HIV-positive, Dr. Redfield is leading the effort to increase screening for the virus and access to care, through the Division of Infectious Disease, part of the UM School of Medicine’s Department of Medicine. This program is based at **University of Maryland Medical Center Midtown Campus**.



Rarely does the opening of one renovated unit attract so much rejoicing throughout the hospital, but staff throughout the University of Maryland Medical Center have a soft spot for their smallest patients. A six-year effort came to fruition in September 2015 with the opening of the Drs. Rouben and Violet Jiji Neonatal Intensive Care Unit (NICU) at the University of Maryland Children's Hospital (UMCH). The soft lighting, low noise and careful selection of building materials are the result of innovative research put into practice, and a perfect example of patient- and family-centered care.

Caring for Maryland's Smallest Patients



Shuyun "Sue" Cao, RNC, CCRN, and Laura Crampton, BSN, RN, care for 2-day-old Antoin Jones.



The design and renovation was based on extensive research on pediatric environmental health by **Cynthia Bearer, MD, PhD, FAAP**, Mary Gray Cobey Endowed Professor in Neonatology and associate chair for research in the Department of Pediatrics, and **Dina El-Metwally, MB, BCh, PhD**, associate professor of pediatrics and medical director of the NICU. **Dr. Bearer's and Dr. El-Metwally's research, along with feedback from NICU nurses and parents of former patients, helped shape the new space.**

Sound and light can be adjusted in each of the 52 private rooms, which provide each patient with a specialized environment. Rooms also feature a sleeping couch and a "kangaroo chair" so that families may stay overnight and comfortably maintain vital skin-to-skin contact with their baby.

"We base our research on the idea that the womb is the best environment for premature babies. Extraneous chemicals are filtered out, as a mother's body would do," Dr. Bearer said.

Integral research is not just relegated to the lab. The NICU partnered with Port Discovery this summer to launch a pilot program aimed at fostering NICU babies' neurodevelopment. The Mother Goose on the Loose Goslings program teaches families how to engage with preemies through reading, singing, playing and other early-language activities.

Psychology doctoral students at the University of Maryland, Baltimore County work with NICU staff to collect and analyze data to evaluate the program. **Brenda Hussey-Gardner, MD**, associate professor of pediatrics, co-developed the program and looks forward to using data from the program to improve patient care.

The NICU team works hand in hand with the UM Center for Advanced Fetal Care to care for patients who were diagnosed with fetal abnormalities. If born prematurely or in critical condition, these patients can receive important sub-specialty care not offered at community hospitals.

*"This coordinated effort is paramount to the success of our babies," said **Christopher Harman, MD**, the Sylvan Frieman, MD, Endowed Professor in Obstetrics, Gynecology and Reproductive Sciences. "We know that if our patients are admitted to the NICU, they receive the best possible care rooted in basic and translational research."*

The NICU staff continues to evaluate patient outcomes in the new NICU, to measure the impact of the changes. One outcome is already clear: families and staff love the new space.



NURTURING FRAGILE NEWBORNS

*The new NICU features a better environment for newborns, based on research by faculty including **Cynthia Bearer, MD, PhD, FAAP**.*

Nationwide, there is a declining number of pediatricians trained in the subspecialties. However, the UMCH is a full-service children's hospital and includes faculty physicians in more than 30 areas of pediatric specialty care, and attracts and trains fellows to join these fields. The Pediatric Intensive Care Unit (PICU) is where 9-year-old Camron Hyatt recovered after cardiac and vascular surgery, cared for by a team including **Christine Anis, BSN, RN**, and **Jason Custer, MD**, assistant professor of pediatrics and PICU medical director. Nurses, respiratory therapists and other staff in the PICU are experts in the most serious illnesses affecting the youngest patients.



UNIVERSITY of MARYLAND

SCHOOL OF
MEDICINE

2016



Katayoun Eslami of Easton, Md.,
and **Derek Hatfield** of San Diego,
Calif., are members of the
UMSOM Class of 2019.

highlights

RESEARCH

FDA APPROVES CHOLERA VACCINE

In a milestone that was years in the making, a vaccine to prevent cholera, invented and developed by researchers at the School of Medicine's Center for Vaccine Development (CVD), was approved in June by the US Food and Drug Administration (FDA). Leading the effort were **James B. Kaper, PhD**, professor and chair of microbiology and immunology and senior associate dean for academic affairs, and **Myron Levine, MD, DTPH**, the Simon and Bessie Grollman Distinguished Professor. The vaccine, **Vaxchora**, is the only approved vaccine in the US for protection against cholera. Its licensure allows for use in people traveling to regions in which cholera is common, including humanitarian aid workers and the military. The vaccine was invented in the 1980s at the CVD. Since 2009, CVD researchers have worked closely with PaxVax, a global biotechnology company based in California, to develop the vaccine and secure FDA approval.

PREVENTING DEADLY INFECTIONS WITH A VACCINE

The CVD also has partnered with industry to develop a vaccine to prevent a group of deadly bacterial infections that occur commonly among hospital patients. Led by **Alan Cross, MD**, professor of medicine; **Raphael Simon, PhD**, assistant professor of medicine; and **Sharon Tennant, PhD**, assistant professor of medicine, these experts in vaccine development will focus on a vaccine for several types of Gram-negative bacteria that can cause damage and death when they infect humans.

ERADICATING EBOLA THROUGH VACCINATION

A clinical trial of a new Ebola vaccine (ChAd3-EBO-Z), which resulted from an unprecedented global consortium assembled at the behest of the World Health Organization, found that it was well-tolerated and stimulated strong immune responses in adults in Mali, West Africa, and in the US. The trial was carried out by a group of faculty researchers within the CVD and led by **Milagritos Tapia, MD**, associate professor of pediatrics, and **Kirsten Lyke**,

MD, associate professor of medicine, collaborating closely with **Samba Sow, MD, MSc**, adjunct professor of medicine and director general of CVD-Mali, an institution jointly maintained by the Ministry of Health of Mali and CVD. **It was the first testing of this vaccine in adult health care workers and other at-risk persons in Africa.** The trial identified the dose to be used in subsequent clinical trials and for large-scale manufacture of the vaccine. If larger trials (some already ongoing at CVD-Mali) corroborate the vaccine's clinical acceptability and immunogenicity, and with evidence of protection from future field trials or from non-human primate challenge models, the vaccine could obtain regulatory approvals to become a tool to interrupt transmission in future outbreaks.

RESEARCH ILLUMINATES KEY ASPECTS OF SLEEPING AND WAKING

Andrea Meredith, PhD, associate professor of physiology, and colleagues identified the workings of a key pathway that helps regulate sleep. The pathway appears to play a role in regulating the "switch" between wakefulness and sleep. **This is the first study to elucidate this process in such biophysical detail.** Dr. Meredith focused on the suprachiasmatic nucleus (SCN) in the hypothalamus, particularly a group of channels known as BK potassium channels, which seem to be particularly active in the SCN. This was the first study to show that BK channel inactivation is critical for encoding circadian rhythm in the brain.

A SCIENTIFIC APPROACH TO CORRECTING HEARING LOSS

Almost 40 million Americans suffer from hearing loss. Right now, there is no way to reverse this condition, largely because auditory hair cells, which sense sound and relay that information to the brain, do not regenerate. **A new study led by scientists here found a key clue to how these hair cells develop.** It identified a new role for a particular group of proteins, known as RFX transcription factors, in the development and survival



James Kaper



Myron Levine



Alan Cross



Raphael Simon



Sharon Tennant



Milagritos Tapia



Kirsten Lyke



Samba Sow



Andrea Meredith

of the hair cells. Although the experiments were done in mice, principal investigator **Ronna Hertzano, MD, PhD**, assistant professor of otorhinolaryngology-head and neck surgery, says that it is likely that these genes work similarly in humans. Eventually, it might be possible to use increased understanding of RFX transcription factor to treat hearing loss, by either protecting hair cells from death or fostering their growth.

RESEARCHERS IDENTIFY POTENTIALLY REVOLUTIONARY ANTIDEPRESSANT COMPOUND

For years, scientists and doctors have known that ketamine can treat depression rapidly, often working within hours. However, the drug, which is approved as an anesthetic, has major side effects and is often abused. Researchers **Scott Thompson, PhD**, professor and chair in the Department of Physiology, and **Todd Gould, MD**, associate professor of psychiatry, identified a metabolite of ketamine that quickly reversed depression in mice, but without ketamine's side effects.

NEW SURGICAL TOOL FOR MITRAL VALVE REPAIR FINDS SUCCESS IN FIRST HUMAN STUDY

James Gammie, MD, professor of surgery and head of cardiac surgery, found 100 percent procedural success in a safety and performance study on a novel device to repair the mitral heart valve, the first such study done in humans. The image-guided device, based on technology developed at the School of Medicine, is deployed through a tiny opening in a beating heart. It avoids open-heart surgery, automates a key part of the valve repair process, simplifies the procedure, and reduces operating room time. The device, known as the Harpoon TSD-5, was made by Harpoon Medical Inc. of Baltimore and is an



investigational device. At publication, the device was awaiting approval from the US Food and Drug Administration for use in patients in the United States.

CRUCIAL DRUG FOR RADIATION SICKNESS PROVEN EFFECTIVE

As a result of research performed at the School of Medicine, the FDA approved the use of the drug Neulasta to treat the deleterious effects of radiation exposure following a nuclear incident. The drug is one of a very small number that have been approved for the treatment of acute radiation injury. The research was done by **Thomas MacVittie, PhD**, professor of radiation oncology, and **Kim Hankey, PhD**, study director, both with the Preclinical Radiobiology Laboratory in the Department of Radiation Oncology's Division of Translational Radiation Sciences (DTRS). **Ann Farese, MA, MS**, assistant professor of radiation oncology, also contributed. **Zeljko Vuyaskovic, MD, PhD**, professor of radiation oncology and director of the DTRS, continues research in this area.

GENETIC MAKEUP OF DANGEROUS E. COLI STRAINS IDENTIFIED

A multidisciplinary group of researchers at the School of Medicine have for the first time determined the genetic makeup of various strains of *E. coli*, which every year kills hundreds of thousands of people around the world. The scientists, led by **David Rasko, PhD**, associate professor of microbiology and immunology at the Institute for Genome Sciences (IGS), and his team, identified certain strains that are typically much more lethal than others. The results will help researchers focus efforts to identify, treat and potentially control these more dangerous versions.

POSITIVE RESULTS IN SEARCH FOR MERS TREATMENT

Matthew Frieman, PhD, associate professor of microbiology and immunology, helped lead a study that offered promising results in the search for a treatment for Middle East respiratory syndrome (MERS). The treatment — an antibody that blocks the MERS virus — was produced by cows that had been genetically modified to mimic certain aspects of the human immune system. These cows were given a new MERS vaccine (created by vaccine biotech company Novavax) that led to production of anti-MERS antibodies in large quantities. These antibodies were then purified to produce the therapeutic agent that was tested in the MERS-infected mice.

LONGER SURVIVAL FOR HEART TRANSPLANTS ACROSS SPECIES

Richard Pierson, MD, professor of surgery, was a co-author on a study of a new immune-suppressing therapy that led to the longest survival yet for a cross-species heart transplant. The study involved transplanting pig hearts into baboons. The results could lead to increased use of xenotransplantation, the transplantation of organs from one species to another. Researchers hope this approach might eventually be used in humans, helping to ease the severe organ shortage among patients awaiting transplantation.

NEW WAYS TO DECODE LARGE AMOUNTS OF BIOLOGICAL DATA

In recent years, the amount of genomic data available to scientists has exploded. With faster and cheaper techniques increasingly available, hundreds of plants, animals and microbes have been sequenced in recent years. However, this ever-expanding trove of genetic information has created a problem: how can scientists quickly analyze all of this data, which could hold the key to better understanding many diseases, and solving other health and environmental issues? **Andrew Neuwald, PhD**, professor of biochemistry and molecular biology and a senior scientist at the Institute for Genome Sciences (IGS), helped develop an innovative computing technique that, on very large amounts of data, is both faster and more accurate than current methods. To spur research, a program using this technique is being offered for free to the biomedical research community. Dr. Neuwald collaborated on the work with Stephen Altschul, PhD, a senior investigator at the National Center for Biotechnology Information at the National Institutes of Health.



Ronna Hertzano



Scott Thompson



Todd Gould



James Gammie



Thomas MacVittie



Kim Hankey



Ann Farese



Zeljko Vuyaskovic



David Rasko

CLINICAL CARE



ELIMINATING DIALYSIS

In a first-of-its-kind procedure in the United States, a patient was able to avoid dialysis when surgeons simultaneously removed two diseased kidneys and also transplanted a kidney from a living donor — all as part of a 28-person paired kidney exchange (PKE). The procedure, performed in May on a patient with polycystic kidney disease (PKD), eliminated the need for the patient to ever undergo dialysis. **David Leeson, MD**, associate professor of surgery, and head of kidney and pancreas transplant at the University of Maryland Medical Center, developed the procedure plan.

CIRARA HAS SUCCESS IN STROKE PATIENTS

J. Marc Simard, MD, PhD, professor of neurosurgery, along with colleagues at Yale University and Harvard/Massachusetts General Hospital, found in a study that Cirara, an investigational drug, powerfully reduced brain swelling and death in patients who had suffered a type of large stroke called malignant infarction, which normally carries a high mortality rate. In stroke patients age 70 or younger, the researchers found that at six months after the stroke, there was a three-fold reduction in overall mortality among patients who were given Cirara, and a 10-fold decrease in death from brain swelling among the Cirara group.



NEW TOOL IN THE FIGHT AGAINST BREAST CANCER

After more than a decade of research and development, researchers in the Department of Radiation Oncology began enrolling patients in the first clinical trial of GammaPod, a new high-precision, image-guided radiation therapy system specifically designed to treat early-stage breast cancer. The GammaPod system, which uses thousands of precisely focused beams of radiation from 36 rotating sources in combination with a two-layer, vacuum-assisted cup that immobilizes the breast to achieve accuracy within 2 millimeters, was developed at the School of Medicine.

NOVEL WAYS TO REDUCE TRANSMISSION OF GERMS

As part of an \$11 million multi-institution effort by the US Centers for Disease Control and Prevention (CDC), researchers at the School of Medicine are focusing on new and innovative ways to improve how hospitals and other health care facilities can better prevent the spread of germs, including the Ebola virus and other emerging infectious disease threats. **Anthony Harris, MD, MPH**, professor of epidemiology and public health, is leading the school's part in the project. Overall, the effort includes six institutions nationwide.

SCHOOL OF MEDICINE TESTS MALARIA VACCINE IN BURKINA FASO

Malaria is one of the world's deadliest diseases: it infects hundreds of millions of people every year, and kills about half a million, most of them less than 5 years old. There is no vaccine. However, in July, School of Medicine researchers started a Phase 1 trial of a malaria vaccine that has shown success in early tests to test its safety and efficacy.

"This trial will tell us a lot about how the vaccine works on the ground, in a place where malaria is a real problem," said **Matthew Laurens, MD, MPH**, associate professor of pediatrics at CVD and the Institute for Global Health, who is co-leading the study. **Christopher Plowe, MD, MPH**, the Frank M. Calia Professor of Medicine, as well as founding director of IGH and of the Division of Malaria Research, is also co-leading the trial. The vaccine was originally developed by Sanaria, a biotech company based in Rockville.



Matthew Frieman



Richard Pierson



Andrew Neuwald



David Leeson



J. Marc Simard



Anthony Harris

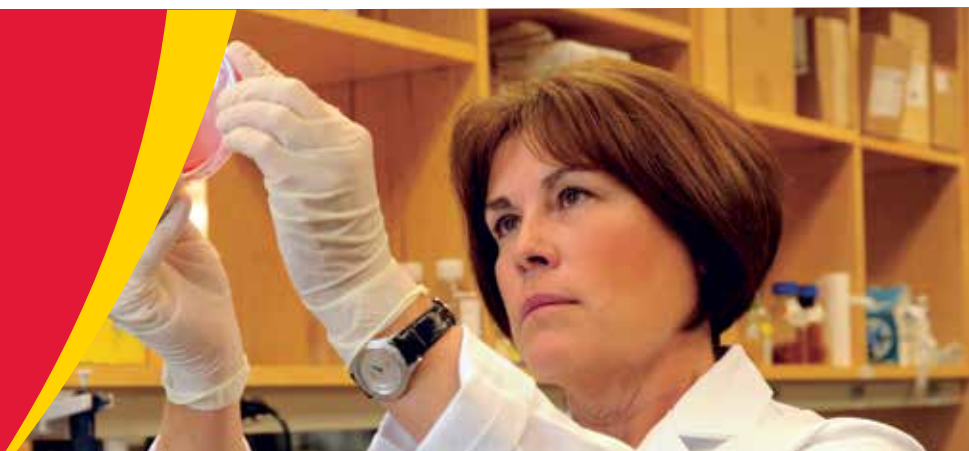


Matthew Laurens



Christopher Plowe

HONORS & AWARDS



Curt Civin, MD, professor of pediatrics and physiology, director of the Center for Stem Cell Biology and Regenerative Medicine, and associate dean for research, **received the American Society of Hematology (ASH) 2015 Mentor Award**, which honors outstanding commitment to the training and career development of early-career hematologists.

Steven Czinn, MD, professor and chair of the Department of Pediatrics, was named the **inaugural Drs. Rouben and Violet Jiji Professor of Pediatrics**.

Eduardo Davila, PhD, associate professor of microbiology and immunology, was chosen as the **2016 recipient of the Dean's Faculty Award for Diversity and Inclusion**. Dr. Davila has long been a strong advocate for increased minority access to scientific careers and research. He oversees several different programs to help minority students, and works with high school students, undergraduates, graduate students and post-graduates. Over the past several years, he has mentored more than 40 students.

Louis DeTolla Jr., VMD, MS, PhD, professor of pathology, medicine, and epidemiology and public health and head of veterinary resources, was **appointed to the board of directors** for the National Association for Biomedical Research (NABR).

Robert Fischell, ScD, a member of the UMSOM Board of Visitors, was **awarded the National Medal of Technology and Innovation**, the highest honor for technological achievement bestowed by the President of the United States. Dr. Fischell is known for inventing lifesaving medical devices and pioneering the modern era of space satellites. He holds more than 200 patents, including nearly 30 patents on orbiting spacecraft.

Claire Fraser, PhD, professor of medicine and microbiology and immunology, was presented with the **inaugural Dean's Endowed Professorship** in the School of Medicine on Dec. 7, 2015. The professorship was funded by School of Medicine Board of Visitors member Robert E. Fischell, ScD, and his wife, Susan R. Fischell.

Joseph Friedberg, MD, professor of surgery, was named the **Charles Reid Edwards, MD, Professor of Surgery** in June.

Kathleen Neuzil, MD, MPH, professor of medicine, director of the Center for Vaccine Development, and deputy director of the Institute for Global Health (IGH), was the **recipient of the 2016 Vanderbilt University School of Medicine Distinguished Alumni Award**.

Christopher Plowe, MD, MPH, FASTMH, founding director of IGH and director of the Division of Malaria Research, was named the **Frank M. Calia, MD, Professor of Medicine** in June.

Andrew Pollak, MD, the James Lawrence Kernan Professor and Chair of the Department of Orthopaedics, was **awarded the 22nd Annual Health Services Leadership Award** by the Baltimore Area Council of the Boy Scouts of America in January.

Jacques Ravel, PhD, professor of microbiology and immunology and associate director of the Institute for Genome Sciences, has been named a **2015-2017 Blaise Pascal International Research Chair**, one of the most prestigious European science awards.

Deborah Stein, MD, MPH, professor of surgery, was named the **inaugural R Adams Cowley, MD, Professor in Shock and Trauma** in May.

Zeljko Vujaskovic, MD, PhD, professor of radiation oncology, was the **recipient of the 2016 J. Eugene Robinson Award** at the annual Society for Thermal Medicine meeting in April. Dr. Vujaskovic, who is also director of the Division of Translational Radiation Sciences and director of the Maryland Proton Alliance, received the award for his contributions to hyperthermic oncology.



Curt Civin



Steven Czinn



Eduardo Davila



Louis DeTolla Jr.



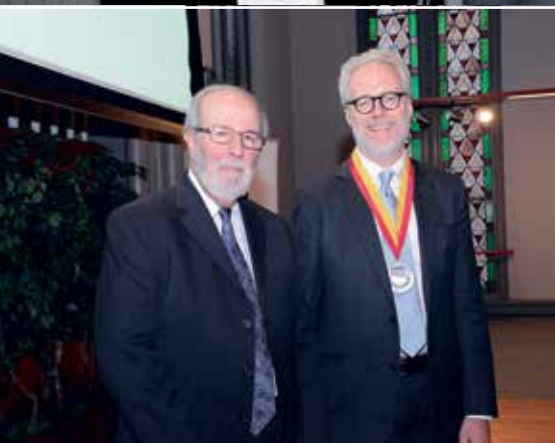
Robert Fischell



Claire Fraser



Joseph Friedberg



2016 INVESTITURES

Newly endowed professors (clockwise from left) Dr. Czinn with Richard and Stacy Hoffman, stewards of the Rouben and Violet Jiji Foundation; Dean Reece and Dr. Fraser with Susan Fischell and Dr. Fischell; Dr. Friedberg with Dean Reece and Stephen T. Bartlett, MD, the Peter Angelos Distinguished Professor and Chair of the Department of Surgery; Dr. Stein with Thomas M. Scalea, MD, FACS, MCCM, the Honorable Francis X. Kelly Distinguished Professor of Trauma Surgery; and Dr. Plowe with Dr. Calia.



GRANT of DISTINCTION The Center for Vaccine Development

The Center for Vaccine Development (CVD) staff has been awarded a significant grant from the Bill & Melinda Gates Foundation for research that will help determine why so many children under 5 years old are dying in the world's poorest countries. The grant will fund use of an innovative alternative to traditional autopsy known as minimally invasive tissue sampling. The technique, which involves the collection of tissue samples with fine needles, allows researchers to quickly identify the cause of death, and could help illuminate ways to save lives and improve the health of children in these vulnerable areas. The grant supports work at CVD's center in Bamako, Mali. It is one of the first three sites to be chosen, joining Soweto, South Africa, and Manhica, Mozambique. This work is part of a larger effort led by Emory University and funded by the Gates Foundation to create a network of up to 25 disease surveillance sites known as the Child Health and Mortality Prevention Surveillance Network. The program is a long-term project, and is expected to last for 20 years.



Kathleen Neuzil



Christopher Plowe



Andrew Pollak



Jacques Ravel



Deborah Stein



Zeljko Vujaskovic

TRANSITIONS



William Blattner, MD, professor of medicine, retired in January. Dr. Blattner also was co-founder, associate director, and head of the Division of Epidemiology and Prevention in the Institute of Human Virology.

Joanne Dorgan, PhD, MPH, professor of epidemiology and public health, was appointed director of the Division of Cancer Epidemiology in March, following the retirement of Dr. Blattner.

Sharon Bowser, MBA, assistant dean for information services, was promoted to deputy chief information officer (CIO) for the University of Maryland School of Medicine in December 2015.

Robert Buchanan, MD, was appointed director of the UMSOM Maryland Psychiatric Research Center (MPRC) in February.

Peter Crino, MD, PhD, was appointed chairman of the Department of Neurology in March. Dr. Crino succeeds interim chair **Barney Stern, MD**, professor of neurology. Dr. Stern is now vice chair of the department.

Warren D'Souza, PhD, MBA, professor of radiation oncology, was appointed vice president for enterprise data and analytics at UMMS in September 2015.

Laura Hungerford, DVM, MPH, PhD, CPH, FNAP, professor of epidemiology and public health, was appointed vice chair for academic programs for the department in November 2015. She replaced the retiring professor emerita **Patricia Langenberg, PhD**, who served in that role for 20 years.



Mona Baumgarten, PhD, professor of epidemiology and public health, replaced Dr. Hungerford as the director of the Program in Epidemiology and Human Genetics.

Joseph Martinez, MD, associate professor of emergency medicine and internal medicine, was appointed assistant dean for clinical medical education, and residency programs liaison, in March. Dr. Martinez is continuing with his prior student affairs duties, and will keep his current title of assistant dean of student affairs in addition to his new titles.

Mohan Suntha, MD, MBA, the Marlene and Stewart Greenebaum Professor of Radiation Oncology and vice chairman of the department of radiation oncology, was named president and chief executive officer of UMMC, effective September 1. Dr. Suntha was previously president and CEO of the University of Maryland St. Joseph Medical Center.

Samuel Tisherman, MD, FACS, FCCM, professor of surgery, was appointed director of the Division of Critical Care and Trauma Education in the Program in Trauma in January.

The Program in Health Disparities and Population Health (previously known as the Program in Minority Health and Health Disparities in Education and Research when led by the now-retired **Claudia Baquet, MD**) has a new home in the Department of Epidemiology and Public Health. Led by co-directors **Wendy Lane, MD, MPH**, clinical associate professor, and **J. Kathleen (Kate) Tracy, PhD**, associate professor, the program aims to advance health equity and population health through research, education, and service. **Lily Jarman-Reisch, MSW, MA**, is associate director of the program.



William Blattner



Joanne Dorgan



Sharon Bowser



Robert Buchanan



Peter Crino



Barney Stern



Warren D'Souza



Laura Hungerford

ENDOWED PROFESSORSHIPS

Stephen Bartlett, MD

Peter Angelos Distinguished
Professor in Surgery

Cynthia Bearer, MD

Mary Gray Cobey Endowed Professor
in Neonatology

Maureen Black, PhD

John A. Scholl, MD, and Mary Louise Scholl, MD,
Endowed Professor in Pediatrics

Kevin Cullen, MD

Marlene and Stewart Greenebaum
Distinguished Professor in Oncology

Steven Czinn, MD

Drs. Rouben and Violet Jiji Professor
of Pediatrics

Stephen Davis, MBBS

Dr. Theodore E. Woodward Chair in Medicine

Richard Eckert, PhD

John F.B. Weaver Endowed Professor

Howard Eisenberg, MD

Raymond K. Thompson, MD,
Endowed Chair in Neurosurgery

Alan Faden, MD

David S. Brown Professor in Trauma

Gary Fiskum, PhD

M. Jane Matjasko Professor for Research in
Anesthesiology

Claire Fraser, PhD

Dean's Endowed Professor in the
School of Medicine

Joseph S. Friedberg, MD

Charles Reid Edwards, MD, Professor of
Surgery

Robert Gallo, MD

Homer & Martha Gudelsky Distinguished
Professor in Medicine

Bartley Griffith, MD

Thomas E. and Alice Marie Hales
Distinguished Professor in
Transplant Surgery

Christopher Harman, MD

The Sylvan Frieman, MD, Endowed
Professor in Obstetrics, Gynecology &
Reproductive Sciences

Jeffrey Hasday, MD

Dr. Herbert Berger Professor of Medicine

Sharon Henry, MD

Anne Scalea Professor in Trauma

Aldo Iacono, MD

Hamish S. and Christine C. Osborne
Professor in Advanced Pulmonary Care

Bankole Johnson, DSc, MD, MB, ChB, MPhil, FRCPsych, DFAPA, FACFEI

Dr. Irving J. Taylor Endowed Professor and
Chair, Department of Psychiatry

Myron Levine, MD, DTPH

Simon and Bessie Grollman
Distinguished Professor

Elias Melhem, MD

Dean John M. Dennis Chair in Radiology

Mary Njoku, MD

M. Jane Matjasko Professor for Education
in Anesthesiology

Robert O'Toole, MD

Hansjörg Wyss Medical Foundation Professor
in Orthopaedic Trauma

John Olson, Jr., MD, PhD

Campbell and Jeanette Plugge Professor
in Surgery

Christopher Plowe, MD, MPH, FASTMH

Frank H. Calia, MD, Professor of Medicine

Andrew Pollak, MD

James Lawrence Kernan Endowed
Professor and Chair in the
Department of Orthopaedics

Aaron Rapoport, MD

Gary Jobson Professor in Medical Oncology

Jean-Pierre Raufman, MD

Moses Paulson, MD, and Helen Golden
Paulson Endowed Chair in the Division
of Gastroenterology

E. Albert Reece, MD, PhD, MBA

John Z. and Akiko K. Bowers Distinguished
Professor and Dean at the University of
Maryland School of Medicine

William Regine, MD, FACR, FACRO

Isadore & Fannie Schneider Foxman
Chair in the Department of
Radiation Oncology

Stephen Reich, MD

Frederick Henry Prince Distinguished
Professor in Neurology

Peter Rock, MD, MBA

Dr. Martin A. Helrich Chair
for Anesthesiology

Mary Rodgers, PT, PhD, FAPTA, FASB

George R. Hepburn Dynasplint
Professor in Physical Therapy and
Rehabilitation Science

Rajabrata Sarkar, MD, PhD

Barbara Baur Dunlap Endowed Professor
in Surgery

Thomas Scalea, MD

The Honorable Francis X. Kelly Distinguished
Professor in Trauma Surgery

Michael Shipley, PhD

Donald E. Wilson, MD, MACP, Distinguished
Professor

Alan Shuldiner, MD

John L. Whitehurst Endowed Professor

Lisa Shulman, MD

Eugenia Brin Professor in Parkinson's
Disease and Movement Disorders

Deborah M. Stein, MD, MPH

R Adams Cowley, MD, Professor in Shock
and Trauma

Barney Stern, MD

Stewart J. Greenebaum Professor
in Stroke Neurology

Mohan Suntha, MD, MBA

Marlene and Stewart Greenebaum Endowed
Professor in Radiation Oncology

Jian-Ying (Jay) Wang, MD, PhD

The Joseph and Corinne Schwartz Endowed
Professor in Surgery

Susan Wolfsthal, MD

Celeste Lauve Woodward, MD, Endowed
Professor in Humanism and Ethical
Medical Practice

Cedric Yu, DSc, FAAPM

Carl M. Mansfield, MD, Professor
in Radiation Oncology



Patricia Langenberg



Mona Baumgarten



Joseph Martinez



Mohan Suntha



Samuel Tisherman



Wendy Lane



Kate Tracy

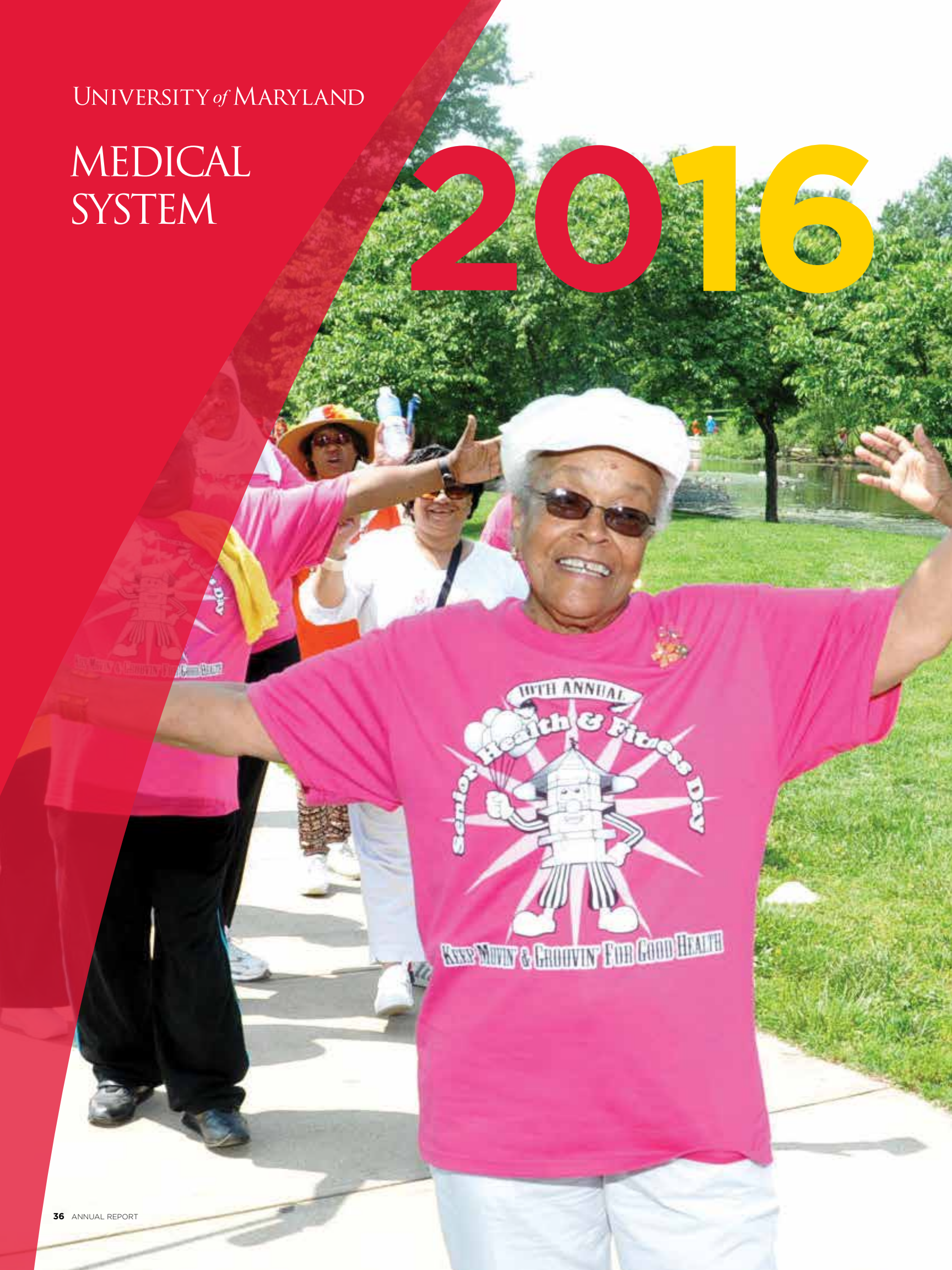


Lily Jarman-Reisch

UNIVERSITY of MARYLAND

MEDICAL
SYSTEM

2016



highlights

COMMUNITY

Central to the Health of Maryland



The University of Maryland Medical System (UMMS) is a comprehensive network of academic, community and specialty hospitals, affiliated physicians and skilled care teams that provide world-class care across the state.

Each member organization provides medical screenings, immunizations, educational materials and support to local residents. Here are a few examples of how UMMS is working to improve the health of its communities:



The St. Clare Medical Outreach Program, operated and financed entirely by University of Maryland St. Joseph Medical Center, has stayed true to its roots in Baltimore. The program began as a traveling medical outreach

van for uninsured patients, then evolved into a primary care clinic within the Esperanza Center in Fells Point before relocating to Baltimore County.



More than 500 people participated in University of Maryland Baltimore Washington Medical Center's second annual Color Your Heart 5K Fun Run May 14, 2016, at Kinder Park.

Healthy Harford is Harford County's healthy community initiative. Founded in 1993, Healthy Harford is a partnership of local government agencies, businesses, nonprofit organizations — including University of Maryland Upper Chesapeake Health — and citizens dedicated to improving health through education, policy changes and improvements to the community.

To provide free dental care, University of Maryland Charles Regional Medical Center partners with Maryland Mission of Mercy to hold a community clinic every two years. UM CRMC provides planning, logistics, volunteers and clinical resources for the event.



The University of Maryland Rehabilitation & Orthopaedic Institute's Adapted Sports Program promotes involvement in adapted recreational and competitive sports for people with physical disabilities in order to improve independence, self-confidence, health and overall well-being.



University of Maryland Shore Regional Health partners with community providers and organizations to offer free preventive health screenings and support groups throughout the year.

Every hospital within the system conducts a formal Community Health Needs Assessment to identify strategic priorities for outreach programming, in order to stay attuned to the communities' changing needs.

Healthy communities are empowered communities.

Learn more at umms.org/community



22 SOUTH GREENE STREET
BALTIMORE, MD 21201
410-328-8667
www.umm.edu

University of Maryland Medical Center UNIVERSITY CAMPUS

The University of Maryland Medical Center (UMMC) is the flagship of the University of Maryland Medical System (UMMS) and the heart of the System's downtown Baltimore campus. The 750-bed hospital provides tertiary and quaternary care, with more intensive care beds than any hospital in the state and internationally recognized programs in trauma, cancer care, cardiac care, neurological care, women's and children's health, and organ and tissue transplantation. The Medical Center also provides comprehensive care for the West Baltimore community in coordination with its second location, UMMC Midtown Campus. The 1,177 attending physicians at UMMC are all faculty members of the University of Maryland School of Medicine.

NATIONAL RECOGNITION

The cancer center achieved the National Cancer Institute's highest designation as one of only 47 "comprehensive cancer centers," recognizing its high caliber of scientific leadership and robust programs in basic, clinical and population science research. To reflect the new designation, the center's name is now the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center.

UMMC received the Intelligent Health Association's (IHA) 2016 GRAND Award and the Improving Patient Care and Health Delivery Awards. IHA established these nationwide awards in 2012 to recognize institutions that incorporate wireless technologies toward the enhancement of patient experience and safety. Colleen Driscoll, MD, assistant professor of pediatrics and a neonatologist at the University of Maryland Children's Hospital, led a team of clinicians, nurses and engineers to develop a text-messaging alert system that improves communication between the Labor and Delivery and Neonatology teams when a newborn requires resuscitation. UMMC is dedicated to implementing the latest technology in service of the smallest, most fragile patients.



The project that won the IHA award involved clinicians and clinical engineering staff including, from left, Samuel Gurmu, Treza James, MS, NNP-BC; Inhel Rekik, B.Eng, MS; Dina El-Metwally, MB, BCh, PhD; Colleen Driscoll, MD; Joan Treacy, MS, RNC-NIC; and George Reed.

Safe Kids Baltimore, a coalition led by the University of Maryland Children's Hospital, worked with students at Patterson Park Middle School in Baltimore to produce a music video about safety when crossing the street. The video won the Safe Kids Worldwide contest, earning the school a professional production, which then won a national video industry award.



NEW LEED CERTIFICATION

UMMC has long been committed to environmental sustainability, and in October became the first hospital in Baltimore to receive LEED Gold Certification for an inpatient building — the Shock Trauma Critical Care Tower. LEED (Leadership in Energy and Environmental Design) Certification is an internationally recognized standard of resource efficiency, with Gold being the second-highest designation, after Platinum. The tower, completed in 2013, is 15 percent more efficient than a typical new building. It was constructed using recycled materials, a reflective roof finish that reduces heat absorption, plumbing fixtures that use 30 percent less water and energy-conserving LED lights in operating rooms.



HEART ATTACK TEAMS HONORED

For the third year in a row, UMMC's cardiology teams earned the Platinum Performance Achievement Award for continued excellence in the treatment of heart attack patients, based on guidelines set by the American College of Cardiology and the American Heart Association. The success involves collaboration between first-responders and the Emergency Department and all cardiac units.

827 LINDEN AVENUE
BALTIMORE, MD 21201
410-225-8000
www.umm.edu/midtown

University of Maryland Medical Center MIDTOWN CAMPUS

University of Maryland Medical Center (UMMC) Midtown Campus, located in Baltimore's cultural center near the historic Mount Vernon neighborhood, provides access to a full range of medical and surgical care. The 167-bed UMMC Midtown Campus is a second location of the University of Maryland Medical Center, with an active medical staff of 502 physicians.

GREAT CARE, TWO LOCATIONS

When UMMC Midtown Campus changed its name in 2013, the University of Maryland Medical Center (UMMC) became one hospital with two complementary locations. UMMC Midtown Campus specializes in primary and secondary care with a focus on chronic disease management; while UMMC's University campus provides highly specialized care for the most complex diseases and conditions.

Today, more than 15 integrated programs now call UMMC Midtown Campus home, including the world-class University of Maryland Center for Diabetes and Endocrinology, University of Maryland Sleep Disorders Center, and the University of Maryland Center for Infectious Diseases.

Patients now have the ease of accessing academic medicine in a community-based setting. At UMMC Midtown Campus, patients will find University of Maryland School of Medicine faculty physicians, community physicians and employed physicians working alongside one another to provide the highest level of care.

SERVING THE COMMUNITY

UMMC Midtown Campus is committed to the health and well-being of Baltimore residents. In addition to participating in more than 65 health fairs each year, UMMC Midtown Campus

empowers Baltimore communities by providing access to health education and resources, including health and wellness programs such as:

- Living Well with High Blood Pressure, which includes an initiative to help African-American men with undiagnosed hypertension get their blood pressure under control.
- Diabetes Prevention Program, a 16-week class for people who are at risk for diabetes or have been diagnosed as prediabetic.
- Living Well with Chronic Disease, a six-week workshop for people with chronic health conditions, as well as their caregivers. Each class helps you set goals, make action plans and improve quality of life.

RECOGNIZED FOR WORLD-CLASS DIABETES CARE

The University of Maryland Center for Diabetes and Endocrinology has been recognized by the National Committee for Quality Assurance (NCQA) for the consistently high quality of care its physicians provide to patients with diabetes. The Diabetes Recognition Program recognizes physicians who use evidence-based, nationally recognized clinical measures for diabetes care and management.



Adam Spanier, MD, PhD, MPH, associate professor of pediatrics

EHR IMPROVES PATIENT SAFETY AND CARE

UMMC Midtown Campus implemented a new electronic health record (EHR), along with the University of Maryland Medical Center's University campus, in 2016. This new platform, called Portfolio, helps care teams communicate about each patient. It provides immediate access to clinical information by all members of the patient care team — whether they are at a hospital, a clinic or other care setting. The use of an EHR has been shown to improve the safety and quality of care for patients.



301 HOSPITAL DRIVE
GLEN BURNIE, MD 21061
410-787-4000
www.mybwmc.org

University of Maryland Baltimore Washington Medical Center

University of Maryland Baltimore Washington Medical Center (UM BWMC) provides the highest quality services and care for residents of Anne Arundel County and the surrounding region. With 293 beds and 2,800 employees and an active medical staff of more than 700, UM BWMC has continually grown to meet the needs of the community. Complex surgeries are performed in high-tech surgical suites, cancer is fought with state-of-the-art linear accelerators to deliver radiation with pinpoint accuracy, and heart disease is treated by an award-winning inpatient clinical team.

RELATIONSHIP-BASED CARE

In December 2015, UM BWMC began implementing a philosophy of patient care known as relationship-based care (RBC). Its goal is to build a foundation of strong relationships with co-workers and patients. UM BWMC began by implementing three-day workshops to bring together staff from every department to explore RBC and remind themselves why they chose health care for their profession. An assessment found many strengths already present, including staff commitment, teamwork within departments, strong relationships among employees and pride in the organization. In January, UM BWMC began implementing this patient care model in units that care for patients who are frequently moved during the same stay in the hospital.



7 West patient care technician Julie Kosydar

IMPROVING PATIENT SAFETY AND SATISFACTION

In December, UM BWMC's 4 South nursing unit for medical-surgical patients moved to the 7th floor of the west tower, where the recently built space offers modern, private patient rooms. This new unit, called 7 West, is piloting an updated nurse call system to increase patient safety and improve communication between the patient and the caregivers. Smartphones pair with the nurse call system and staff location devices. The devices help measure patient needs and call-bell response time. After the program was launched, patient satisfaction scores showed a significant improvement.



From left, Cathy Whitaker, MSN, RN, vice president and chief nursing officer; R. Kent Schwab, board chairman; Karen E. Olscamp, president and CEO; Stanley J. Klos Jr., board member; Deborah Heys, MS, RN-BC, nurse manager of 7 West; and Susan Ward, vice president.

BEHAVIORAL HEALTH GRANT

In January 2016, UM BWMC and the Anne Arundel County Department of Health were awarded a federal grant of nearly \$230,000 from the Substance Abuse and Mental Health Services Administration, through the Maryland Behavioral Health Administration, to treat individuals suffering from an opiate overdose — most commonly from heroin addiction. The Targeted Capacity Expansion: Medication Assisted Treatment-Prescription Drug and Opioid Addiction grant funds a full-time nurse coordinator and two full-time peer specialists. These individuals help coordinate care plans, such as enrolling patients in certified outpatient methadone clinics, and serve as support throughout recovery. The goal is to obtain appropriate treatment for those trying to manage their illness and to assist individuals in achieving and sustaining long-term recovery. The program, Overdose Survivors Outreach Services, will focus on the comprehensive care and treatment of individuals to reduce recidivism and save lives. The new model of care expects to enroll at least 30 people during its first year.

5 GARRETT AVENUE
LA PLATA, MD 20646
301-609-4000
www.charlesregional.org

University of Maryland Charles Regional Medical Center

Robyn D. Anderson, MD, assistant professor of medicine and director of critical care at UM CRMC, coordinates on-site intensive care enhanced by 24-7 tele-ICU coverage.



University of Maryland Charles Regional Medical Center (UM CRMC) has been the center of health care in La Plata, Charles County, for decades. The 89-bed Medical Center, with an active medical staff of 140, has a rich history of providing high-quality care to the community since 1939. Today, it has grown significantly and expanded to meet the needs of the increasing population. UM CRMC serves the community's needs with distinction, delivers award-winning care and is one of the largest employers in Charles County.

NEW OUTPATIENT CENTERS

Open seven days a week, University of Maryland Charles Regional Urgent Care opened this year across the street from the hospital. Patients can be seen for common illnesses and minor injuries. To keep pace with rapid changes in medical care and technology, UM CRMC began construction of a new outpatient health care center featuring three new service lines. The Washington Avenue site will offer sports and orthopaedic rehabilitation programs, an advanced imaging center and post-acute and primary care services.

CHIEF MEDICAL OFFICER



In March 2016, UM CRMC welcomed new Chief Medical Officer **Joseph Moser, MD**, an obstetrician-gynecologist who brings 18 years of experience as vice president of medical affairs. Dr. Moser oversees clinical programs, patient safety, compliance with regulatory standards, physician coverage and recruitment and the Medical Staff Office.

eICU PROGRAM WITH UMMC

Telemedicine has arrived at UM CRMC. Using technology, the University of Maryland eCare (UM eCare) tele-ICU program enhances access to highly trained and experienced UM eCare critical care physicians and nurses. The tele-ICU provides

24-hour access to intensivists who provide support to the on-site ICU at UM CRMC to improve outcomes for the most critically ill patients.

MEETING COMMUNITY HEALTH NEEDS

This year, UM CRMC welcomed certified diabetes educator Cindy Adams to the team helping people better manage and cope with their diabetes. UM CRMC also offered a new class, "Living Well with Chronic Conditions." Developed at Stanford University, the free program empowers participants to better manage pain, fatigue, frustration and diet that can be associated with chronic disease.

AWARDS FOR QUALITY, STROKE CARE AND WOUND HEALING

For the fourth consecutive year, UM CRMC was named a Top Performer on Key Quality Measures by The Joint Commission, the nation's top accreditor of hospitals. The award is given for attaining and sustaining excellence in management of heart failure, pneumonia, surgical care and venous thromboembolism.

The hospital also was recognized for improved stroke treatment and outcomes by the American Heart Association and American Stroke Association with the Get With The Guidelines — Stroke Gold Plus — Target: Stroke Honor Roll Elite award.



For the third consecutive year, UM CRMC received national excellence awards in wound healing. The Center was awarded the Robert A. Warriner III, MD, Center for Excellence and the Healogics Inc. Center of Distinction awards for delivering the highest quality care.

RENOVATIONS

To meet UM CRMC's growing power needs, the medical center received three new emergency generators and transfer switches, ensuring the hospital can continue providing critical services during an extended power outage.



2200 KERNAN DRIVE
BALTIMORE, MD 21207
410-448-2500
www.umrehabortho.org

University of Maryland Rehabilitation & Orthopaedic Institute

The University of Maryland Rehabilitation & Orthopaedic Institute is Maryland's largest and most comprehensive rehabilitation and orthopaedic specialty hospital. Founded 120 years ago, the 138-bed hospital provides highly specialized care to people recovering from stroke and neurological diseases as well as traumatic injuries of the spinal cord and brain. UM Rehab & Ortho is a leader in treating neurological conditions and musculoskeletal disease, employing robotic technologies to improve movement, and performing leading-edge clinical research. Many of the 190 physicians on staff are faculty of the University of Maryland School of Medicine. The hospital is an integral component of the University of Maryland Rehabilitation Network.

GOING FOR GOLD WITH ADAPTED SPORTS



Complementary to the Institute's rehabilitation services is the Adapted Sports Program, which offers instruction and competitive play in adapted golf, wheelchair basketball and wheelchair rugby for individuals with physical limitations. In 2016, the Institute's wheelchair rugby team, the Maryland Mayhem, held its second annual "Maryland Crabpot Tournament," hosting teams from New York, Philadelphia and Washington, DC. The team was especially proud and

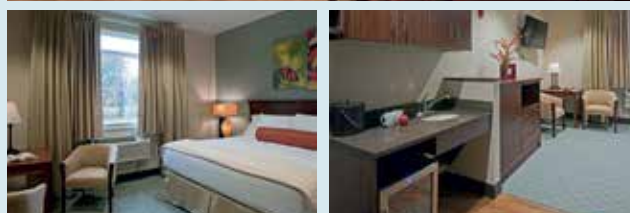
excited in May when team captain Ryan Major earned a spot on the USA Wheelchair Rugby team in the Invictus Games in Orlando, Fla., where the team captured the gold medal in this international wounded-warrior competition.

CONNECTING TO THE COMMUNITY

UM Rehab & Ortho expanded its services this year with the addition of the Patient Navigator Program. Four navigators now support patients in the areas of spinal cord injury, brain injury, stroke and comprehensive medical rehabilitation. The goals of the program are to improve outcomes for patients, reduce readmissions to the hospital following discharge, facilitate better communication with primary care providers and improve follow-up appointment attendance. Patients and caregivers can more easily access services across the system and throughout the community, as well as manage their own care with the help of the patient navigators.

THE HACKERMAN-PATZ HOUSE

In November 2015, UM Rehab & Ortho opened the doors to its own Hackerman-Patz House. Conveniently located on the hospital campus, the house provides a home-away-from-home for out-of-town families of patients who are receiving care at UM Rehab & Ortho from throughout the country. Situated in a picturesque and restorative setting, the Hackerman-Patz House offers an affordable housing option for families who have uprooted their lives in exchange for access to the very best care. The Hackerman-Patz House includes 10 bedrooms, with plans to add another 10 rooms as occupancy grows. Amenities include in-suite bathrooms; a guest laundry room; and a great room with a desk and computers to function as a business area for guests.



7601 OSLER DRIVE
TOWSON, MD 21204
410-337-1000
www.stjosephtowson.com

University of Maryland St. Joseph Medical Center

Joanna Saba, MD, is medical director of the St. Clare Medical Outreach Program



University of Maryland St. Joseph Medical Center (UM SJMC), located in Towson, is a 232-bed, acute care hospital with 857 medical staff members. UM SJMC has a rich heritage of providing loving service and compassionate care since its founding in 1864. Ever present in its Catholic mission is the desire and will to care for the members of its community, offering a wide variety of outreach and wellness programs to keep patients healthy.

Clinical programs and centers of excellence include the Heart, Cancer and Orthopaedic Institutes, Women and Children's Services and affiliations with primary care physicians throughout Baltimore County.

The **Heart Institute** provides a complete continuum of care, including surgery, all-digital cardiac catheterization, accredited echocardiography lab, electrophysiology lab, nuclear medicine, and a cardiovascular fitness program. Patients in need of cardiac surgery benefit from the combined UM SJMC and the University of Maryland Medical Center joint Division of Cardiac Surgery, which provides the most advanced surgery options and lifesaving research to more patients than ever.

The **Orthopaedic Institute** has been named one of the nation's top orthopaedic facilities by *U.S. News & World Report*, and designated a Blue Distinction Center in the categories for hip, knee and spine surgery by CareFirst BlueCross BlueShield. The 50-bed Orthopaedic Unit includes a rehabilitation facility.

The **Family Childbirth Center** includes labor, delivery and recovery suites; postpartum mother/baby suites and a **Level III+ Neonatal Intensive Care Unit**. Thanks to the generosity of donors, the medical center reached its \$2 million goal to renovate the Mother-Baby wing. Construction on the unit will begin in late 2016.

The **UM St. Joseph Cancer Institute** was awarded a three-year Gold Level accreditation with commendation as a comprehensive community cancer center by the American College of Surgeons Commission on Cancer, the highest recognition the commission awards. The Cancer Institute is a formal affiliate of the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center.

UM St. Joseph Medical Group providers in 21 office locations went live with Portfolio, the UMMS electronic health record, in all phases of the product, including scheduling, registration, clinical support and billing. After months of preparation and training, the team converted more than 16,000 appointments to the new system the week prior to ensure a seamless transition.

The new **Transitional Care Center** uses a multidisciplinary approach (hospitalist, pharmacist, case manager) to manage patients at high-risk of readmission and provide them with follow up care.

These patients — such as those with congestive heart failure, chronic obstructive pulmonary disease, sepsis, taking multiple medications or with limited sources of outside support — will be identified while they are hospitalized at UM SJMC. If a high-risk patient is unable to be scheduled with their primary care or specialist physician within a week of discharge, the patient will be seen in the Transitional Care Center.



Healing Hands Guild honorees, from left, Roberto Ferrer, MD; Linda Barr, MD; Mark Saba, MD; M. Alma Lynch-Nyhan, MD; and Kevin Stierer, MD. Not pictured: Brian Mulliken, MD.



UM SHORE MEDICAL CENTER AT EASTON
219 S. WASHINGTON STREET
EASTON, MD 21601
410-822-1000

UM SHORE MEDICAL CENTER AT DORCHESTER
300 BYRN STREET
CAMBRIDGE, MD 21613
410-228-5511

UM SHORE MEDICAL CENTER AT CHESTERTOWN
100 BROWN STREET
CHESTERTOWN, MD 21620
410-778-3300
www.umshoreregional.org

University of Maryland Shore Regional Health

University of Maryland Shore Regional Health (UM SRH) is the principal provider of comprehensive health services for the residents of Caroline, Dorchester, Kent, Queen Anne's and Talbot counties on Maryland's Eastern Shore. The team includes more than 2,500 employees, 321 active medical staff members, board members and volunteers who work with community partners to fulfill the organization's mission of **Creating Healthier Communities Together**. The three inpatient hospitals have a combined total of 204 beds.

UM SRH completed a number of expansion and development projects. The second phase of **UM Shore Medical Pavilion at Easton** opened its doors to patients in April 2016 and provides 50,000 square feet of newly renovated space for primary care, cardiovascular diagnostics and multiple specialties. The first phase of the Pavilion opened in May 2015.

In April, UM Shore Regional Health completed renovation of the Critical Care Unit (CCU) at **UM Shore Medical Center at Chestertown**, with an updated nursing station, isolation areas and ceiling-mounted equipment for safe patient lifting. **UM Chester River Health Foundation** funded \$233,000 of the project's total cost of \$283,000.



President and CEO Ken Kozel, far right, at the CCU grand opening with nurses Steven Baxter, Linda Pippin, Mickey Roderick, Peggy Roca, Kathy Elliott, Mary Jo Keefe, Cassandra Price and Sandy Prochaska.

In May 2016, the **Clark Comprehensive Breast Center** opened its expanded location in Easton. Named in recognition of a \$5-million gift from the Clark Charitable Foundation, the Breast Center's expansion was part of a \$6.5-million renovation project at the **Diagnostic and Imaging Center**, housed at that same

location. The 14-month project, which began in February 2015, was completed in three phases and, in addition to the expansion of the Breast Center, encompassed all laboratory and imaging spaces.

At the new Breast Center, women throughout the five-county region have greater access to 3-D digital mammography and other diagnostics, and an expert breast health team in one location, improving the patient experience and patient outcomes. The new location is adjacent to **UM Shore Regional Health's Cancer Center**, which offers patients a convenient, comprehensive approach.

UM Shore Regional Health entered into a partnership with **ChoiceOne Urgent Care** to provide convenient urgent care services throughout the region. **ChoiceOne Urgent Care Denton** began seeing patients in May 2016. An Easton location opened in the fall of 2016. This latest venture is among many community partnerships forged by UM SRH to bring to Eastern Shore residents exceptional accessible care close to home.

UM Shore Regional Health's newest medical office building — **UM Shore Medical Pavilion at Chestertown** — opened its doors to patients in June 2016. The new Pavilion provides space for primary care offices and a variety of medical specialties.

Providers at UM Shore Medical Pavilions at Chestertown and Easton and the **Clark Comprehensive Breast Center** are affiliated with **UM Community Medical Group**, as are the new Women's Health providers.

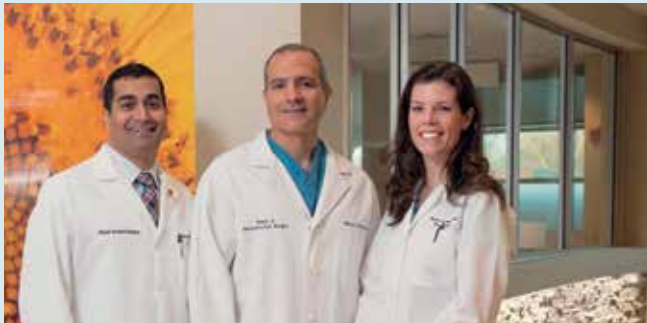


Women's services grew in 2016 with the addition of an obstetrics and gynecology practice whose providers play significant roles at **UM Shore Regional Health's Birthing Center**, located at **UM Shore Medical Center at Easton**, and now in its 20th year.

UM HARFORD MEMORIAL HOSPITAL
501 SOUTH UNION AVENUE
HAVRE DE GRACE, MD 21078
443-843-5000

UM UPPER CHESAPEAKE
MEDICAL CENTER
500 UPPER CHESAPEAKE DRIVE
BEL AIR, MD 21014
443-643-1000
www.umuch.org

University of Maryland Upper Chesapeake Health



For the past century, University of Maryland Upper Chesapeake Health (UM UCH) has offered the residents of northeastern Maryland an unparalleled combination of award-winning clinical expertise, leading-edge technology and an exceptional patient experience. The organization's vision is to become the preferred, integrated health care system creating the healthiest community in Maryland.

UM UCH includes two acute care hospitals — UM Upper Chesapeake Medical Center (UM UCMC) in Bel Air and UM Harford Memorial Hospital (UM HMH) in Havre de Grace — with a combined medical staff of 630 and 277 licensed beds. UM UCH operates The Upper Chesapeake Health Foundation, the Klein Ambulatory Care Center and two medical office buildings on its Bel Air Campus. It also owns and operates the Senator Bob Hooper House, an assisted-living community specializing in hospice care.

The Patricia D. and M. Scot Kaufman Cancer Center is in its third year of operation. Its affiliation with the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center means local access to clinical trials, the highest quality radiation oncology program, genetic counseling and a joint Tumor Board, which meets to discuss individual cases.

The University of Maryland Faculty Physicians Inc. practice has offices in Pavilion II at UM UCMC. University of Maryland School of Medicine specialists see patients in this office for adult and pediatric specialty services.

UM UCH's Vision 2020 plans were shared this year and include establishing a new medical campus located adjacent to Interstate 95 on the 97-acre site UM UCH owns at Bulle Rock. This will replace the current but aging UM HMH in downtown Havre de Grace. The goal is to improve the health of the population served by offering a regional behavioral health facility while also acute care and emergency services with local and national health care trends. The time frame for the opening of the medical campus is 2020.

AWARDS AND RECOGNITIONS

- For the fifth year in a row, the Primary Stroke Centers at both UM UCH hospitals received the American Heart Association/American Stroke Association's Get With The Guidelines — Stroke Gold Plus Achievement Award as well as Target Stroke Elite Honor Roll Recognition.
- The Kaufman Cancer Center was named a 2016 Association of Community Cancer Centers (ACCC) Innovator Award Winner for its outstanding contributions to palliative care in the community.
- UM UCH was again certified by the National Quality Measures for Breast Centers (NQMBC) and is a Certified Breast Center of Excellence.
- Two of the organization's work groups were honored by the Maryland Patient Safety Center for their quality and patient safety submissions, "Multidisciplinary Approach to Delirium in the ICU" and "Care Beyond What Meets the Eye: Transforming the Patient and Family Experience Through a Coordinated Care Model."



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Mt. Washington Pediatric Hospital

Virginia Keane, MD, clinical associate professor of pediatrics, was recognized by *Baltimore Magazine* as a Top Doc 2015.

Mt. Washington Pediatric Hospital (MWPH) specializes in family-focused treatment of children with serious, chronic and/or complex medical needs. The hospital is a jointly owned affiliate of the University of Maryland Medical System and Johns Hopkins Medicine.

Treating more than 8,000 patients a year on an inpatient and outpatient basis, the 102-bed post-acute hospital's main location is in Baltimore, with a 15-bed unit at Prince George's Hospital Center in Cheverly. Founded in 1922 to provide a respite from the city where children could recover from illness and injury, MWPH continues to offer a unique and diverse portfolio of children's programs and services, including rehabilitation, behavioral health, a sleep study center, treatment of feeding disorders and weight management. The hospital has a medical staff of 132, including physicians, nurse practitioners and psychologists. The hospital's **Center for Neonatal Transitional Care** is the only facility of its kind in the Mid-Atlantic region and provides services for premature infants and other babies born with serious health challenges.

SOUGHT-AFTER CARE

A number of infants are born drug-dependent due to their mothers taking prescribed and non-prescribed opiates during pregnancy. Not enough hospitals are equipped to treat these infants through the drug-withdrawal process. MWPH has become a resource for health care providers throughout Maryland and is highly sought-after for its therapeutic care. MWPH admits close to 100 infants each year with neonatal abstinence syndrome, which represents about one-fourth of its inpatient population. These newborns arrive from hospitals throughout Maryland shortly after delivery and will stay an average of two to three weeks before going home. In addition to the routine feeding and medication schedules of any hospital

setting, MWPH's team of doctors, nurses, social workers and child life therapists provide integrated services for the family and baby.

A KALEIDOSCOPE OF IDEAS

MWPH hosted its first-ever Feeding Disorders Conference in October 2015, garnering the spotlight as a thought leader in the field. Attracting 168 participants from across the country, the two-day conference featured 24 presenters, 10 of whom were from the MWPH team. Conference founder **Richard Katz, MD, MBA, FAAP**, is chief medical officer and vice president of medical affairs at MWPH. Dr. Katz had long dreamed of pulling together an event that spotlighted not only what MWPH offered at its Feeding Program, but a compilation of what professionals across the country were doing. "Strategies for Treating Pediatric Feeding Disorders: A Kaleidoscope of Ideas" created an interdisciplinary forum for experts to share best practices and create long-term partnerships. Feeding disorders affect 20 to 50 percent of all children.

Since its founding, MWPH has responded to the shifting needs of the community. From the malnourishment and rheumatic fever prevalent early in the 1900s to the traumatic brain injury and lead poisoning affecting youth today, MWPH helps children regain their health and make the transition home.



Ellen Wingert with a patient in the Feeding Day Treatment Program



Center for Neonatal Transitional Care



Statewide Health Care Network

- | | | | | | |
|---|---|----|---|----|---|
| 1 | UNIVERSITY of MARYLAND MEDICAL CENTER | 6 | UNIVERSITY of MARYLAND SHORE MEDICAL CENTER AT CHESTERTOWN | 11 | UNIVERSITY of MARYLAND CHARLES REGIONAL MEDICAL CENTER |
| 2 | UNIVERSITY of MARYLAND MEDICAL CENTER MIDTOWN CAMPUS | 7 | UNIVERSITY of MARYLAND SHORE MEDICAL CENTER AT EASTON | 12 | UNIVERSITY of MARYLAND UPPER CHESAPEAKE MEDICAL CENTER
MEMBER OF UPPER CHESAPEAKE HEALTH |
| 3 | UNIVERSITY of MARYLAND REHABILITATION & ORTHOPAEDIC INSTITUTE | 8 | UNIVERSITY of MARYLAND SHORE MEDICAL CENTER AT DORCHESTER | 13 | UNIVERSITY of MARYLAND HARFORD MEMORIAL HOSPITAL
MEMBER OF UPPER CHESAPEAKE HEALTH |
| 4 | UNIVERSITY of MARYLAND BALTIMORE WASHINGTON MEDICAL CENTER | 9 | UNIVERSITY of MARYLAND SHORE EMERGENCY CENTER AT QUEENSTOWN | 14 | MT. WASHINGTON PEDIATRIC HOSPITAL
(Joint Venture with Johns Hopkins Medicine) |
| 5 | UNIVERSITY of MARYLAND ST. JOSEPH MEDICAL CENTER | 10 | UNIVERSITY of MARYLAND SHORE NURSING & REHABILITATION CENTER AT CHESTERTOWN | 15 | UNION HOSPITAL OF CECIL COUNTY |

FISCAL 2016 FACTS



UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

FACULTY	2,959
Full-time	1,342
Part-time	287
Adjunct	1,330

STAFF	3,219
UM Faculty Practice Inc.	1,210
UM School of Medicine	2,009

STUDENTS	1,353
Medical	624
MD/PhD	47
Graduate (MS, PhD)	364
Public Health	69
Physical Therapy (DPT, PhD)	182
Genetic Counseling	16
Medical and Research Technology	45
Clinical Research Certificate	6

POST-DOCTORAL FELLOWS	566
Clinical	211
Research	355

RESIDENTS	680
(Trained by UMSOM Faculty)	

OUR INCOME

Tuition and Fees	\$ 30,052,726
State Appropriations	42,822,445
Total Grants and Contracts	399,179,422
Gifts, Endowments and Other Expenses	15,845,571
Medical Services Plan	301,000,000
Reimbursements from Affiliated Hospitals	<u>175,670,429</u>
Total	\$ 964,570,593

OUR EXPENSES

Instruction/Training	\$ 89,513,940
Research	416,869,345
Clinical Service	418,005,412
General and Administrative	<u>40,181,896</u>
Total	\$ 964,570,593

FINANCIAL

FISCAL 2016 FACTS



LICENSED BEDS

2,252

EMPLOYEES

24,187

HOSPITAL ADMISSIONS

110,371

OUTPATIENT VISITS

1,315,096

EMERGENCY VISITS

386,929

OUTPATIENT SURGICAL CASES

65,353

OUR INCOME

From services to inpatients	\$ 2,139,663,000
From services to outpatients	2,083,148,000
These services produced total gross revenue of	\$ 4,222,811,000
Less amounts we had to deduct for contractual allowances to third-party payors	(636,526,000)
Less the cost of charity care for persons without the ability to pay for their care and for uncollectible accounts	<u>(218,433,000)</u>
Therefore, our net revenue from patient care services was	3,367,852,000
In addition, our other revenue from operating, including state support, was	<u>301,472,000</u>
Thus, our total revenue from operations was	\$ 3,669,324,000

OUR EXPENSES

For salaries, wages and fringe benefits to our employees	\$ 1,740,360,000
For medical supplies, pharmaceuticals and purchased services	1,562,546,000
For depreciation on our buildings and equipment	200,764,000
For interest costs on our outstanding bonds	<u>75,070,000</u>
All of these operating expenses totaled	\$3,578,740,000

OUR NET RESULTS

Income from operations	\$ 90,584,000
Less non-operating revenue net of expenses, which excludes changes in market value of financial investments and other activities	<u>(26,582,000)</u>
Net income	\$64,002,000

* Fiscal Year 2016 figures are unaudited.

REPORTS



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NEW LEADERS



MOHAN SUNTHA, MD, MBA

A physician leader with more than 20 years of medical and administrative experience within the University of Maryland Medical System, Dr. Suntha was named president and chief executive officer of the University of Maryland Medical Center (UMMC), effective Sept. 1, 2016. Dr. Suntha had been president and CEO of the University of Maryland St. Joseph Medical Center (UM SJMC) since 2012, and is credited with leading that hospital through a remarkable financial recovery after it became part of UMMS.



THOMAS B. SMYTH, MD

A physician leader in the UM SJMC and Towson-area medical community, Dr. Smyth succeeded Dr. Suntha as president and CEO of UM SJMC. Dr. Smyth joined UM SJMC as medical director of the UM St. Joseph Medical Group in October of 2015, providing administrative and clinical oversight to the physicians employed by the group. He worked with hospital leadership to maintain and enhance clinical quality, operational efficiency and financial performance.

2016

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TREES	ENERGY	GREENHOUSE	WATER	SOLID WASTE
13 fully grown	6 million BTU	GAS 1,086 pounds	5,890 gallons	394 pounds

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