

# INOVA

JOIN THE FUTURE OF HEALTH

MAGAZINE

## One in a Million

**Inova's cardiogenic shock team and ECMO program are two reasons John Harrity is alive today**



spring 2018

**Childhood obesity — Is it nature or nurture?**

**Inova's latest partnerships advance new healthcare technologies**

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**Inova Magazine** is published several times a year to advance and promote Inova's mission: to improve the health of the diverse community it serves through excellence in patient care, education and research. Inova is a pioneer in the field of medicine, exploring the science of genomics and leading the way in the new era of predictive medicine.

# Currents

HEALTHCARE NEWS IN SMALL DOSES



*Inova's first accelerator partner is HeMemics Biotechnologies Inc. Among the company's products is the HemBox, a quick diagnostic test for infectious diseases. Just how fast is the test? It takes only 15 seconds to activate the chip and less than a second to detect bacteria. This portable device can be used at the bedside or in the physician's office.*

## Accelerating Innovation

### **Inova grows tech companies to speed benefits to patients**

**H**eMemics Biotechnologies Inc., located in Rockville, Maryland, develops rapid diagnostic test platforms to diagnose various bacterial and viral pathogens. That is not its only claim to fame. It recently became the first company to join the Inova Personalized Health Accelerator (IPHA), a program that encourages emerging healthcare companies to develop and produce technology that advances personalized health.

"We've been largely a research and development group," explains John Warden, COO of HeMemics. "Now our goal is to commercialize [our test], and we really needed help to make this happen."

Enter IPHA, which opened in September. It is on track to support four to six companies a year that are pursuing discoveries in analytics, devices and services. Companies accepted into IPHA,

such as HeMemics, benefit from research and development capital, education, clinical validation and mentorship.

HeMemics is working on a test that can detect specific bacteria in 15 seconds, which would allow physicians to make informed prescription choices much more quickly than when they have to wait days for test results. Warden points out that IPHA not only gave the company capital so work could continue, it provided HeMemics with access to clinics to test its product and refine its tools for clinical use. "It's one thing to develop a technology," Warden says. "It's another thing to put all the buttons in the right place, have the screen display correctly and have it the right size so people feel comfortable using it."

Peter Jobse, Managing Director of the program, is excited about the benefits IPHA will bring to the

community, from higher education to entrepreneurial opportunities. "We've had conversations with George Mason [University] and University of Virginia," he says. "A number of schools are interested in seeing how some of their advanced degree programs could feed into the process of creating an entrepreneurial environment."

And developing a product that healthcare can benefit from in the region and beyond is the accelerator's ultimate goal. "We're very excited about the prospects of what these new companies can deliver not only to the community that Inova serves, but the healthcare services community from a global basis," Jobse says. **INNOVA**



**Learn more about the Inova Personalized Health**

**Accelerator at [inovapha.org](http://inovapha.org). Find out more about Peter Jobse's thoughts on tech trends in "Conversations" on page 13.**

# Pharmaceutical Breakthrough



*Inova CEO J. Stephen Jones, MD, FACS*

## New Inova CEO Takes Helm

J. Stephen Jones, MD, FACS, the former President of Cleveland Clinic Regional Hospital and Health Centers, has taken the reins of Inova as its new CEO. He succeeds Knox Singleton, who announced his retirement last September.

“I am so impressed by the organization,” says Dr. Jones, who assumed responsibilities in April. “All of the pieces are in place for Inova to be the premier health system on the eastern seaboard. Key to achieving this will be to build upon the strong research and academic programs already in place that help us attract top physicians.”

Dr. Jones, who became President of Cleveland Clinic’s regional hospitals in late 2014, led a strategic transformation that improved quality and safety metrics, expanded the healthcare system, increased the use of telemedicine, established 24 Express Care locations for patient-oriented primary care and rebranded all hospitals under the Cleveland Clinic brand.

“By every measure, Stephen is a great choice for Inova,” says Singleton, who served as Inova’s CEO for 35 years. “In addition to his record in clinical leadership and his experience in health-care operations, he also has been a successful leader of medical education and translational research. I look forward to supporting him as he transitions into his new role here at Inova.”

Under Singleton’s leadership, the number of Inova hospitals grew from three to five, the health system added an insurance arm, and the employee roster soared from 1,000 to 17,000. One of his key legacies is the development of the Inova Center for Personalized Health — a genomics hub — that will be built on a 117-acre campus that was previously occupied by Exxon Mobil. Inova announced plans for this in 2015. **INOVA**

## Inova Center for Drug Discovery opens

**T**he new Director of the Inova Center for Drug Discovery, which opened in February, is driven to develop medicines to help people fight diseases such as cancer.

“I have a passion to find new medicines,” explains Milton Brown, MD, PhD, who holds a doctorate in synthetic chemistry. “It’s been a lifelong passion, as reflected in my training and in my history of being involved in drug discovery and development. Illnesses may have not touched you directly, but they have definitely touched someone in your family, and knowing those types of problems exist — that fuels my passion to find more therapies.”

Inova’s new center will differ from other drug-development companies in part because Inova’s drug targets will not be market-driven. “We’re not working on things just based on market finds,” Dr. Brown says. “We work on our own projects based on the impact that we can have on bringing that project to the clinical area.” This may mean working on drugs that will help fewer than 1,000 patients a year, for example, he adds.

Dr. Brown, who came to Inova last year after serving as the founding director of the Drug Discovery Program at Georgetown University, has worked on medications to treat breast cancer, hypertension, seizures and more, and several drugs are now in clinical testing.

The long-term goals for the center include securing national funding from the National Institutes of Health (NIH) and completing investigational new drug-enabling studies, which would allow the researchers to move ahead to human testing. Another goal is to work with the community to be part of the process and to help raise funds for the clinical trials. **INOVA**

## Targeted Funding

Thanks to generous gifts from Tony and Annette Nader, and Phil and Marge Odeen, the new Inova Center for Drug Discovery will be able to unlock targeted therapies.

Tony and Annette gave \$2 million to support a “wonderful healthcare system in our own backyard,” says Tony, Chairman of the Inova Health System Board of Trustees.

All three of the Naders’ children were born at Inova Fair Oaks Hospital, and it’s where Annette was successfully treated for noninvasive breast cancer. “Coming off that experience and then being given this opportunity to help Inova develop targeted therapeutic drugs — that immediately caught our interest,” Annette explains.

Likewise, Phil and Marge Odeen, who also gave \$2 million, long have been involved with Inova — as patients, benefactors and board members. The couple also has several close friends newly diagnosed with cancer. “We feel strongly about finding highly targeted treatments for cancer, which drew us to Inova’s work in genomics. It’s exciting and rewarding to see what Inova is accomplishing,” Phil says.

For more information on how philanthropy can make a difference at Inova, please contact the Inova Health Foundation at **703.289.2072** or at [foundation@inova.org](mailto:foundation@inova.org).



Seema Wadhwa, Inova Assistant Vice President, Sustainability and Wellness, shows the Inova Well program graphic, which depicts the many facets of wellness.

# A New Kind of Gym

**Inova Center for Healthy Living focuses on lifestyle to keep people well**

**T**he Inova Center for Healthy Living in Fairfax is not like a commercial health club. And that's part of its appeal.

The new center, which is scheduled to open in the fall at the Inova Center for Personalized Health, will offer a personal touch you cannot find in a more traditional fitness or wellness setting, explains Seema Wadhwa, Assistant Vice President of Sustainability and Wellness at Inova. "What we'll be able to provide is the staff and the expertise to help monitor a person through their wellness," Wadhwa says. "Let's say you have a cardiac incident. You have your medical treatment, and then you have some rehabilitation that's covered through your insurance. After that, you're free to go to a gym, but most people may not have that sense of comfort going to a typical brick and mortar gym. That's where we can help."

The Inova Center for Healthy Living will offer medically based physical fitness programs, along with sports medicine professionals and on-site dietitians, and more traditional health and wellness classes tied to Inova Well, Inova's health and wellness program.

People often want to work on improving their health but may not know how to go about it, Wadhwa says. "We are now providing people with a place to do this." **INOVA**

## 360° View

The center's services focus on five key wellness areas that concentrate on body awareness:

- 1 getting active
- 2 eating well
- 3 encouraging a healthy mind
- 4 health coaching
- 5 living green

**&** For more information about the Inova Center for Healthy Living, visit [inova.org/well](http://inova.org/well).

Photo: Mike Morgan

## Healthy Living and the Earth's Sustainability

Here are a few ways to promote sustainability, according to Seema Wadhwa, Assistant Vice President of Sustainability and Wellness at Inova.



### Go Local

Processed foods are convenient, but the environment and our health are paying a high price for our dependence on these foods. Reducing our consumption of processed foods and eating locally grown products are not only healthier options, but they also decrease the need for fuel to transport the food, and the use of chemicals to process and package them.



### Power Yourself

Walking or riding bicycles to get from point A to point B may not always be feasible, but when possible, using your own muscle power to get around not only helps increase your exercise level, it also helps the environment. Fewer cars on the road reduces smog in the air. Smog can cause or worsen lung, heart and neurological diseases, and it affects overall quality of life.



### Limit Waste

By limiting the amount of waste we generate, we cut down on the amount of garbage in the landfills, and we also reduce the toxins that escape into the environment and the amount of fuel used to transport the waste.

Learn more about what Inova is doing to improve the environment at [inova.org/sustainability](http://inova.org/sustainability).



*The Inova Virts Family Emergency and Trauma Center, which is now open, includes several new private treatment bays, three larger operating rooms and a remodeled nurses station.*

## Families Invest in Critical Care

Positive personal experiences at Inova Loudoun Hospital (ILH) have inspired many Loudoun community residents to give back.

“My brother and sister-in-law both suffered heart attacks and were treated at Inova Fairfax Hospital,” Fred Schaufeld recalls. “We saw an overwhelming need for regional cardiac care in our own community.”

This experience more than a decade ago led to a gift of \$1 million, which resulted in the naming of the Schaufeld Family Heart Center at ILH. A decade later, Fred, his wife, Karen, and Fred’s sister-in-law, Bobbi Schaufeld, stepped forward with a generous gift of \$5 million. This donation will help fuel the next stage of growth for the Inova Heart and Vascular Institute (IHVI) – Schaufeld Family Heart Center.

Similarly, after Sharon Virts’ brother, Kevin, was rushed to the ILH Cornwall Campus Emergency Room (ER) with a brain aneurysm, Sharon and her husband, Scott Miller, decided to give ILH \$2 million. This gift supported the growth of the hospital’s ER and helped create the Inova Virts Miller Family Emergency and Trauma Center, Loudoun County’s only Level III trauma center.

Gifts from the Schaufelds, and Sharon Virts and Scott Miller helped to kick-start the \$20 million “Loudoun Rising” fundraising campaign. Sharon and Scott have since given a \$2 million gift to support the growth of the trauma program, \$1 million of which is in the form of a matching gift to the campaign.

*To contribute to Sharon Virts and Scott Miller’s matching gift, contact Suzy Quinn, Executive Director, Inova Loudoun Hospital Foundation, at 703.858.8803 or at [suzy.quinn@inova.org](mailto:suzy.quinn@inova.org).*

# Anticipating Needs

## ***Inova Loudoun Hospital grows with its community***

**L**oudoun County has welcomed 73,609 new residents, a 23.6 percent increase, since 2010, according to the 2017 U.S. Census figures. This helps to seal Loudoun County’s status as Virginia’s fastest-growing county.

In response to the rapid growth, Inova Loudoun Hospital (ILH) has broadened its services. Case in point: the ILH Inova Virts Miller Family Emergency and Trauma Center, which is Loudoun County’s only trauma center with a Level III designation. This achievement follows a \$5 million emergency room renovation and expansion, and gives the community round-the-clock access to advanced medical attention for life’s most serious injuries and illnesses.

“Inova promised Loudoun County that we would bring increased levels of care to the community. Offering this high degree of trauma care so close to home and from an exceptional team of emergency-trained physicians, nurses and surgeons is another step in our commitment to fulfill that promise,” says Deborah Addo, Senior Vice President, Inova, and CEO, ILH.

There have been other major developments at ILH. In March, ILH’s Inova Schar Cancer Institute – Peterson Family Breast Center opened its doors. The comprehensive breast center

brings together subspecialized physicians and clinicians who are dedicated to excellence in breast care, from screening and diagnosis to clinical trials and genomics. Services include comprehensive breast imaging; breast navigation, genetic counseling and Life with Cancer®, a free Inova program that helps patients meet the challenges of living with cancer. The Peterson Family Breast Center was made possible through the generous support of the Peterson Family Foundation.

Meanwhile, the new patient tower is on track for completion in 2020. The 385,000-square-foot, 7-story building will feature all private patient rooms, a new progressive care unit, a new Neonatal Intensive Care Unit (NICU) with enhanced capabilities, and a new labor and delivery unit. There will be additional space within the tower for future medical services.

“We’re expanding and upgrading so our facilities and services are as advanced as our work, our skills and our team’s commitment to Loudoun County,” Addo emphasizes.

Many of the new ILH additions, including the trauma center and new tower, are a result of donations contributed through a \$20 million fundraising drive, “Loudoun Rising: Taking Health to New Heights.” **INOVA**



Photo: Mike Morgan

# One in a Million

**J**ohn Harrity thought he was in the best shape of his life. The patent attorney, husband and father of two exercised seven days a week and “could run a marathon at any time.” But two years ago, at age 49, while playing basketball with friends, John collapsed on the ground — and nearly died from a massive heart attack.

While his fitness routine no doubt helped the Centreville resident survive and recuperate, John credits the cardiogenic shock team and Extracorporeal Membrane Oxygenation (ECMO) program at Inova Fairfax Medical Campus (IFMC) for saving his life in 2016. After being rushed to IFMC, John suffered a devastating bleeding complication in his lungs that required a special machine to support heart and lung function until he could recover.

The ECMO machine is one of eight Inova has invested in over the last several years to provide exceptional care to patients like John, whose heart and/or lungs are damaged by complex heart attacks and other dire conditions triggering cardiogenic shock.

*John Harrity poses in a shirt promoting The Harrity Race — an annual 5k race and fun walk that John’s law firm started in 2012. All of the funds raised, including 100% of the entry fees, have been donated to partner charities. Since John’s heart attack, the firm has donated exclusively to the American Heart Association. Approximately 100 participants took part in last year’s event. Check out [harrityllp.com/harrity4charity/harrityrace](http://harrityllp.com/harrity4charity/harrityrace) for information about this year’s race.*

million to one. It’s really the doctors and the ECMO machine that’s a large portion of the reason I’m here today.”

## Life or Death Situations

After years of caring for patients suffering cardiogenic shock — who span all ages — Inova formally launched the cardiogenic shock team in January

***Inova’s cardiogenic shock team and ECMO program — the only in Northern Virginia — are two reasons John Harrity is alive today***

John spent about a week on ECMO and eight total weeks in Inova’s Cardiovascular Intensive Care Unit (CICU) before a stint in rehabilitation led to his full recovery.

“I wasn’t expected to make it. At one point a priest came in to read me my Last Rites,” says John, now 51. “My cardiologist later said the odds I would have survived were a

2017. The combination of coordinated care the team offers and the assembly of devices, treatments and tools such as ECMO available at Inova literally spell the difference between life and death for patients with extreme heart or lung difficulties.

About half of patients in cardiogenic shock, which can also stem from infections, pneu-

monia, poisoning and other acute illnesses, die because of their bodies’ inability to pump enough oxygen or remove harmful carbon dioxide from their blood. Inova’s team is already beating those grim statistics.

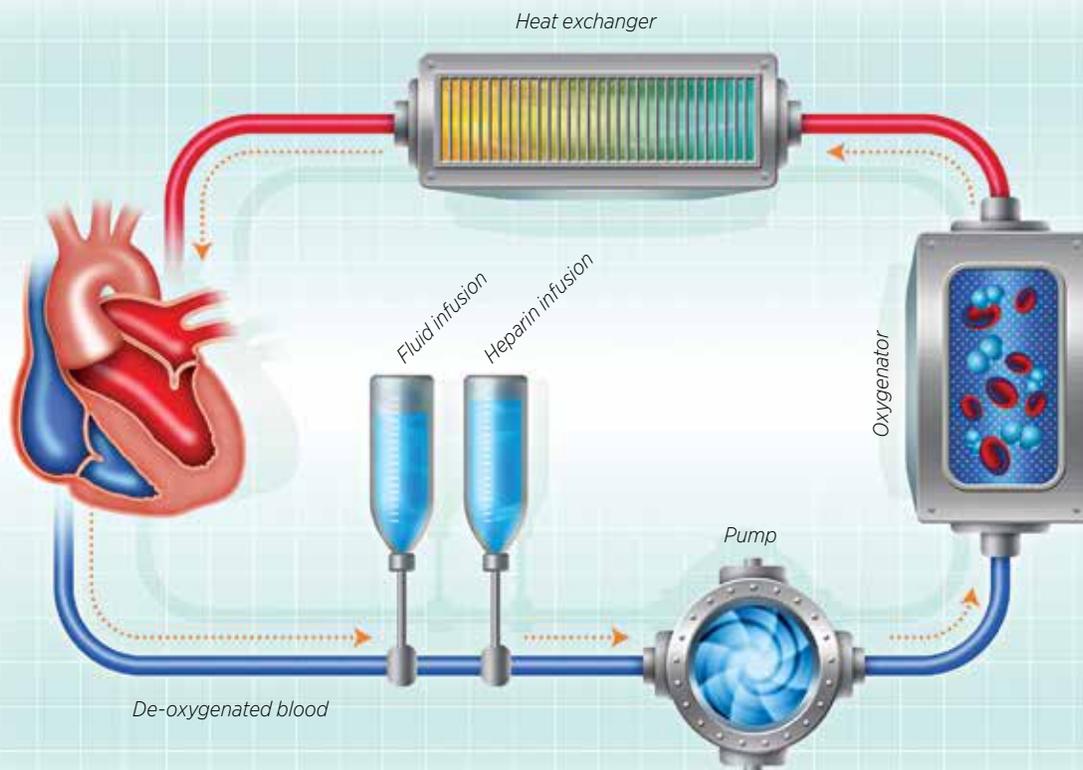
“The idea is to surround the patient in real time with all of the expertise we need to decide on the best treatment for that patient in that situation at that time,” explains Charles Murphy, MD, Director of the CICU at IFMC.

A call activating the team’s services is arranged each time a new case emerges. Team members rely on evidence-based care plans to guide their treatment choices. In its first year, the cardiogenic shock



*John Harrity spent eight weeks in Inova’s Cardiovascular Intensive Care Unit. Here he is with Ramesh Singh, MD, a member of Inova’s cardiogenic shock team.*

Illustration: Tom White/9 Surf Studios



The Extracorporeal Membrane Oxygenation (ECMO) device draws de-oxygenated blood from the patient and enriches it with oxygen in the same manner that the lungs would. As de-oxygenated blood leaves the body, the system infuses it with fluids — including Heparin, an anticoagulant — before pumping it into a membrane oxygenator. There ECMO filters carbon dioxide from the red blood cells and replaces the carbon dioxide with oxygen. ECMO then heats the blood before returning it to the body, either via a major artery or the venous system, depending on the nature of the specific procedure.

team was activated about 150 times, with members also conducting after-action reviews on each case so “we can learn from experience in real time and improve our care even more,” Dr. Murphy says.

Team members include clinicians such as heart surgeons, cardiologists, intensivists, ICU nurses, OR nurses, respiratory therapists, advanced practice providers and perfusionists, among others. Its formation “has elevated our level of care to that of a destination heart recovery center,” says Behnam Tehrani, MD, Medical Director of the Inova Fairfax Cardiac Catheterization Laboratories. “Often, healthcare professionals provide care in silos, but we function as a collaborative and multidisciplinary team that’s on call 24/7 just for this particular disease state. We’re one of only a handful of centers around the country that has undertaken this innovative approach toward tackling a syndrome that for too long has been associated with exceedingly high complications and death.”

### Northern Virginia’s ECMO Center

In close collaboration with the cardiogenic shock team is Inova’s ECMO program. The program’s formal expansion began in 2016, growing from about a dozen patients to more than 80 in 2017.

Patients placed on ECMO support — which can last days to weeks — may also include those who ultimately need an implantable pump or other device to sustain heart function long-term, or can be bridged to a heart or lung transplant.

“Inova is the only center that provides ECMO, as well as other heart-assist devices, in the Northern Virginia area,” says Heidi Dalton, MD, Inova’s Director of Adult and Pediatric ECMO. “In addition to providing the highest level of patient care, the program also focuses on enhancing the academic activities at Inova by actively investigating ways to make the treatment safer and more effective. Reducing bleeding and clotting complications are our main research focus.”

### Helping Others

Knowing how taxing having a family member on ECMO can be, John and his wife, Eileen, are now volunteering at Inova as part of a newly formed ECMO Support Team, offering perspective and a friendly ear to other families going through the ECMO experience.

“Families like the Harritys are invaluable because they tell us things we would never think of to help make the program better,”

Dr. Dalton says. “From a family level, it’s sometimes nicer to talk to someone who’s been there.”

Back to exercising six days a week, John is mindful of the second chance Inova helped give him. “I had my annual checkup with my cardiologist and said, ‘Look, I still plan on living until I’m over 100. Will anything stand in the way of that?’ And he said absolutely not. Your heart is 100 percent.”

Ramesh Singh, MD, Inova’s Surgical Director of Mechanical Circulatory Support, says John’s optimal outcome also reflects the cardiogenic shock team’s steadfast dedication.

“The buck kind of ends with us,” Dr. Singh says. “We want to make a real dent in the mortality rate from cardiogenic shock. One thing we always remember is that the enemy of great is good — and we’re not happy with being just good.” **INOVA**

**&** Read more heart-care patient testimonials at [inovaheart.org/why-choose-us/patient-testimonials](http://inovaheart.org/why-choose-us/patient-testimonials).

## Personalizing Heart Care

A scant two years after the establishment of Inova's Cardiovascular Genomics Center (CGC), it's already turning heads for analyzing genes to personalize heart care for patients of all ages.

Launched in May 2016, the CGC's cornerstone offerings include MediMap Heart, pharmacogenomics testing (PGx) to help doctors narrow down the best choice of certain cardiovascular drugs based on patients' DNA. It tests for six genes influencing responses to eight prescription medications used for heart conditions.

Most notably, MediMap Heart focuses on the popular blood thinner clopidogrel (Plavix), which won't work for about 1 in 3 people because they carry a genetic variant hindering them from metabolizing the drug into its active form. Plavix is among the world's top three best-selling drugs, with more than 25 million prescriptions written for it each year in the United States, according to national statistics.

"MediMap Heart is a novel offering and not something many health systems are incorporating," says CGC Director Palak Shah, MD.

On the pediatrics front, CGC cardiologists can readily collaborate to ensure that children whose parents have a potentially inherited heart condition undergo appropriate genetic testing — and vice-versa when kids are the heart patients. Most of these conditions involve life-threatening arrhythmias or cardiomyopathies, says Mitchell Cohen, MD, Co-Director of Inova's Pediatric Heart Program.

"This is one of the few places where you have a dedicated genomics program with pediatric and adult cardiologists and genetic counselors all under the same umbrella," Dr. Cohen says.

# Beacons

HEAR IT FROM AN EXPERT

## Pain Care 2.0

### **Inova's Opioid Initiative continues aggressive pain management while cutting potential drug abuse**

by Martin H. Brown, MD, FACEP

**M**ost people come to the Emergency Department (ED) in pain. Whether from a broken bone, kidney stone, ruptured appendix or any other condition triggering acute or sudden pain, it's our job to effectively control it.

Inova adheres to that mission while also leading the assault to change the trajectory of the nation's opioid epidemic, an explosive increase in the use and misuse of prescription opioid painkillers such as morphine, codeine, hydrocodone (Vicodin) and oxycodone (OxyContin, Percocet). Three years ago, we launched the Opioid Initiative at Inova Alexandria Hospital (IAH), a program that quickly expanded to EDs across the Inova system and has achieved remarkable results.

While opioids can be highly effective at managing acute pain, they can also lead to dependence, addiction or even death when abused. Opioid overdoses kill more than 115 people every day in the United States. And research



*Martin H. Brown, MD, FACEP, is Chairman of the Department of Emergency Medicine at Inova Alexandria Hospital. He is board-certified in emergency medicine and internal medicine.*

published in 2017 by the Centers for Disease Control and Prevention underscores a high likelihood that once you're taking opioids, it's hard to stop. The study showed that 12 percent of patients prescribed a six-day supply were still taking opioids a year later, with those odds doubling if a 12-day supply was ordered.

The Opioid Initiative minimizes the

risks of prescription drug misuse and abuse while continuing to aggressively treat patients' acute pain. A major testament to our efforts — which also include educating and retraining physicians, nurses and patients about opioid alternatives — is the boost in Inova's patient satisfaction scores for pain control after the Opioid Initiative was put in place.

ED providers continue to frequently prescribe opioids for severe pain. But now, we don't start with an opioid when a nonopioid approach — which includes anesthetic skin patches, ketamine, nitrous oxide, trigger point injections and others — can work instead. We've developed guidelines about how many opioid pills to send home with patients discharged from the hospital, reducing that number dramatically or prescribing a nonopioid alternative.

We've also identified shorter-acting opioid medications that are less addictive than some of their chemical cousins and devised safe, long-term pain management strategies for any patients suffering from chronic pain.

After collecting continuous data about the effects of our efforts, several clear success stories have emerged. Since 2014, opioid prescribing has dropped about 20 percent per year systemwide. Additionally, the EDs at IAH and Inova Loudoun Hospital have cut their use of the potent opioid hydromorphone (Dilaudid) by more than 80 percent. All of these milestones represent important steps toward cutting the risk of opioid dependence in our patients.

Rest assured, when you come to our EDs, we're going to aggressively treat your pain. But we're also committed to not overtreating it, using medications with the fewest side effects and chances of potential problems down the line. **INOVA**

# Pathways

THE VANGUARD OF  
GENOMIC MEDICINE



# Running in the Family

*Inova examines genomic data to better understand the causes of childhood obesity*

**B**abies' rounded cheeks and dimpled thighs are delightful to behold. But when infants cross the line into obesity, a risk factor for health problems down the line, signs of excess weight may be more disturbing than endearing.

Inova's longstanding efforts to tackle childhood obesity now include a fresh look at how genes may contribute to extra weight by a child's first birthday. Genomic testing done on Inova infants and their parents is beginning to tease out how DNA and environmental, clinical and social factors combine to raise the odds of obesity at an early age, with an eye toward proactively preventing or managing these danger signals.

"We're trying to find out why there's inappropriate weight gain in early childhood, and that's a cutting-edge thing," says Kathi Huddleston, PhD, RN, Director of Clinical Research Projects at Inova Translational Medicine Institute (ITMI). "It's definitely a research question we're still struggling with. But the exciting part is that Inova's on the 'A-Team' when it comes to looking for reasons for pediatric obesity. We're even trying to look at factors related to preconception, conception and pregnancy . . . that set our engines in a different way."

Obesity in adults has long been a research focus for scientists, "but nobody's really looked at obesity this early on," adds pediatric gastroenterologist Suchi Hourigan, MD, Director of Microbiome Research at ITMI.

## Examining 'Sweet Spot' of Genes, Environment

Nationwide, childhood obesity has more than doubled in the past 30 years, according to the Centers for Disease Control and Prevention. ITMI's efforts to stay abreast of this trend in the Northern Virginia area include examining both the genes and gut microbiome — the vast array of bacteria and other organisms colonizing the intestines — of babies born at Inova Women's Hospital.

The data has been collected as part of the First 1,000 Days of Life and Beyond study, which ITMI launched in 2012 to identify key influences on children's health outcomes, including obesity. Dr. Hourigan's more recent research has examined the first stool of newborn babies, called meconium, for bacteria that could portend which babies would be obese by 12 months of age.

What insights have been gleaned so far? A cross-section of just under 700 Inova children who underwent genomic sequencing with their mothers and fathers found that more than 61 percent were classified as normal weight at 12 months, while 16.2 percent were overweight, 12.9 percent were obese and 9.7 percent were severely obese.

The ITMI study, published recently in the *Journal of Pediatrics*, uncovered several factors

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**"Inova's on the 'A-Team' when it comes to looking for reasons for pediatric obesity. We're even trying to look at factors related to preconception, conception and pregnancy . . . that set our engines in a different way."**

KATHI HUDDLESTON, PhD, RN

linked to extra pounds at 1 year old, including a mother's increased weight gain in pregnancy and a baby's lower breast milk consumption at 6 months of age. But strong genetic factors — genes considered highly predictive of obesity — weren't pinpointed.

"There's no silver bullet, and I don't think anybody expects to find a single gene related to obesity," Dr. Huddleston explains. "But we all realize there are genetic tendencies and epigenetics that look at the relationship between environment and genes, and that's probably where the sweet spot is."

Adds Dr. Hourigan: "We found some mild genetic associations in those who were severely obese, but not in overweight children. We can point to trends, but at a very young age it really seems like social, environmental and clinical factors have a bigger influence than genomic factors."

## Multipronged Efforts Against Obesity

While genes clearly don't tell the whole story about a child's propensity for weight gain, Dr. Hourigan's microbiome research did point to "microbial signatures" foretelling obesity. Stool composition in newborns reflects many factors, including a mother's weight gain, antibiotic use and diet during pregnancy.

"We found we could predict from the first stool who would be obese at 12 months compared to those from the normal-weight set," Dr. Hourigan says. "It shows your risk for obesity starts before you're born and it's reflected in that stool."

ITMI's genomic testing also examined what's called "genetic admixture," each child's genetic ancestry. When children's DNA

findings were balanced with clinical and social factors, the research suggested African-American babies stand at higher risk of obesity than their Caucasian and Hispanic peers. "This shows that cultural factors play a huge role in obesity, more than genetic ancestry," Dr. Hourigan says.

Inova's established efforts to fight obesity include participating in the Northern Virginia Healthy Kids Coalition, a grassroots group of local organizations and school districts promoting better health for kids. Additionally, Inova's



## Encouraging News for Toddlers

WIC is the Special Supplemental Nutrition Program for Women, Infants, and Children. It provides healthy foods and nutrition education to pregnant women, mothers and children under age 5. Currently, the program serves about half of all infants born in the United States.

Virginia and Maryland currently rank in the top 10 in a list of state obesity rates for WIC participants, ages 2-4. A 2016 report, however, from the Centers for Disease Control and Prevention offers some encouraging news. More than half of states, including Virginia and Maryland, reported declines in obesity among this age group. A few contributing factors:

- ▶ Changes to the packaging of foods to better align with healthy eating guidelines
- ▶ Program revisions to promote and support breastfeeding
- ▶ Increased awareness of the need to prevent obesity at an early age

### Top 10 state obesity rates for WIC participants, ages 2-4

1. *Virginia*
2. *Alaska*
3. *Delaware*
4. *South Dakota*
5. *Nebraska*
6. *California*
7. *Massachusetts (tied)*
8. *Maryland*
9. *West Virginia*
10. *Alabama*
10. *Rhode Island (tied)*

Childhood Obesity Prevention Programs offer a suite of free programs to low-income children and their parents to encourage healthier eating and more physical activity. Most recently, Inova also formed a Pediatric Obesity Task Force to address the issue.

"Childhood obesity is epidemic, and Virginia is surprisingly in the top 10 states," Dr. Huddleston says. "Inova is trying to do something about it. We've got a community partner in the Pediatric Obesity Task Force, a research partner in ITMI, and we've got many clinical experts. All of us are looking for the answer through a different lens but still focused on the same outcome: to optimize the health of future generations." **INOVA**



Find out more about Inova Translational Medicine Institute research studies at [inova.org/itmi](http://inova.org/itmi).

## Tech Burst

### ***Inova dives head-first into advanced healthcare technologies***

Peter Jobse, Managing Director of Inova Strategic Investments, sees innovations on a personal level. Consider this: New software and hardware capabilities are nudging healthcare from reactive to preventive. Progressive computer technologies combined with talented researchers and physicians are turning genomics and big data into highly individualized disease treatment — in some cases, even predicting disease risk and allowing early intervention. And innovative mobile apps are fostering a deeper engagement between patient and physician. As an internationally recognized leader in healthcare innovation, Inova has already implemented many of the most promising technological developments. Jobse elaborates on this healthcare trend.

### **What is the biggest story in healthcare technology right now?**

Personalized cancer therapy is at the center of healthcare news, and what we're doing at Inova puts us on the leading edge. Many healthcare systems are still trying to determine how technology will affect their cancer treatment protocol. But at Inova Schar Cancer Institute, we've already initiated the latest advancements.

### **How does technology play into personalized cancer therapy?**

There are multiple layers of technology going on here. Highly advanced computing technologies let us sequence a tumor's genetic structure and then compare the results against new research to support diagnosis and identify potential therapeutic solutions. But since different therapies work better on different patients, Inova is also at the forefront of an emerging area called companion diagnostics. This involves genomic and standard lab tests to determine how a patient's disease will respond to specific therapeutic solutions. We're coming at personalized cancer therapy from every angle.



### **What else is happening?**

Our leadership in technological innovations is taking Inova deeper into pharmacogenomics. It's a relatively new field that uses genomic testing to predict the efficacy of drug treatments for a wide variety of medications — from pain management to cardiovascular conditions and now behavioral health.

### **What about big data?**

For years, everyone in healthcare has been talking about big data, but we weren't sure how to use it. Today, new technologies allow us to extract knowledge from this data and apply it in a clinical environment. For example, data taught us that in certain diagnostic situations we don't need quite so many tests. Fewer tests can mean less discomfort, potential anguish, time and cost. In this way, big data opened the door to a far more patient-centric approach to healthcare.

### **Are there trends beyond diagnostics and treatment?**

Inova is expanding what we call engagement services, which focuses on deeper access to healthcare information and services in a real-time mobile device environment. This lets our patients tap into educational and interactive tools, schedule appointments and reach out to an Inova healthcare expert with questions. We're seeing a lot of interest in this area, especially from our millennial patients who are constantly connected to a wide variety of networked services.

### **What's ahead?**

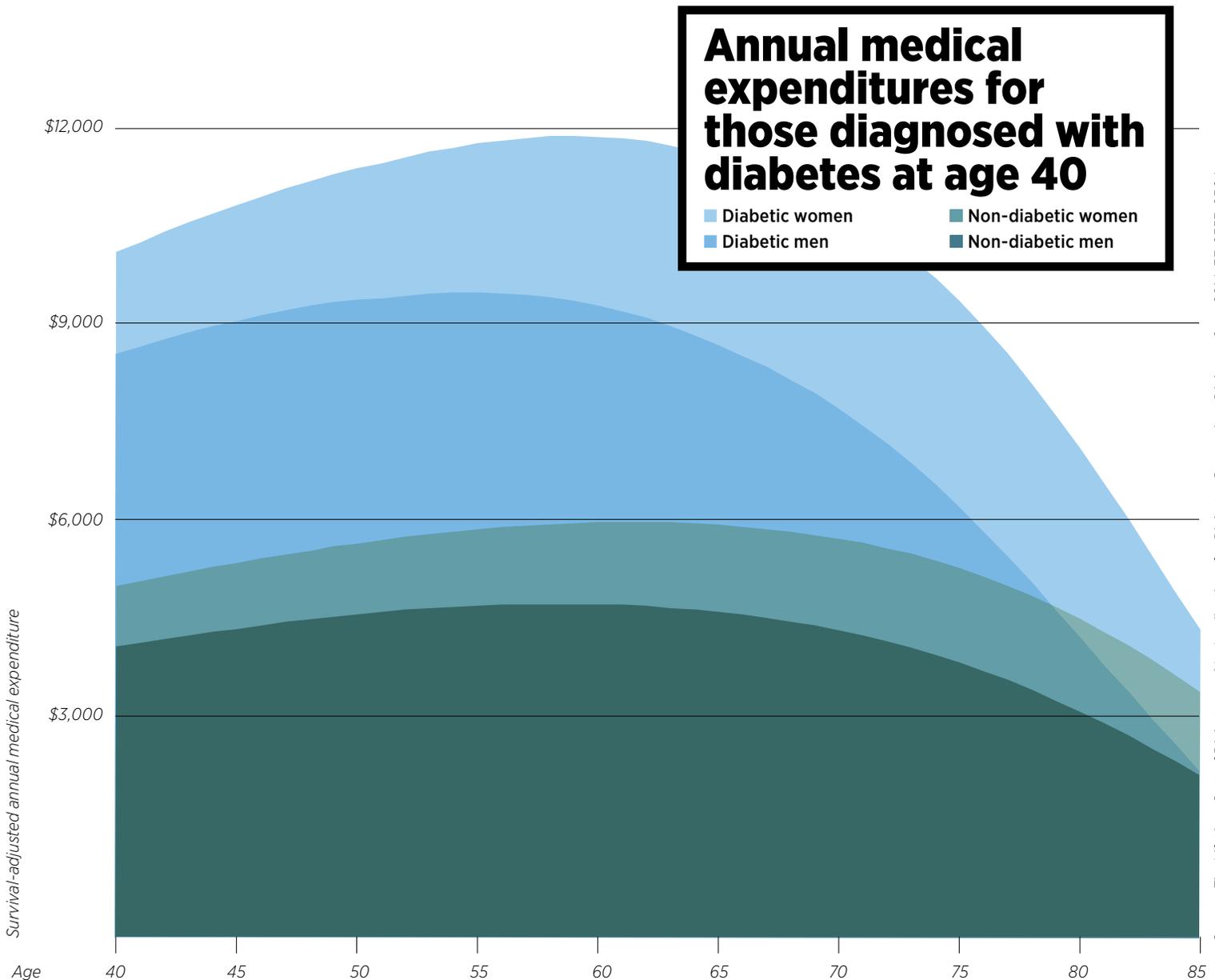
Innovation never stands still, so it's hard to predict. That's why we created the Inova Personalized Health Accelerator (IPHA), which gives us an opportunity to provide education, clinical validation, mentorship and starting capital to companies with early-stage technology prototypes. In this way, Inova will be able to participate in the evaluation, development and implementation of technology solutions. By engaging at this level of company development, we obtain a panoramic perspective of healthcare innovation. These solutions will improve Inova's operations and outcomes — one patient at a time. **INOVA**



Learn more about the Inova Center for Personalized Health at [inova.org/icph](http://inova.org/icph).

# The Price of Diabetes

*The disease comes with clinical and financial burdens; Inova can help lower costs*



# Lifetime medical spending for diabetics by type of medical service

Age at diagnosis	Inpatient care (%)	Prescription medications (%)	Outpatient care (%)	Other medical services (%)	Total
40	36.7	41.7	17.8	3.8	\$124,600
50	35.1	44.3	17.2	3.5	\$91,200
60	33.0	49.7	14.5	2.8	\$53,800
65	30.6	54.8	12.5	2.1	\$35,900

Source: American Diabetes Association

**T**hirty million. That’s the number of Americans diagnosed with diabetes. Another estimated 84 million Americans have pre-diabetes, a condition in which blood glucose levels are higher than normal but not high enough for a diabetes diagnosis.

These overwhelming statistics, compiled by the Centers for Disease Control and Prevention (CDC), come with a high price. First and foremost, the disease costs lives. The CDC ranks diabetes as the seventh-leading cause of death in the United States. Diabetes is also directly linked to complications, from life-altering microvascular diseases, involving the eyes, kidneys and nerve damage, to life-threatening macrovascular diseases, such as heart disease, stroke and peripheral artery disease.

There is a financial toll, as well, in the form of high out-of-pocket expenses. The average annual price tag per patient hovers around \$13,700, with roughly \$7,900 going solely to diabetes care. CDC reports that individuals with diabetes spend twice as much on annual medical care than those without diabetes.

But board-certified endocrinologist Yasser Ousman, MD, Medical Director of the Inova Center for Wellness and Metabolic Health, is quick to emphasize that those diagnosed with diabetes — and especially those with prediabetes — have significant power to positively affect clinical and financial outcomes. It comes down to the following ripple effect:

- ▶ Diabetes self-care decreases disease progression and complications.
- ▶ This reduces the need for additional expensive medications, tests, supplies, monitoring devices, and often intervention specialists or surgery.
- ▶ As medical needs decrease, so do medical costs.

Key to diabetes self-care is education, Dr. Ousman stresses. “Diabetes is a chronic disease that is so dependent on patient knowledge. We need to provide education upfront and repeatedly. That’s why Inova has a dedicated diabetes education program in place.”

## Diabetes Education

That program is the Inova Center for Wellness and Metabolic Health, which offers comprehensive diabetes education classes and individualized consultations. A team of nurses, dietitians and certified diabetes educators deliver the knowledge, skills and abilities for diabetes self-care. Patients with specific medical nutrition needs can also schedule individualized consultations with a registered dietician.

To help put those diagnosed with diabetes on a healthy path to successful self-care, Inova physicians will generally order diabetes education and medical nutrition therapy. This includes a one-hour individual assessment, followed by group classes and an individual appointment with a dietician for medical nutrition therapy.

## Promoting Positive Changes

“Our programs empower those with diabetes to make positive lifestyle changes,” says Marc Bailey, Director, Inova Center for Wellness and

Metabolic Health. As an example, he points to the center’s two-hour prediabetes class, which includes weight management. This is a critical area of concern for persons with prediabetes, as these persons are often at increased risk for developing diabetes down the road.

The CDC estimates that nearly 90 percent of adults living with type 2 diabetes are overweight or obese. Put simply, excessive weight impedes the body’s ability to use insulin properly and control blood sugar levels. Here are the likely results:

- ▶ For those diagnosed with diabetes, being overweight or obese speeds up disease progression, increases the need for medication and magnifies risk for complications.
- ▶ For those with prediabetes, research studies show that weight management can actually prevent or delay type 2 diabetes.

Anchoring Inova’s prediabetes and diabetes education classes is an emphasis on small, consistent steps focused on realistic goals. “This isn’t a diet class based on deprivation or fads. And we’re not telling people to work out four hours a day. It’s about learning healthy lifestyle choices that make living with diabetes a part of daily life,” Bailey stresses. “So we talk about healthy food choices, from portion sizes to how carbohydrates affect your blood sugar level. We discuss ways to work activity into an already busy schedule. And we encourage asking one of our qualified Inova diabetes educators for help when needed.”

To keep those with diabetes as well as prediabetes motivated, Inova diabetes educators often remind patients that a modest weight loss is highly beneficial. “If you’re overweight, losing only 5 to 10 percent of your current weight is associated with lower blood sugar and reduced insulin resistance, as well as lower blood pressure and lower lipids,” Dr. Ousman says.

Along with medications, medical advancements and research, Dr. Ousman believes that effective self-care is the cornerstone for successful diabetes treatment and outcomes. Until everyone understands this concept, the Inova Center for Wellness and Metabolic Health will remain open — and ready to educate. **INOVA**

**&** Learn more about the Inova Center for Wellness and Metabolic Health at [inova.org/diabetes](http://inova.org/diabetes).

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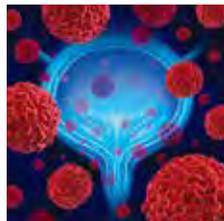
Check out the most recent issue of Inova's newsletter *InHealth*, covering the latest developments at Inova's five hospitals, plus inspiring recovery stories and tips for overall health and wellness.

### SPRING/SUMMER 2018

- ▶ Inova Alexandria Hospital's NICU helps babies thrive
- ▶ Two heart transplant patients find love at Inova Fairfax Medical Campus
- ▶ Genetics program at Inova Fair Oaks Hospital offers cancer patients more options
- ▶ Breast center opens at Inova Loudoun Hospital
- ▶ Wound center at Inova Mount Vernon Hospital treats a variety of conditions

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## RECENT BLOG POSTS



### Treatment Innovation for Patients with Prostate, Bladder and Kidney Cancers

The doctors and researchers at Inova Schar Cancer Institute are committed to providing cutting-edge treatment to our patients. When it comes to genitourinary cancers (GU), we have a lot of promising new treatments and research advances to keep track of ...



### New Procedure Closes Holes in the Heart to Reduce Risk of Stroke

Every baby in the world is born with a hole in his or her heart. Known as the patent foramen ovale (PFO), the hole allows blood to bypass an unborn baby's lungs. After a baby is born and starts breathing, the hole closes — most of the time.

In as many as a quarter of people, the PFO doesn't close. Usually, it causes no problems. In a subset of people, though, the hole can raise the risk of stroke. In patients with PFO who have had a stroke, we consider closing the hole with surgery ...



### Hips and Knees Achy in Colder Weather? Tips to Keep Joints Moving Smoothly

If your knees act up in winter weather or your achy hip predicts rainstorms, it's not a figment of your imagination. Changes in temperature and barometric pressure can indeed affect the way your joints function and feel ...

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