Excellence and leadership in medical education, patient care and research: that’s what defines the University of Michigan Health System. We are a premier academic medical center made up of three hospitals and more than 40 health centers and clinics throughout Michigan; the University of Michigan Medical School; the clinical activities of the University of Michigan School of Nursing; and a physician faculty group practice.
Leading Our Future

When I joined the University of Michigan in March 2015, I was very familiar with the University’s status as a premier academic medical center. Since then, my work and interactions here have only reinforced that our scope and quality of clinical care, top tier medical education and amazing discoveries distinguish us from other medical centers.

The incredible talent of the people who work and learn here give us the unique ability to position ourselves as a leader in the future of health care.

In this report we tell stories of how we change lives: the lives of our patients, their families, our students and trainees, and the people in the communities we serve.

We share stories about the excitement of translating research discoveries into treatment innovations. We tell stories of how such discoveries have positively changed the possibilities in patient care.

We are especially proud of our newly-transformed medical school curriculum, introduced during the fall 2015 semester. This new curriculum accelerates foundational knowledge and clinical experience — helping us provide the best possible training for the demands of tomorrow’s health care leaders.

During the past year, our doctors, nurses and assisting personnel cared for a record number of patients. This allowed us to serve people in need and maintain a strong operating margin. Going forward, we intend to continue the business strategies and financial discipline that give us a sound footing to invest in our future.

We have also continued expansion of our North Campus Research Complex — producing an environment conducive to collaborative investigation across diverse disciplines and departments. Increased state-of-the art laboratory space should help us attract and recruit top faculty in both clinical and basic science research.

As we advance into the future, I’m confident that we have what is needed to excel. With our sights focused clearly on the changing health care landscape, we’ll leverage the three parts of our mission to benefit our patients and our communities.

I hope you find our stories as inspiring as I do. Please share them with your colleagues, family members and friends.

Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, University of Michigan Medical School
(Dean appointment effective 1/1/2016)
Garrett Peterson spent his first days in a neonatal intensive care unit (NICU). These early days grew into a 10-month stay in U-M C.S. Mott Children’s Hospital as he struggled to breathe.

Garrett was born with tetralogy of fallot with absent pulmonary valve causing tracheobronchomalacia. His pulmonary airways collapsed and he needed constant ventilator support.

Even with a ventilator, his parents, Jake and Natalie Peterson of Utah, were alarmed to see that something minor could cause him to become upset and turn blue. According to Jake Peterson, “We were struggling to transition Garrett from a hospital grade ventilator to a home ventilator and afraid that at some point he might not be able to be revived.”

Then they read an article about Kaiba Gionfriddo, another baby with tracheobronchomalacia. Kaiba’s condition greatly improved after a custom-made splint was developed and inserted into his airway at U-M C.S. Mott Children’s Hospital.

Kaiba’s surgery was the first time a custom bioresorbable splint was created and implanted to open airways. Scott Hollister, Ph.D., professor of biomedical engineering and mechanical engineering and associate professor of surgery at U-M, and his team used a 3D laser printer to create splints composed of a biopolymer that would eventually be absorbed by Garrett’s body.

As the Petersons weighed the potential benefits of another major surgery for their son, their baby acquired a virus and his condition deteriorated. Doctors in Utah said that there was nothing else they could do.

The Petersons were unwilling to give up and contacted Dr. Green again. After reviewing Garrett’s scans, Dr. Green told them that he could get Garrett off the ventilator so they could take him home. “He was so confident without sugar-coating,” Mrs. Peterson remembers.

Six days later they were on a survival flight to Michigan. “We were floored with the hospital and staff because it was such an amazing hospital. It was the next level of care at U-M. Everyone was so kind to us and genuinely cared about Garrett,” says Mrs. Peterson.

During the next two weeks, high-resolution scans of Garrett’s airways and computer-aided design were used to create 3D models of his airways and the tiny splints that would be inserted to keep them open. Scott Hollister, Ph.D., professor of biomedical engineering and mechanical engineering and associate professor of surgery at U-M, and his team used a 3D laser printer to create splints composed of a biopolymer that would eventually be absorbed by Garrett’s body.

(continued on next page)
“To actually build something that a surgeon can use to save a person’s life? It’s a tremendous feeling,” says Dr. Hollister.

Emergency clearance was obtained from the Food and Drug Administration to implant the splints. Garrett’s surgery was performed on January 31, 2014 by Richard Ohye, M.D., head of pediatric cardiovascular surgery at C.S. Mott, assisted by Dr. Green. The splints were sewn around the airways to expand the trachea and bronchus and provide a skeleton to aid proper growth.

“The operation lasted more than eight hours and every hour of the surgery they would update us. They were smiling so you could tell it was going great. Garrett is now doing great with only half the ventilator support he had before his surgery,” notes Mrs. Peterson.

Since returning home last year, Garrett, now three years old, uses a ventilator only when he sleeps and is gradually being weaned from it. The Petersons hope the tracheotomy tube can be removed in another year or two. Physical and occupational therapists are helping Garrett catch up physically after spending so much time in the hospital.

“He went from hardly any quality of life to a full quality of life. He is a fun little boy and before this we didn’t get to see his full personality because of the medications,” Mrs. Peterson adds.

“Severe tracheobronchomalacia is a condition that has frustrated me for years,” says Dr. Green. “I’ve seen children die from it. To see this device work, for a second time, it’s a major accomplishment and offers hope for these children.”

A third baby, Ian Orbich, received a bioresorbable splint at C.S. Mott in April 2014. Follow-up research published in the April 2015 issue of *Science Translational Medicine* indicates that Kaiba, Garrett and Ian are doing well and able to breathe on their own without a ventilator or special medications.

Green and Hollister have applied for a patent for the 3D-printed splint. They have already used the image-based design and 3D-biomaterial printing process to build and test ear and nose structures in pre-clinical models.

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3D-Printed Splints Offer New Life for Babies: *UMHS Develops the First Treatment for Severe Tracheobronchomalacia (continued)*

Above Left: Jake and Natalie Peterson, Glenn Green, M.D. holding Garrett, Richard Ohye, M.D., and Scott Hollister, Ph.D.

Lower Left: Laura Wetzel, CRNA and Kaiba Gionfriddo

Immediate Left: Ian Orbich
Brain cells and heart muscle are irreplaceable. When damaged by illness or accident, permanent impairment usually results.

Even minutes of delayed treatment can have a negative long-term impact. Now, patients’ long-term outcomes can be improved with a new, advanced approach to emergency critical care.

The Joyce and Don Massey Emergency Critical Care Center [Massey EC3] treats emergency patients with stroke, cardiac arrest, traumatic brain injury (TBI) and other serious conditions.

It is the first such center in the country.

A family tragedy inspired the Masseys’ interest in critical care. In 1983 Joyce Massey suffered a traumatic brain injury [TBI] and was seriously impaired for the remainder of her life.

Her husband, Don Massey, owner of a network of auto dealerships, and their daughter, Brenda, president of their family foundation, recently donated funds for TBI clinical research and technology innovation.

Massey EC3, named in their honor, is a focal point for developing new emergency diagnostic tools and treatments for TBI and other illnesses.

“Every time a patient with a serious TBI enters our emergency department, or flies in our helicopters, we do all we can in those first critical hours to prevent as much lasting damage as possible. Through research and advances in care, fueled by the Massey gift, we can improve the odds of patients here and around the world,” says Robert Neumar, M.D., Ph.D., chair of the U-M Medical School’s department of emergency medicine.

With this level of care, some patients with a TBI, sepsis, hemorrhage, overdose or acute lung injury may be able to get through their health crises without needing an intensive care unit (ICU) bed. This is advantageous for patients and helps alleviate the high demand for U-M ICU care.

“Working in the Emergency Critical Care Center, I feel like we are more a part of the long-term healing process,” says Colleen May, R.N. “There is not a shift ...that goes by without learning something new or seeing something I haven’t seen before. It is very exciting to be a part of something that you feel hasn’t been done before, and even more exciting when you can see that it is working and making a difference in people’s lives,” adds May.

“Massey EC3 will help U-M meet a growing demand for emergency critical care, which has risen 24 percent in five years.
Stan Larkin never wanted to be first. He just wanted to be his old self. Yet on December 23, 2014, he became the first person to leave a Michigan hospital — the Frankel Cardiovascular Center (CVC) at the University of Michigan — with a completely artificial heart.

Larkin, 24, of Ypsilanti, Michigan, has familial cardiomyopathy, an inherited heart condition. His health was deteriorating while he waited for a suitable donor heart.

His doctors were concerned about his survival until transplant. They recommended replacing his failing heart with a temporary artificial organ. Stan was evaluated and judged to be an appropriate candidate for this life-changing event.

Kevin Knott, a physician’s assistant in the Center for Circulatory Support/Artificial Heart Unit of the CVC, had the task of explaining the artificial heart option to Stan. “When you first talk to patients, it seems like science fiction,” he says.

Elizabeth Murphy, R.N., B.S.N., clinical care coordinator, Adult Cardiac Surgery, helped Stan Larkin with insurance and other practical requirements before his surgery on November 7, 2014.

“Most patients get the left ventricular assistive device since the right side still works, but Stan was unique as he had right-sided heart failure too,” she explains.

Stan’s experience was unusual in another way. He was hospitalized at the same time as his brother, Dominque Larkin, who also was waiting for a donor heart. Dominque was matched with a heart donation and underwent heart transplant surgery on December 14, 2014 at U-M’s Frankel Cardiovascular Center.

Both brothers have familial cardiomyopathy that was diagnosed after Stan collapsed at a basketball game in 2007. His brother was then found to have a similar life-threatening heart condition.

Stan had right ventricular dysplasia. An implanted defibrillator helped to regulate his heart rhythm for a period of time. However, his condition worsened so that neither heart chamber could collect and pump blood effectively.

(continued on next page)
On November 7, 2014, Stan’s failing heart was replaced with a SynCardia temporary artificial heart. He was then connected to a machine that delivers compressed air into his ventricles so blood can be pumped throughout his body. This 418-pound machine — dubbed “Big Blue” by hospital staff — was effective but meant that he had to remain in the hospital.

Then his doctors suggested a groundbreaking innovation — switching him to the Freedom® portable driver, a newer, portable device to pump his blood. The Freedom® portable driver is stored in a backpack so the patient is no longer tethered to a hospital bed.

Living with the Freedom® portable driver outside the hospital requires a highly motivated, strong patient who can take on the required self-care. The device’s lithium batteries have to be recharged often and its plastic tubing needs to be maintained.

“The patient needs to follow a special low-sodium diet, take medications and report any symptoms. We were worried that there might be problems but Stan has been fastidious. He’s pretty good at self-care and his family helps him. He hasn’t been re-hospitalized, which is a good sign,” Knott says.

Stan was the first U-M patient to receive the Freedom® portable driver.

A few days before Christmas 2014, Stan left the hospital with an artificial heart and a very special backpack. “It was a stressful situation but after I got it, I felt so much better. I can honestly say I’ve gotten used to it. This is what’s keeping me going. I can’t wait to get a heart transplant so I can truly feel like myself again,” he says.

The multi-disciplinary team at the U-M Center for Circulatory Support has implanted more than 500 devices for patients with advanced heart failure. The team has tested most of the implantable circulatory support devices currently being used.
Movement Helps ICU Patients Heal Faster

Intensive care unit (ICU) patients spend most or all of their time in bed. Their fragile medical conditions and connections to vital equipment discourage mobility.

“I was always interested in how to get ICU patients moving. I read that movement could improve blood flow and I wondered if that could reduce skin breakdown,” says Sharon Dickinson, M.S.N., R.N., clinical nurse specialist for the U-M Surgical ICU and Rapid Response Team.

ICU patients are prone to skin breakdown or pressure ulcers, which can become painful and difficult to treat. Pressure ulcers result from constant rubbing or pressure against the skin. “Skin fails like every other organ of the body,” explains Dickinson.

Dickinson, along with two ICU nursing colleagues, developed a protocol to enhance mobility for ICU patients. The first step was a process to determine the degree of movement that patients can handle. Multiple mobility levels were created with the most basic level covering patients who can manage only assisted range-of-motion movements in bed. The most mobile individuals are those who can walk on their own, sometimes with a cane or other device.

ICU physicians, patient care technicians and patients’ family members were brought into the process once implementation began. “We did a big initiative with families. When you have family involvement, you get greater mobility. We had their full support,” says Dickinson.

“We were walking patients on ventilators and patients who were on continuous renal dialysis. Patients have a better sense of well-being if they can get out of bed,” she says.

Two groups of ICU patients — one a control group and the other participants in the mobility protocol — were compared on a number of measures. While the incidence of pressure ulcers was not lower for the group that was more mobile, the time period before onset of a pressure ulcer was longer.

Other improvements are encouraging. During the protocol testing, patients who were mobilized were able to get off of breathing machines sooner and were discharged earlier.

The mobility protocol has been expanded to the Trauma/Burn ICU with “very good outcomes,” says Dickinson. It is also being introduced in the step-down unit and some general patient care units.

Results of their work have been published in Critical Care Nurse Quarterly. [Dickinson, S., Tschannen, D., Shever, L. (2013) Can the Use of an Early Mobility Program Reduce the Incidence of Pressure Ulcers in the Surgical Critical Care Unit? Critical Care Nurse Quarterly 29(1)127-40.]

“Patients have a better sense of well-being if they can get out of bed.”
The University of Michigan began educating physicians in 1850 and nurses in 1891. A leader early on, in 1869 U-M became the first university in the country to establish a hospital for training students. Both the Medical School and School of Nursing prepare students to be outstanding clinicians, teachers and scientists who will lead improvements in health care. (continued on next page)
Making a Great Medical School Better

Technological advances, new forms of health care delivery and financial restructuring are transforming health care dramatically. As health care evolves, medical education is revamping to develop physicians with new skills and adaptability to change.

In 2013, U-M was one of 11 medical schools chosen for an American Medical Association grant to redesign its curriculum. More than 300 faculty members and students, led by Rajesh S. Mangrulkar, M.D., associate dean of medical student education and associate professor of internal medicine and learning health sciences, devoted two years to the curriculum transformation.

“We need to bring medical education into the 21st century, where data-driven, team-based health care — grounded in science and quality, and informed by ethical, social and patient-centric factors — is the norm,” says Dr. Mangrulkar.

The architecture of the new curriculum, he explains, is connecting science to patients throughout all phases, deepening the skill sets of learners, promoting flexibility, and facilitating a new core of medical education — an enhanced vision for the graduate of the University of Michigan Medical School. The challenge is to be forward-thinking and envision what medicine will be like when the first graduates of the new program enter the “sweet spot” of their careers in 15 to 20 years, explains Dr. Mangrulkar.

The new curriculum, introduced in the fall of 2015, emphasizes:

- integration of clinical and scientific training
- leadership and communication skills for working as a team
- paths of excellence for specialized knowledge
- creation of the M-Home small group learning community

Nursing Curriculum Integrates Practice and Research to Enhance Education and Patient Care

The Clinical Excellence Initiative (CEI) is an exciting new partnership between the School of Nursing and U-M Health System. “We have embedded nursing faculty within patient care units to enhance clinical education for students and nursing staff. Together they are undertaking evidence-based improvement projects that benefit patients and families,” explains Margaret Calarco, Ph.D., R.N., chief of nursing services.

“We are very pleased that the CEI has already brought about improvements in many nurse-sensitive patient outcomes, such as pressure ulcer reduction and readmission rates. These results have been reported in clinical publications and scholarly presentations,” comments Kathleen Potempa, Ph.D., R.N., dean of the School of Nursing.
Improving Health Worldwide

The University of Michigan Health System is committed to improving global health with extensive collaborative programs through the University’s Global REACH program. Both the Medical School and the School of Nursing, along with other U-M schools, are actively engaged with colleagues abroad to enhance education, patient care and research.

U-M students and faculty bring the resources of a great academic health system to underserved communities across the globe. In turn, both students and faculty gain important experience in global health issues and diseases that are rarely seen in the United States.

Nursing students, researchers and faculty are clinical and academic partners of universities, hospitals and government agencies in 20 countries. This robust global program encompasses the exchange of scholars, joint research and overseas clinical immersion for students.

The U-M School of Nursing is a Pan-American Health Collaborating Center for Research and Clinical Training in Health Promotion—one of only ten American centers designated by the World Health Organization (WHO).

At the Medical School, one-third of fourth-year students take an international clinical elective; 295 medical students work in more than 50 countries. The University has especially strong medical ties to Ghana and Ethiopia; ties that are expanding since the launch of the Center for International Reproductive Health Training (CIRHT) in Ethiopia.

CIRHT is helping to integrate reproductive medical training into medical curricula at nine Ethiopian medical schools. Doctors, nurses and midwives are learning ways to improve women’s health and reduce Ethiopia’s very high maternal mortality rate.

“I saw women dying from preventable deaths too often in my country,” says Lia Tadesse, M.D., M.H.A., executive director of CIRHT. “I knew I had to get involved with efforts to help stop this.”

“I am honored by the opportunity to lead a center that will play a critical role in saving lives and empowering women. Women are the anchors of their families and communities. Stronger, healthier women lead to more stable families and, ultimately, to a more productive country.”
Changes in the physical learning environment are also improving medical education. While lecture halls, libraries and labs are still commonly used fixtures for U-M medical and nursing students, such traditional learning spaces are being reconfigured for 21st century realities.

Collaborative, interactive learning spaces equipped with state-of-the-art technology are essential to prepare physicians and nurses for the future. Design of U-M’s recently completed instructional facilities reflect new ways to learn, treat patients and work in multidisciplinary teams. The A. Alfred Taubman Health Sciences Library re-opened during the late summer of 2015 after an 18-month, $55 million renovation and expansion from a traditional book repository to a modern instructional center. Now a medical education hub, the Taubman library features light-filled, technology-driven classrooms, team break-out areas, simulation units to learn patient-interaction skills, and teleconferencing capabilities. The library’s print collection is now stored off-campus.

The School of Nursing opened a new instructional building in 2015. This new center enriches learning through state-of-the-art anatomy and skills labs, high-fidelity manikins to simulate patients, and patient suites for interactive learning. Classrooms with the latest learning technology are designed to encourage student engagement and discourse.

“They now have what it takes to become leading nursing scientists, educators and paradigm changers,” says Kathleen Potempa, Ph.D., R.N., dean of the School of Nursing.
The University of Michigan Health System is a national research leader based on many measures, such as the scope and quality of its investigations and the size of its research portfolio. In FY 2015, sponsored research revenues reached $417.6 million, an increase of 2.7 percent, despite a competitive funding environment. More than 526 clinical trials sponsored by industry are underway at U-M hospitals and clinics, giving patients access to the latest innovations and providing independent testing of future treatments.

The Fast Forward Medical Innovation program was launched in 2014 to accelerate the movement of discoveries from the university to the marketplace and bedside.

### Medical Innovation at UMHS

<table>
<thead>
<tr>
<th>Examples of Medical Discovery</th>
<th>FY 2015</th>
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<tr>
<td>New inventions</td>
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<tr>
<td>New startup companies</td>
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</tr>
</tbody>
</table>

“The research we do at this Medical School has an incredible potential to help patients in the near and long term. We’re working to unleash more of that potential than ever before.”

—KEVIN WARD, M.D., EXECUTIVE DIRECTOR, FAST FORWARD MEDICAL INNOVATION
Scientists Build a Gut to Understand the Microorganisms that Affect Our Body

One example of research that holds promise for future treatments is the investigation of the human microbiome — a community of microorganisms that live in our gut and interact in complex ways with both positive and negative consequences.

U-M scientists are studying Clostridium difficile, or C. difficile, which can cause serious intestinal symptoms and life-threatening disease in people, often when they are in a nursing home or hospital — and after taking antibiotics. By introducing spores of antibiotics into animals’ mouths, researchers found that the spores quickly changed into cells that disrupted the gut microbiome, moving into the large intestine with toxic effects on cells lining the gut.

“If we can understand the process that specific bacteria use to germinate and get established, we may be able to intervene more effectively,” explains Vincent Young, M.D., Ph.D., senior author of this study. (Study results were published in the journal *Infection and Immunity*.) Young is an associate professor, internal medicine-infectious diseases at U-M Medical School and co-leader of the school’s Host Microbiome Initiative.

Another team of U-M scientists is using stem cells to grow tiny “guts in a dish” in order to study how disease-causing bacteria and viruses affect the gut’s ecosystem. A five-year, $6.4-million federal grant will allow the researchers to expand development of human intestinal organoids, known as HIOs.

HIOs are tiny hollow spheres of cells that can be injected with a mix of bacteria. The team will study the interaction between HIOs and the normal gut microbiome as well as disease-causing pathogens.

“Eventually we want this to be a model for anyone to use, one that can be scaled up to create large arrays of HIOs for high throughput uses such as drug screening,” says Dr. Young.

Clinical Study Shows that New Prostate Cancer Detection Surpasses the PSA

The Mi-Prostate Score, or MiPS, is a prostate cancer detection test developed at U-M, that combines the PSA (prostate specific antigen) test with two biomarkers for prostate cancer — T2:ERT and PCA3 — that are found in urine. The test has been available for clinical use since 2013 and is licensed to Hologic.

To gauge the comparative effectiveness of MiPS, 1,977 men who were undergoing prostate biopsy because of elevated PSA levels were given the MiPS test. Researchers assessed how well the individual biomarkers and combinations of biomarkers predicted the likelihood of cancer and of aggressive cancer that requires immediate treatment. Results showed that the MiPS test improved prostate cancer detection compared to the PSA.

“Around 50 percent of men who undergo a prostate biopsy will not have cancer. We need better ways to manage elevated PSA and determine who really needs to have a biopsy. MiPS gives men and their doctors better information to help make those decisions,” comments lead study author Scott A. Tomlins, M.D., Ph.D., assistant professor of pathology and urology at the U-M Medical School.

Development of the Mi-Prostate Score is part of broader efforts at U-M to improve prostate cancer diagnosis, particularly in detecting the type of cancer that requires immediate and aggressive treatment.
Since 2013, U-M researchers who study how health care is delivered, paid for and regulated in America have been organized under the umbrella of the Institute for Healthcare Policy and Innovation (IHPI). The institute’s director, John Z. Ayanian, M.D., M.P.P., reflects on what IHPI has achieved so far.

**What is the purpose of the Institute for Healthcare Policy and Innovation and how does it fit into the overall U-M Health System mission?**

IHPI was formed due to a groundswell of interest from health services researchers on our faculty at the university, who sought a new way to connect, collaborate and share resources. The IHPI was created as a new University-wide institute to help improve the quality, safety, equity and affordability of health care. Many of our members also have clinical roles as physicians, nurses or dentists at U-M or the Ann Arbor VA hospital.

IHPI fits closely with one of the U-M Health System goals to be a national leader in discovering new ways to improve health care and to contribute to health care reform.

**How many individuals are members/participants?**

We currently have nearly 470 faculty who are IHPI members. Many of them have staff and trainees who work with them on their research. About 60 percent of our members hold faculty positions at the Medical School with the remaining members coming from 16 schools, colleges and institutes across all three U-M campuses.

**How is IHPI organized?**

Our members all belong to IHPI while keeping their faculty positions in their home unit. Many belong to sub-groups of researchers focused on health care research on a particular topic, such as children’s health, surgery or mental health. IHPI provides services to them, including access to large troves of health care data that the Institute purchases and shares.

IHPI organizes academic events such as seminars and training in research methods. The Institute offers communication and government relations support in promoting members’ work to leaders in the public and private sectors. And we bring together interdisciplinary groups of researchers and staff to work on new collaborative projects.

**What are some of its current focus areas?**

We focus our institute-level work on studying the health of communities, the impact of health care reform, value for health care spending, and health care innovation. We especially care about issues related to children in poverty and in older adults, the affordability and safety of care, and the health disparities and uneven quality of care that affect many Americans.

**How is the Institute helping to evaluate Michigan’s Medicaid expansion through the Healthy Michigan Plan?**

In mid-2014, we were awarded the state contract to evaluate the Healthy Michigan Plan. This is an innovative insurance option for poor and near-poor adults that now covers more than 600,000 Michiganders. This option has many features that may interest other states as they consider expanding Medicaid under the Affordable Care Act.

The federal agency that approved the Healthy Michigan Plan specifically requires a robust evaluation of its impact. We’re pleased to have been selected by the Michigan Department of Health and Human Services to carry out this work.
UM Care Extends to Diverse Communities

The excellence of U-M care extends far beyond its facilities. University physicians and nurses work at hospitals throughout Michigan, in community-based clinics and overseas. By bringing world-class care to populations which otherwise might not have access, U-M clinicians are saving lives far beyond state borders.

U-M Health System has affiliations with several Michigan health systems, including MidMichigan Health, based in Midland. U-M physicians conduct clinics at MidMichigan facilities in gynecologic oncology, heart failure and other specialized areas of need. The affiliation provides enhanced care for MidMichigan patients, educational opportunities for their physicians, and the marketing advantage of co-branding with the university. U-M also assists MidMichigan Health with physician recruitment.

In Washtenaw County, Michigan, U-M participates in many nonprofit and government programs to advance population health and community wellbeing. Clinical staff members particularly value their volunteer work for the nonprofit Hope Clinic, based in Ypsilanti. U-M Health System providers have volunteered at this clinic since 1997, caring for uninsured and underinsured adults.

Jill Fenske, M.D., clinical assistant professor of family medicine, volunteers at the clinic regularly, serves on its board and organized a residents’ community medicine clinic at Hope. "There is a lot of gap care for people who don’t qualify for insurance under the Affordable Care Act or Medicaid — or have high-deductible, catastrophic health plans. We stabilize their conditions and social workers help them apply for insurance," she explains.

In 2010, U-M otolaryngologists established a specialty clinic (held quarterly at the U-M Taubman Center) for patients whose diagnosis and treatment can’t be handled at the Hope facility. The dermatology and plastic surgery departments have since joined this effort.

“We have 10 to 15 patients come for procedures such as removal of lesions or skin cancer using local anesthesia. It’s hard to get this kind of care for these patients. Afterwards they go back to Hope unless there is a problem,” says Paul Cederna, M.D., professor of surgery.

“It is good for us to appreciate the difficulties of patients who are uninsured and underinsured. There isn’t any other venue where plastics, otolaryngology and dermatology work so closely together. It is amazing not only for the patients, but also for the doctors to learn from working with each other so closely,” adds Kelly Cha, M.D., assistant professor of dermatology.

In 2011, Paula Anne Newman-Casey, M.D., clinical lecturer of ophthalmology, helped set up an ophthalmology clinic held five times a year at the Kellogg Eye Center. “We can’t provide some services at Hope without our equipment. When we started the clinic there was a backlog of several hundred patients but we cleared that out within a year. We see 40 to 60 patients each time,” says Dr. Newman-Casey.

When patients need more extensive treatment or surgery, volunteer patient financial coordinators help them apply for M-Support, UM’s special financial program for uninsured patients.

Finding volunteers to staff the Hope specialty clinics is easy. A broad range of nurses, physicians, students, technicians and nonmedical staff quickly sign up for each scheduled weekend clinic.

“This is a very appreciative community and meets an important need,” says Andrew Birkeland, M.D., a fourth-year otolaryngology resident.
U-M Health System is a diverse community of 26,000 faculty, staff, students, trainees and volunteers from all over the world. Patient care is impacted by 3,160 physicians and faculty members, nearly 5,000 nurses, and many other health professionals and additional staff in Ann Arbor and other Michigan locations. U-M operates 3 hospitals—with 1,059 pediatric, adult and psychiatric beds and 40 outpatient facilities. 2015 was a year of award-winning achievements and growth throughout the U-M medical center.

An Operational Overview of the University of Michigan Health System

Growth in Patient Care
More than 113,000 adjusted discharges — a 6.6 percent increase year-to-year
Inpatient discharges increased 2.7 percent and clinic visits grew 6.6 percent compared to FY 2014.

Selected Clinical Activity Data

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<thead>
<tr>
<th>Clinical activity</th>
<th>FY 2015</th>
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<tr>
<td>Outpatient visits</td>
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<tr>
<td>Inpatient discharges</td>
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<td>Emergency/urgent care services</td>
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<tr>
<td>Surgeries</td>
<td>52,246</td>
<td>51,583</td>
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Facility Expansion to Better Serve Patients
A new 100,000 square-foot ambulatory care facility opened in Northville, Michigan in July 2014. This new facility provides primary and specialty care, as well as a musculoskeletal program, radiology services and infusion treatment.

In February 2015, the innovative Massey Emergency Critical Care Center opened with five resuscitation/trauma bays and nine patient rooms providing an ICU-level environment for initial care. (See p. 6 for more about the advanced care at the Massey Center.)

Research Expansion
Research funded by all external sources reached $417.6 million during FY 2015, an increase of 2.7 percent above the previous year. (See p. 14 for highlights of several research initiatives that are achieving amazing discoveries in health care and science.)

A Positive Financial Position
Positive 2015 year-end results reflected system growth as well as a continuing focus on improving cost-effectiveness.

Financial Data (Dollar amounts in thousands)

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<thead>
<tr>
<th></th>
<th>FY 2015</th>
<th>FY 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating revenues</td>
<td>$3,900,000</td>
<td>$3,600,000</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>$4,000,000</td>
<td>$3,800,000</td>
</tr>
<tr>
<td>Non-Operating income</td>
<td>$85,400</td>
<td>$126,700</td>
</tr>
<tr>
<td>Cash Flow Margin</td>
<td>6.9%</td>
<td>5.4%</td>
</tr>
</tbody>
</table>

Strong Philanthropic Support
Generous supporters of the Victors for Michigan campaign, launched in 2014, provided $70.9 million of recognized gift revenue for U-M Health System in 2015.
Executive Officers of the University of Michigan Health System – 2015

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