

Carilion Medicine

FALL 2018/WINTER 2019

In partnership with the Virginia Tech Carilion School of Medicine and Fralin Biomedical Research Institute at VTC



OVERCOMING HARMFUL BEHAVIORS

Our greatest
obstacles—and
our greatest
hopes—are all
in our heads.



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PATHWAYS TO UNDERSTANDING:
Medical students gain insights into their patients' lives by taking a stroll through the neighborhoods of Roanoke.

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BY JARED LADIA



THE CHOICES WE MAKE EVERY DAY, BOTH GOOD and bad, can have a dramatic effect on our overall health. Today, we find ourselves fighting chronic conditions—such as diabetes, heart disease, obesity, cancer, and addiction—that are largely the cumulative result of the choices we make every day: what we eat, how much we drink, whether we smoke or abuse substances.

Clearly, some habits are better for us than others.

Take exercise. A recent study published in *JAMA: The Journal of the American Medical Association* found that fewer than one in three Americans meet physical fitness standards.

No matter how busy I am, I make physical activity part of my day. What began one day as a deliberate decision to get up before dawn to exercise is now an automatic behavior. No thinking is required; it's just my ingrained response to an early alarm. And, according to pioneering psychologist and philosopher William James, our days are nothing more than a “mass of habits.”

In fact, research has found that more than 40 percent of the actions we perform every day are habits rather than actual decisions. So, it's easy to see how habits we form can profoundly affect our health—and even our lifespans.

That's the reason we've made employee wellness a priority at Carilion Clinic. We've partnered with Virgin Pulse, a division of one of the world's most recognized brands, to provide employees with a wellness app to encourage healthy habits, such as eating a nutritious breakfast, getting enough sleep, and taking the stairs. We began the program in April 2018 and already more than 60 percent of employees have enrolled.

To make exercise convenient, we have fitness studios throughout our facilities and provide discounted memberships at our wellness centers. Many employees also benefit from our “Fit Rx” exercise prescription, which includes one-on-one sessions with a personal trainer.

By the time our police and security officers completed the program last summer, their fitness levels had improved overall, and half experienced a clinically meaningful weight loss. Their success illustrates the importance of choosing our habits carefully and encouraging our patients to do so as well.

As the special report in this issue reminds us, our brains—the very source of our vulnerability to addictions and other harmful behaviors—also represent our greatest hope for establishing healthful habits.

Patrice M. Weiss, M.D.
Chief Medical Officer and Executive Vice President
Carilion Clinic

Carilion Medicine

President and Chief Executive Officer
Nancy Howell Agee

**Chief Medical Officer and
Executive Vice President**
Patrice M. Weiss, M.D.

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CARILION CLINIC
1906 Belleview Avenue
P.O. Box 13727
Roanoke, VA 24036
CarilionClinic.org
800-422-4842



Carilion Medicine is published twice a year at:
213 McClanahan Street, Suite 200
Roanoke, VA 24014
Phone: 540-266-6586 **Fax:** 540-266-6608
Email: CarilionMedicine@carilionclinic.org
Web: CarilionClinic.org/carilionmedicine

Carilion Clinic is a nationally ranked integrated health care system headquartered in Roanoke, Virginia. Its flagship, Carilion Roanoke Memorial Hospital, is the clinical affiliate of the Virginia Tech Carilion School of Medicine and Jefferson College of Health Sciences.

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On the pulse of the Carilion Clinic community

Transformational Gift

Heywood and Cynthia Fralin and the Horace G. Fralin Charitable Trust have donated a record \$50 million to support science at the Virginia Tech Carilion Research Institute, now renamed the Fralin Biomedical Research Institute within the evolving Virginia Tech Carilion Academic Health Center in Roanoke.

“This significant gift to Virginia Tech will improve lives and set the Fralin Biomedical Research Institute at VTC on a trajectory for future success,” said Nancy Howell Agee, president and chief executive officer of Carilion Clinic. “Carilion Clinic is dedicated to improving the health and health care for our communities across the commonwealth. The expansion of Virginia Tech in Roanoke—and the commitment of the Fralin Biomedical Research Institute to tackle the big problems in health care and find solutions—will serve as a catalyst to fast-track discoveries that will ultimately benefit our citizens across the commonwealth and beyond.”

The most generous donation in the 146-year-history of Virginia Tech—twice as large as any other single gift—will sup-



THE VISIONARY: Heywood Fralin hopes his family's philanthropy will encourage others to support the promise of the expanding VTC Health Sciences and Technology Campus in Roanoke.

port recruiting and retaining world-leading biomedical researchers.

“I appreciate that Virginia Tech and the commonwealth have made such a major investment in the City of Roanoke and the region,” said Heywood Fralin, chairman of Medical Facilities of America and a long-time advocate for higher education

and economic development. “I believe that it's the responsibility of everybody to give back to your community and to leave things better than you found them. I hope many others will come forward to support this emerging academic health center, because when it comes to Roanoke's future, there is no bigger story.”

Excellence in Health Care Leadership Celebrated



Nancy Howell Agee, president and chief executive officer of Carilion Clinic, has received the 2018 Gail L. Warden Leadership Excellence Award of the National Center for Healthcare Leadership.

Agee, who started her career at Carilion as a nurse in 1973, has been at its helm since 2011, leading the health system through an extensive reorganization, collaborating with partners to establish a new medical school, and creating highly successful

medical homes that manage the care of patients with chronic diseases. In her tenure, she has stressed quality, safety, value over volume, and preventive care, driving the \$2-billion health system to national prominence. In addition, in January 2018, she became chair of the Board of Trustees of the American Hospital Association.

Agee was honored in November at the Leadership Award event.



LUCKY NUMBER: The ninth class of the Virginia Tech Carilion School of Medicine became the first to enroll since the medical school became the ninth official college of Virginia Tech.

Medical School Joins Virginia Tech

In July, after clearing two key accreditation hurdles, the Virginia Tech Carilion School of Medicine officially became the ninth college of Virginia Tech.

“We are very pleased to achieve these milestones and have our accrediting bodies’ support,” said Virginia Tech President Timothy Sands. “As an independent institution, the school has been an incredible success over the past decade. As a college, we hope to build on that success with the school at the center of our continued plans for a robust health sciences and technology campus in Roanoke, benefiting the region, the university, and Carilion Clinic, our key partner throughout this journey.”

The medical school accepted its first class of students in 2010. It has since graduated five classes, each with

a 100-percent match rate to residency. After the charter class graduated in 2014, the school received full accreditation from the Liaison Committee on Medical Education.

Members of the Class of 2022 will be the first to receive their entire education as Virginia Tech students. Nearly 4,000 students applied for 42 spots in the class.

“Once again, we continue to attract competitive students, who are not only academically qualified, but also have diverse backgrounds and experiences that lend well to our patient-centered, team-based curriculum,” said Cynda Johnson, M.D., M.B.A., founding dean of the Virginia Tech Carilion School of Medicine.

Members of the class each average more than 2,000 hours of research and 1,600 hours of clinical experience.

Carilion Clinic Honored for Nursing Excellence

In October, Carilion Roanoke Memorial Hospital earned Magnet Recognition for nursing excellence for the fourth consecutive year. Only one other hospital in Virginia can claim that distinction, which is annually awarded by the American Nurses Credentialing Center.

“Earning a Magnet designation is a major achievement,” said Patrice M. Weiss, M.D., Carilion’s chief medical officer and executive vice president. “It reflects the dedication and commitment of nurses to providing the highest quality care, as well as the teamwork of everyone at Carilion.”

The Magnet Recognition Program designates organizations worldwide in which nursing leaders successfully align their nursing strategic goals to improve the organization’s patient outcomes.

According to the American Nurses Credentialing Center, the program provides a roadmap to nursing excellence. To nurses, Magnet Recognition means education and development through every career stage, which leads to greater autonomy at the bedside. To patients, the designation signals the best care, delivered by nurses who are supported to be the best they can be.

“This is wonderful news,” said Meg Scheaffel, chief nursing officer of Carilion Roanoke Memorial Hospital. “Our nurses are innovative and exemplary. Re-designation reflects their dedication and commitment to the highest quality care and our dedication to empowering nurses and building structures where they are supported and thrive.”



PHOTOS: RYAN ANDERSON (TOP LEFT); DARRYLE ARNOLD (ABOVE)



OFF TO A FLYING START: A crane hoisted the signed beam into the air as the crowd watched from below.

Leaders Mark Construction Milestone

A crowd watched in late September as a crane hoisted a steel beam four stories into the sky at the construction site for the Virginia Tech Carilion Biomedical Research Addition in Roanoke.

No ordinary piece of steel, the beam was destined to play a starring role in a construction rite—a topping-out ceremony. The beam had been signed by more than a hundred students, faculty, staff, and health care providers affiliated with Virginia Tech and Carilion Clinic.

“It was an honor to add my name on the beam alongside the signatures of so many positive, enthusiastic people,” said Virginia Tech President Timothy Sands. “Having all our names together really represents how we got here—by working together with a collaborative spirit in the best interest of our region.”

Michael Friedlander, Ph.D., executive director of the Fralin Biomedical Research Institute at VTC, signaled the crane operator to lift the beam into position. Joining him on the outdoor patio to witness the moment were Dr. Sands; Patrice M. Weiss, M.D., chief medical officer and executive vice president of Carilion; and Roanoke Mayor Sherman Lea.

“People have placed their faith in us to create better medical treatments and interventions, to make important discoveries, and to educate the researchers of tomorrow,” said Dr. Friedlander, who is also vice president for health sciences and technology at Virginia Tech. “The topping-out milestone shows that we are moving Virginia Tech Carilion further into its role as a 21st-century academic health center.”

The 139,000-square-foot building-in-progress is expected to open in the spring of 2020. It will add to the interdisciplinary research efforts of the Fralin Biomedical Research Institute and Carilion Clinic, serve as a model facility for experiential learning for students from all of Virginia Tech’s colleges, and augment the university’s Destination Areas, which are pockets of disciplinary and interdisciplinary strength that set Virginia Tech above other universities.

“Besides improving health, the Virginia Tech Carilion partnership has been a catalyst for economic growth and development,” said Dr. Weiss. “It is so gratifying to watch the future unfold right outside my window, a future where innovative, new ideas are born—a future that we can

all share. We’re going to increasingly take discoveries from the lab bench, use them to inform patient treatment at the bedside, then take what we learn in the clinic back to the bench to inform research.”

Dr. Sands said the occasion is a step toward fulfilling Virginia Tech’s vision of transdisciplinary research that brings together faculty and students from the university’s nine colleges and across campuses in Blacksburg, Roanoke, and Northern Virginia.

Meanwhile, Lea proclaimed the day a great one for Roanoke, the nation’s only seven-time All-America City.

“People who live in an All-America City work side-by-side in collaborative partnerships that help us grow and strengthen our community and our economy,” Lea said. “A good example of this is our partnership with Virginia Tech and Carilion Clinic. What an exciting day, to be part of this special topping-out ceremony.”

Nancy Howell Agee, Carilion’s president and chief executive officer, was among those who autographed the beam.

“Signing the beam gives you chills because you think about the legacy we are creating,” she said. “It doesn’t matter if people ever see the names again—for a moment we are recognizing that we are all part of something extraordinary.”



VIEW FROM BELOW: Watching the raising of the beam were, from left, Dr. Patrice M. Weiss, Carilion’s chief medical officer; Dr. Michael Friedlander, executive director of the Fralin Biomedical Research Institute at VTC; Dr. Timothy Sands, president of Virginia Tech; and Sherman Lea, Roanoke mayor.



ON THE ROAD: Healthstorian, a new mobile recording studio, will capture the history of health in southwestern Virginia through the words of patients and their health care providers.

Capturing the Region’s Health, One Story at a Time

The vintage camper may not look much like a recording studio from the outside, but its interior helps reveal its mission: to record and preserve the health stories of people of all backgrounds throughout southwestern Virginia.

Dubbed Healthstorian, the vehicle has been retrofitted as a mobile audio booth that will be traveling to hospitals, clinics, festivals, and neighborhoods throughout the region.

“Having spent the majority of my career here in Roanoke as a geriatric psychiatrist and fan of oral histories, I have often been surprised at our lack of documenting the history of health in our valley,” said David Trinkle, M.D.,

associate dean for community and culture at the Virginia Tech Carilion School of Medicine. “The mobile camper will go a long way in documenting the history of health care and of the health in our community and neighborhoods.”

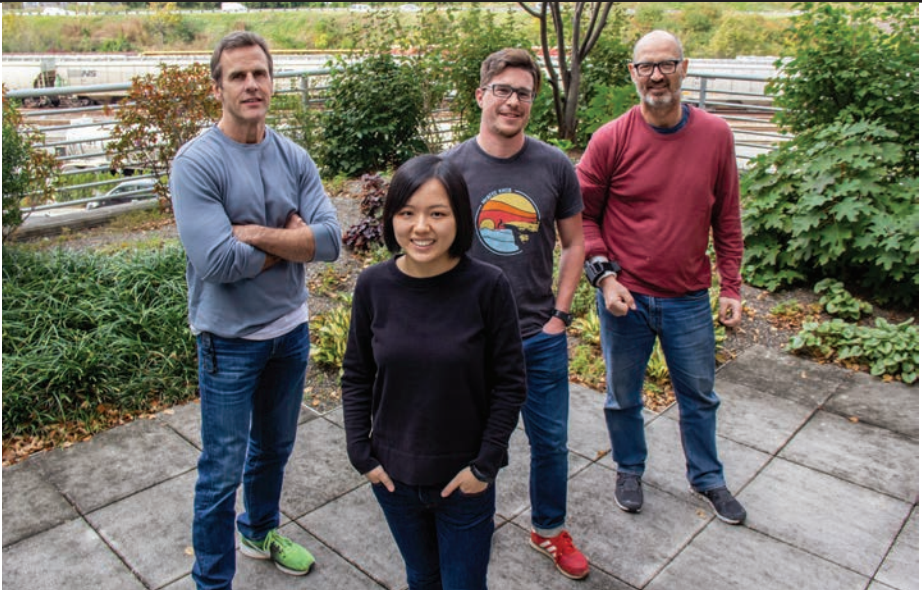
Healthstorian was inspired by the highly acclaimed StoryCorps, which debuted in 2003 with the opening of a StoryBooth in Grand Central Station and has since earned a regular spot on National Public Radio.

The project is a collaboration among the Virginia Tech Carilion School of Medicine, the Fralin Biomedical Research Institute at VTC, Carilion Clinic, Jefferson College of Health Sciences,

Roanoke Public Libraries, and several other Virginia Tech partners.

Interviews are now being conducted with past and present patients and their families, health care providers, administrators, faculty members, and students, all to gain an oral history of the region’s health and health care. All recordings will be housed in the archives of Virginia Tech’s University Libraries.

Healthstorian made its debut in October, when Dr. Trinkle interviewed first Cynda Johnson, M.D., M.B.A., founding dean of the Virginia Tech Carilion School of Medicine, and then Nathaniel L. Bishop, D.Min., president of Jefferson College of Health Sciences.



The Lasting Impact of Early Education

Adults who received intensive educational interventions as children display high levels of fairness in social interactions more than 40 years later, even when being fair comes at a high personal cost, according to a *Nature Communications* study by scientists at the Fralin Biomedical Research Institute at VTC.

The researchers asked 78 participants from the Abecedarian Project, one of the longest-running, randomized controlled studies of the effects of early childhood education in low-income families, to play economic games. An additional 252 participants who received no childhood interventions were recruited as a control group.

The Abecedarian Project—a study originally developed and led by Craig Ramey, Ph.D., now a professor and distinguished research scholar at the Fralin Biomedical Research Institute—follows a cohort of adults who, as children in the 1970s, received intensive, five-year educational interventions, including cognitive and social stimulation.

The latest Abecedarian Project study, led by Read Montague, Ph.D., who directs both the Human Neuroimaging Laboratory

and the Computational Psychiatry Unit at the research institute, found that participants who received intensive educational interventions in early childhood exhibited positive effects on their social decision-making more than four decades later.

The study participants played economic games that measured their trade-offs between self-interest and adherence to social norms of equality. The Abecedarian players strongly rejected unequal division of money across players, even if it meant they would miss out on hefty financial gains themselves.

Using computational modeling, the international team of researchers also discovered differences in the participants’ social decision-making strategies, as those who received educational interventions planned further into the future.

“Our research shows investment in early childhood education—especially that of highly vulnerable children from low-income families—can produce long-term effects in decision-making even decades after the educational experience,” said Yi Luo, Ph.D., first author of the study and a postdoctoral associate in Dr. Montague’s laboratory.

ENDURING IMPRINT: Dr. Read Montague (left) found that people with educational interventions in early childhood showed positive effects on social decision-making more than four decades later. Also pictured, from right, are coauthors Dr. Terry Lohrenz, Dr. Sébastien Héту, and Dr. Yi Luo.

New Fund Aims to Spark Region’s Entrepreneurship

Nearly two years after the creation of the VTC Innovation Fund, the Virginia Tech Foundation and Carilion Clinic have partnered again, this time to create the VTC Seed Fund, a \$7-million venture capital fund to facilitate the commercialization of additional pathways for innovative products and technologies.

Unlike the VTC Innovation Fund, which provides larger investments for established, growth-stage companies, the VTC Seed Fund is intended to provide smaller investments ranging from \$100,000 to \$150,000 to earlier-stage, higher-risk companies.

The VTC Seed Fund expects to increase engagement and mentorship with Virginia Tech alumni, Carilion faculty and other employees, regional entrepreneurs, and high-net-worth individuals. It also aims to spur the interest of local angel investors in the region through the direct cooperation with this critical early-stage investment resource.



“We knew it was important to find ways to fund entrepreneurship in our region,” said Nancy Howell Agee, president and chief executive officer of Carilion. “The early successes of the VTC Innovation Fund encouraged us to invest again, and we have faith that the VTC Seed Fund will do its part to help entrepreneurs in our region.”

briefings

Calling the Shots

Carilion Roanoke Memorial Hospital has become the first hospital in Virginia to earn shared governance accreditation by the internationally recognized Forum for Shared Governance.

“Carilion Roanoke Memorial Hospital has demonstrated its nurses call the shots for their patients,” said Robert Hess, R.N., Ph.D., chief executive officer of the Forum for Shared Governance. Dr. Hess noted that shared governance—a management model that empowers bedside nurses as patient advocates—has been associated with better professional, organizational, and patient outcomes.



Maternal Stress

African-American women undergo more physical stress during the first year after giving birth than Latina and Caucasian women, a consequence that may have long-lasting health effects, according to a Eunice Kennedy Shriver National Institute of Child Health and Human Development study of more than 2,400 low-income women.

“Our study was designed to look for biomarkers that are sensitive to psychological and physical stressors, and in turn determine whether those stressors contribute to poor outcomes for mothers and children,” said study coauthor Sharon Landesman Ramey, Ph.D., a professor and distinguished research scholar at the Fralin Biomedical Research Institute at VTC.

a moment in history



A Pioneer with Heart

Dr. Philip Shiner modernized the practice of cardiology in Roanoke.

When a Roanoke newspaper announced the plan for the region's first cardiac catheter laboratory, the article noted that the same technology that allowed NASA to monitor the vital signs of astronauts on the moon would make it possible for "recovering heart victims at Roanoke Memorial to be more mobile."

The news came in 1971, just two years after man first stepped onto the moon. That was also the year that Philip Shiner, M.D., was named director of the laboratory, which, when it opened several years later, would enable patients in southwestern Virginia to receive definitive diagnoses and cardiac care without traveling outside the region.

HOME IS WHERE THE HEART IS:

Before Dr. Philip Shiner opened Roanoke's first cardiac catheter laboratory in 1974, patients suspected of having a heart condition would have to travel at least two hours to receive a definitive diagnosis.

Dr. Shiner arrived in Roanoke fresh from two cardiology fellowships that followed residency training at Duke University Medical Center and Ohio State University Hospital. He put all that training to good use as he crafted a vision for Carilion's heart program.

A critical part of his legacy took place in 1982, when he became instrumental in hiring the region's first heart surgeon, Paul Frantz, M.D., who provided patients needing open-heart surgery with a local option.

"That first year, Dr. Frantz nearly worked himself to death," noted Hayden Hollingsworth, M.D., who, along with R. Earle Glendy, M.D., had started the cardiology department in 1968.

The same statement could have been made about Dr. Shiner. With his help, other milestones—including the formation in 1989 of HeartNet, a regional cardiac emergency network—continued to accrue.

Within a decade, Carilion's cardiac program was nationally ranked. Carilion has since become home to one of the country's top heart and vascular programs, culminating, most recently, in the development of the Carilion Clinic Cardiovascular Institute, which brings together the full breadth of cardiovascular specialists.

In 2016, the year Dr. Shiner retired, the Philip Thompson Shiner, M.D. Cardiac Catheterization Lab at Carilion Roanoke Memorial Hospital was dedicated in recognition of his exemplary care of patients, leadership in cardiology, and founding of the laboratory.

"Dr. Shiner, who ushered in a new era of heart care for the region, is responsible for modernizing the practice of cardiology in the Roanoke Valley," said Patrice M. Weiss, M.D., Carilion's chief medical officer and executive vice president. "With hard work and vision, he led the way to giving our patients the opportunity for top-quality, lifesaving care close to home." **CM**

PHOTO: JARED LADIA

grand rounds

Education at Carilion Clinic and its affiliates



STAR PERFORMANCE:

Becky Gates, a fourth-year student at the Virginia Tech Carilion School of Medicine, stands outside of Carilion Roanoke Memorial Hospital.

Medical Student Excels at International Conference

Becky Gates, a fourth-year student at the Virginia Tech Carilion School of Medicine, received the Outstanding Oral Presentation Award at the annual meeting for the International Association of Medical Science Educators (IAMSE), held in Las Vegas in June.

Gates never expected to win, especially given that she was up against faculty with many more years of experience in teaching and research. One of her "competitors" was a friendly face: Richard Vari, Ph.D., senior dean for academic affairs at the Virginia Tech Carilion School of Medicine and current president of IAMSE.

"I am very proud of Becky," Dr. Vari said. "You know we are doing something right at the VTC School of Medicine when our students earn awards over their teachers. Our students learn to teach from the very beginning of their medical education through our small-group, problem-based learning curriculum. In addition, they

work on a substantial research project across their four-year education, so they gain a real expertise in their project."

At IAMSE, Gates presented her findings on how the three factors of burnout—high emotional exhaustion, high depersonalization, and low personal accomplishment—are related to perceived well-being for various groups of Carilion Clinic health care professionals.

"We found emotional exhaustion is universally important and has the larger relationship with perceived well-being compared to the other two variables for perceived well-being," said Gates, who has pursued her research under the mentorship of David Musick, Ph.D., associate dean of faculty affairs at the medical school, and Lauren Penwell-Waines, Ph.D., then an assistant professor at the medical school.

Gates plans to participate in next year's IAMSE conference, which will be hosted by her own medical school in June 2019.

GRAND ROUND ON OPIOID ADDICTION



As part of a tour of medical schools across the commonwealth, Ralph Northam, M.D., governor of Virginia, visited the Virginia Tech Carilion School of Medicine in October to offer a grand round on the opioid crisis.

The governor noted that of the 1,534 Virginians who died from a drug overdose in the previous year, 1,227 were addicted to opioids.

The governor invited Ryan Hall, a resident of southwestern Virginia, to share his story. Hall, who struggled with an opioid addiction for years following treatment for a high-school sports injury, has been clean for more than a year. "I was sick and tired of being sick and tired," he said.

Hall offered advice to physicians to help patients avoid addiction: "Watch what you prescribe, how much you prescribe, for how long you prescribe."

Dr. Northam talked about efforts to re-train medical providers to treat pain without opioids or with only restricted doses. "There are some individuals, if they are exposed to a narcotic for three or four days, who can become addicted," he said. "So we have a new regulation in Virginia that physicians can write only a seven-day supply. Some people think we should back that down to five days."



WORDS OF WISDOM: Governor Ralph Northam discusses the opioid crisis.

CLEAR AND PRESENT **DANGER**

Carilion Clinic is using innovative approaches to turn around perilous behaviors. **BY DAVID BUMKE**

LIVING LIKE THERE'S NO TOMORROW HAS NEVER BEEN A PRESCRIPTION for long-term health. Yet that kind of thinking about lifestyles and behavioral choices can become ingrained, often leading to addiction, obesity, diabetes, and other debilitating conditions and illnesses. At a time of stunning medical advances, in which science has overcome so many challenges, it seems that the biggest obstacle to overcome may be ourselves.

Clearly, new approaches are needed at a time of rising tolls of death and disability from addiction to opioids. In Virginia, for example, the number of deaths from abuse of synthetic painkillers rose eightfold, and overdoses from heroin spiked by a factor of 10 in just six years. Throughout the regions that Carilion Clinic serves, those numbers translate into daily displays of human misery, ameliorated only in part by the heroic efforts of physicians, nurses, and others on the frontlines of the unending battle to save lives.

Obesity, meanwhile, has become a major health threat of its own. Both within Virginia and nationally, it's obvious that much improvement is needed to address the rising tide of type 2 diabetes, heart disease, and other obesity-related conditions.

Finding ways to counter delay discounting—the human tendency to prefer immediate gratification over larger future rewards—can help in the quest to change unhealthy behaviors for a lifetime. So can education, which may range from teaching patients about the potential dangers of prescribed opioids to providing nutritional counseling—and fresh produce—to the many people who lack ready access to healthy food choices.

Another part of the answer is in-depth research into causes, treatments, and cures for opioid abuse, overeating, and other addictive behaviors. Sensitive, appropriate, and effective care that addresses patients' immediate and long-term physical and psychological needs is also essential.

With its clinic-based model, expanding research capabilities, and innovative programs, Carilion is leading the charge to help change behaviors and improve health for at-risk communities. **CM**

BACK FROM THE **BRINK**

The best defenses against the opioid epidemic? Prevention, treatment, and a great deal of education for physicians and patients alike. **BY MARCIA LERNER**

FINDING HOPE IN THE HEARTBREAK OF OPIOIDS ISN'T EASY. Against the backdrop of a rising national death toll, Virginia, in particular, is reeling. The number of synthetic opioid-related overdose deaths in the state surged to 678 in 2016, from 87 just six years earlier. Heroin-related deaths, also considered part of the opioid crisis, increased tenfold in the state during the same period.

"I came from New England, which has its own addiction challenges," says Robert Trestman, M.D., Ph.D., professor and chair of Psychiatry and Behavioral Medicine at the Virginia Tech Carilion School of Medicine and Carilion Clinic. "But when I arrived in Roanoke, in the heartland of the Appalachians, the profound impact of opioids on our patients, their families, and our communities was apparent from my first day."



In 2016, Virginia declared the opioid addiction crisis a public health emergency.

Carilion, serving an area devastated by the crisis, has responded by attacking the problem on multiple fronts. The goal of the Opioid Task Force, a primary part of that effort, “is to coordinate all of Carilion’s efforts to minimize the inappropriate use of prescription opioids,” says Dr. Trestman, who serves as co-chair of the task force. “Our objective is to support our patients, offer alternatives to opioids whenever possible, and provide coordinated treatment for those who have become addicted.”

Under that umbrella are initiatives that range from helping drug-using mothers and their opioid-dependent babies, to educating patients and doctors, to conducting cutting edge-research that tackles the issues of addiction itself.

Babies are kept in a dark, quiet environment where time with their mothers is maximized and visitors are strictly limited.



Mothers and Babies

Kimberly Simcox, D.O., a diplomate in addiction medicine at Carilion, first encountered the opioid crisis when she was a high-school student in Roanoke.

“I remember wondering why more and more of my good friends were becoming addicted,” says Dr. Simcox, who is board certified in both OB/GYN and addiction medicine. Then, while doing her OB/GYN residency in Wilmington, North Carolina, from 2009 to 2013, she observed increasing numbers of pregnant patients with withdrawal symptoms. When Dr. Simcox joined Carilion’s New River Valley Medical Center in 2013, she started a program for pregnant, opioid-dependent women—and discovered that helping them with their addiction also improved their adherence to prenatal care.

Dr. Simcox extended that program to Roanoke this year and hopes to launch an expanded version in early 2019. The program’s goals are to work with mothers throughout their pregnancies, providing obstetrical and addiction care at the same time, and to continue caring for the mothers and children after birth.

“At every visit,” says Dr. Simcox, “I’m not only providing them with pharmacological treatment of their opioid dependence, but I’m also emphasizing interventions

Pharmacists have a powerful role to play in dispensing the facts. “We’re the gatekeepers; we fill the prescriptions physicians are writing.”



aimed at helping with their long-term health.” The mothers normally get buprenorphine, which reduces cravings and prevents withdrawal symptoms, while also receiving education on the challenges their babies may face, including neonatal abstinence syndrome. Smoking-cessation programs are also offered.

Whenever possible, the newborns are treated without drugs in a new five-bed unit with a dedicated staff, says Jacinda Hays, D.O., a general pediatrician and pediatric palliative care physician at Carilion. Using a model of care pioneered at Yale University last year, the babies are kept in a dark, quiet environment where time with their mothers is maximized and visitors are strictly limited. The infants are encouraged to learn to soothe themselves with pacifiers, and they’re kept swaddled, frequently rocked, and, whenever possible, given skin-to-skin contact with their mothers.

Most babies receive special formula that helps ease the gastrointestinal problems that are a common part of withdrawal. But mothers who are in a treatment program and aren’t using heroin can breastfeed, according to Dr. Hays. “Our hope is to get the babies and moms off to a good start,” she says. “We try get the babies through the withdrawal process and home without needing any medication.”

But leaving the hospital doesn’t mean leaving the program. “I keep these women in my program for as long as needed to ensure they’re stable,” Dr. Simcox says. The mothers receive support during the vulnerable postpartum time and then are shifted to a Carilion substance-abuse treatment program, where they can continue to improve.

The Value of Knowing More

As important as it is to find effective ways to treat people addicted to opioids, preventing addiction could do much more to ease today’s crisis. One of medicine’s most powerful tools in that effort is information.

Pharmacists have a powerful role to play in dispensing the facts. “We’re the gatekeepers; we fill the prescriptions physicians are writing,” says Charlie Tarasidis, Pharm.D., a staff pharmacist at Carilion. “We have ample opportunity to intervene.”

As part of this effort, Dr. Tarasidis believes it’s crucial that pharmacists educate patients about the drugs they’re receiving. (See sidebar on page 17, “The Conversation.”) “Health care professionals have done a phenomenal job using these medicines to treat patients’ pain,” he says, “but I think we’ve

done an inadequate job of teaching patients how potent and potentially lethal these medications are.”

Administering the drug naloxone to someone who has overdosed can be a lifesaver, and one part of Virginia’s response to the opioid state of emergency is REVIVE!, a program that trains health professionals and lay people how to use naloxone. Dr. Tarasidis has taken part in that training and provides the drug and supportive education to any patient he thinks may benefit from having naloxone in the house.

In addition, because physicians who prescribe opioids will also benefit from information about the drugs and possible alternative treatments, the Health Analytics team at Carilion has created a data analytics “dashboard,” a visual presentation of the number of opioid prescriptions—and the total number of pills—written by each doctor, as well as the patients for whom these prescriptions are written.

“We can review outliers—those who write or receive unusually high numbers of opioid prescriptions,” Dr. Trestman says. He notes that even in cases where a doctor may be writing too many prescriptions for opioids, the goal is educational, not punitive. Carilion physicians have responded positively to these efforts. The doctors also receive education about best practices and rules for prescribing opioids. These initiatives have helped reduce the Emergency Department’s opioid prescriptions, for example, by more than 40 percent.

In a related effort, T.K. Miller, M.D., vice chair of Orthopaedic Surgery at Carilion, working in conjunction with the Virginia Orthopaedic Society, has produced a pocket card that lists information on storage and disposal of unneeded opioids. These unused opioids, typically left in unlocked medicine cabinets, are at high risk of being abused. (Carilion’s pharmacy now also offers drug-destruction options to patients.)

“We’re now giving out thousands of those cards,” says Dr. Trestman, who notes that U.S. Senator Mark Warner, a Virginia Democrat, has requested a supply of them to distribute nationally.

Research Toward a Cure

Reducing the number of opioid prescriptions and educating doctors and patients alike about the potential dangers of the drugs can have a significant impact. But those undertakings won’t put a meaningful dent in addiction. Successful treatment design is the ultimate goal of Warren Bickel,

Ph.D., director of the Addiction Recovery Research Center at the Fralin Biomedical Research Institute at VTC.

“What motivates me,” Dr. Bickel says, “is that if you bring a loved one to a treatment facility and the physicians there are being honest, they have to admit that there’s about a 70-percent chance that treatment will fail.”

Dr. Bickel hypothesizes that a major hurdle in efforts to improve on that sobering statistic is the delay that patients so often face in being admitted to an effective treatment program. They’re brought to the Emergency Department after an overdose, revived with naloxone, and given a referral to a treatment program only to find that it may require they wait a month or more.

“If you’re opioid dependent, you need to use the drug three to four times a day to avoid getting sick,” Dr. Bickel says. “So the most likely outcome of waiting for treatment is that you’ll continue using the opioid, and—if you’re lucky—you’ll end up in the ER again.”

To improve on this situation, Dr. Bickel is working with Carilion’s psychiatric division to create a regimen in which opioid-addicted patients in the Emergency Department can be immediately engaged in treatment. Once addicted

increasing the time span to three months, to alter their conception of the future to one that aligns with more positive behavior. Texting is one tool for getting that message across, and in research involving those with alcohol-use disorders, that approach has been effective in reducing drinking.

Other work includes using transcranial magnetic stimulation to target parts of the brain that may not be fully active in drug dependence, or to calm down other areas that are too active. Additional research has the goal of improving the understanding of how the brain works at a molecular level. That knowledge could help create a diagnostic tool for early identification of people likely to experience substance-abuse challenges.

All of this research, along with efforts to limit opioid prescriptions and follow best practices in educating patients and doctors, are being integrated into Carilion’s approach to addressing the opioid crisis—a crisis that alienates victims from their families and communities well before an all-too-common fatal overdose claims their lives.

The ready availability of opioids and a history of over-prescription have contributed to this crisis. “What makes the opioid epidemic unique is the fact that over the



Many of those addicted to drugs engage in what’s known as delay discounting, in which they are willing to take smaller yet immediate rewards, rather than waiting for a better payoff.

individuals are sufficiently recovered and are willing, they are given an initial dose of Suboxone (a drug that can help alleviate symptoms), a bridging prescription of the medication for several days, and an appointment within 72 hours for ongoing treatment.

Another project involves the science of human prospection, which studies how people think about the future. Many of those addicted to drugs engage in what’s known as delay discounting, in which they are willing to take smaller yet immediate rewards, rather than waiting for a better payoff.

Dr. Bickel once conducted a study that asked heroin-dependent people and a control group to describe what they meant when they said “future.” For those in the control group, the term connoted an average of 4.7 years—but for those addicted to heroin, the average was nine days.


“If that’s your frame of reference,” says Dr. Bickel, “you may do things that aren’t really good for yourself or others.”

To help counter that tendency, he has developed an intervention that relies on a process called episodic future thinking. That may involve asking people what they’re likely to be doing a week or a month ahead—and then gradually

past 20 years, the medical profession and the pharmaceutical industry, each in different ways, have helped create it,” explains Dr. Trestman. “Despite our oath to do no harm and to reduce pain and suffering, our actions have contributed to making things worse for many people.”

Yet if those in the healing professions are linked to the epidemic’s origin, that only adds to their motivation to find a way out.

“This epidemic has humbled us profoundly,” says Dr. Trestman. “We’re facing a real call to action that may be a paradigm for other initiatives that go beyond the hospital’s borders and reach into the community.

“Ultimately, as physicians, we need to start thinking more and more in terms of public health,” Dr. Trestman says. “As with so many other profound problems, whether smallpox, polio, or HIV, once we wrap our minds around it and get organized, we come up with solutions. We’re already beginning to do that. There will always be new problems. But I think each time, we learn a little bit more.” 

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THE CONVERSATION

Charlie Tarasidis, Pharm.D., a staff pharmacist at Carilion Clinic, has made it his mission to educate patients about opioid addiction. When people pick up their first prescription, he leads them through a typical—yet essential—discussion.

Starting Out

“When you come into the pharmacy, one of my first questions is, ‘Have you received this level of pain medication in the past for any reason? Are you accustomed to opioids, because that’s what has been prescribed for you? Did you know that?’ Many people don’t realize they’re getting opioids.”

The Fear

“When they find out—‘Oh, this is an opioid?’—often the first reaction is fear. ‘Am I going to become an addict?’ So we have a conversation. I explain that they’re taking a potent and potentially lethal medicine.”

The Basics

“Then we’ll talk about the repercussions of taking too much of the drug, or of taking it for too long. I’ll ask whether there are issues in the home we should be aware of. They might say, ‘Well, I have a son who is a recovering addict.’ When patients realize what having those pills around might do to someone who is in recovery, often they decide they don’t want to fill the prescription after all.”

Practical Matters

“We also talk about opioid storage and disposal, and about family dynamics and the environment. Are there drug users in the home? Is there a way to keep small children safe? Then we may start the naloxone conversation, about whether they’d like to have it on hand and be trained to use it. I might say, ‘You haven’t taken many of these medications in the past, and although I don’t expect you to have a problem, things can happen. You keep a fire extinguisher in your house, don’t you? Just in case you have a fire. Why not carry an opioid-reversal kit if you’re going to take opioids?’

“And once we go through all of this, they might say, ‘Gee, do I have to get this whole prescription? Maybe I can get half of it, or maybe I don’t need to use it at all.’”





From its community clinics to its surgical suites and research laboratories, Carilion Clinic is tackling the twin epidemics of obesity and type 2 diabetes. **BY CHARLES SLACK**

DOUBLE TROUBLE

FOR THE MAN LYING ON HIS BACK at Carilion Roanoke Memorial Hospital, this was the ultimate wake-up call.

Sure, he'd put on a lot of weight. He ate more than he knew he should, but who didn't? And between his desk job and family responsibilities, who had time for exercise? He'd made it to his 40s feeling good and thinking of himself, despite obesity, as a healthy person. He couldn't recall his last visit to a doctor.

Yet now here he was in the Emergency Department suffering from chest pains and shortness of breath. Tests revealed wave after wave of terrifying news. In addition to severe hypertension, he was diagnosed with type 2 diabetes, a potentially fatal illness that can lead to cardiovascular disease, nerve and eye impairments, kidney damage, and a host of other serious conditions.

Though the connection between type 2 diabetes and weight is well established (more than 90 percent of those with the disease are overweight or obese), the man “was shocked that this had happened to him,” says Natalie Klawonn, M.D., a bariatrician at Carilion Clinic. The stakes couldn’t have been higher: Without significant weight loss and changes to his lifestyle, he might not see his kids grow up.

A Rising Epidemic

At a time when some 39 percent of U.S. adults are obese and more than 100 million are classified as either diabetic or prediabetic because of their weight, clinicians who invoke the term “epidemic” are hardly exaggerating.

Obesity has become so common that even doctors-in-training sometimes need to be reminded not to overlook its health risks, says Mark Greenawald, M.D., Carilion’s vice chair of Family and Community Medicine. “Somebody will have a body mass index in the obese range. I’ll ask a resident, ‘What did you think of their weight?’ and the resident won’t have even noticed, because that weight has become the new norm.”

Type 2, by far the most common type of diabetes, occurs when the body resists insulin, a hormone essential to regulating blood sugar. With each pound of excess weight, the resistance only stiffens. “When that happens, they start to suffer the consequences of diabetes over the span of years and decades,” says David Salzberg, M.D., bariatric

surgeon and head of Carilion’s Weight Loss Center. (Type 1, representing about 5 percent of diabetes cases, is an autoimmune disease that prevents the pancreas from producing insulin.)

What’s especially vexing about type 2 diabetes is that relief seems tantalizingly attainable. Losing as little as 5 percent of body weight can significantly reduce the symptoms, and for patients who can lose more and keep the pounds off, both the symptoms and the need for medication often disappear entirely.

Yet as a thousand fad diets and untold closets stuffed with last year’s exercise gizmos attest, those goals are infinitely easier to talk about than to achieve. In rural areas such as southwestern Virginia, low incomes, increasingly sedentary lifestyles, and a reluctance to seek medical care only add to the challenges. In response to this epidemic, Carilion has launched a multifront offensive stretching from community clinics to surgical suites to research laboratories.

The Medical Side of Weight Loss

For that man in his 40s, life changed when Dr. Klawonn offered him not just dire news but a hopeful path forward—enrollment in Carilion’s intensive, 12-week Medical Weight Loss Program.

Since the program’s inception in January 2017, roughly 2,000 adult patients have been through the program, open to those with a body-mass index greater than 30 (186 pounds for a 5-foot, 6-inch adult)—the standard threshold for obesity. A pedi-

atric bariatrician will be added soon, to help combat the growing problem of childhood obesity.

On the first day, patients meet with Dr. Klawonn as well as a psychologist, a nutritionist, and an exercise physiologist. Patients measure progress against incremental, achievable goals. And, in a society that too often cruelly frames obesity as a lifestyle choice by people lacking resolve, the program calls it “a lifelong illness.”

“If it were as simple as ‘eat less,’ everyone would do it,” Dr. Klawonn says. “I tell my patients that with obesity, like diabetes, it’s always going to be there, even if it’s gone into remission.”

The program resorts to weight-loss drugs only sparingly and tactically. “We may give them a medication that will stop them being quite so hungry for a few weeks, until we can get the stomach to shrink,” Dr. Klawonn says. “We can also use medications to target food-addiction thoughts and behaviors as well as target specific disorders such as binge eating. It’s a matter of getting them over their hurdles.”

Long after the 12 weeks are over, follow-up visits and consultations help ensure that good habits don’t fall by the wayside. And while success is by no means universal, results can be life-changing for patients and their families.

Over the next year, dietary changes, regular exercise, and steady encouragement from Carilion clinicians helped the man lose 150 pounds and stop his medications for diabetes and hypertension. Better still, he’s passed his healthy habits along to his wife and kids, all of whom had struggled with their weight. These days, family activities often include hikes or bike rides.

“You don’t have to become a ‘health nut,’” Dr. Klawonn says. “You can still do normal things. It’s about living a healthier life.”

Surgical Answers

Still, diet and exercise aren’t always enough, and patients with a body-mass index greater than 40—or 35, if health concerns warrant—may be candidates for surgery. Performing some 300 new surgeries (not counting follow-up procedures) each year, Carilion is one of the busiest bariatric centers in the Mid-Atlantic region. Since 2006, it’s also been accredited as a “Center of Excellence” by the American College of Surgeons and the American Metabolic and Bariatric Surgery Society.

Most Carilion procedures these days involve minimally invasive laparoscopic or robot-assisted approaches, greatly reducing patient discomfort and recovery times. Not only have times in actual surgery been reduced from six hours with open surgery to about one hour for a sleeve gastrectomy

“If we do surgery without giving patients an idea of the addiction that is causing them to overeat and without giving them the tools to fight it, they will regain the weight 100 percent of the time.”



Ask the Experts



MARK GREENAWALD, M.D.
Department of Family and Community Medicine
“I’ll ask a resident, ‘What did you think of their weight?’ and the resident won’t have even noticed, because that weight has become the new norm.”



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Department of Medicine
“We may give them a medication that will stop them being quite so hungry for a few weeks, until we can get the stomach to shrink.”



T.A. LUCKTONG, M.D.
Department of Surgery
“Following a procedure, not everybody can come off their diabetic medications. But most can.”



DAVID SALZBERG, M.D.
Department of Surgery
“Patients come out of surgery with almost no pain, and they’re back up and on their feet within four hours of coming out of anesthesia.”



One program, Fresh Foods Rx, aims to improve nutrition for some of the estimated 1.7 million Virginians now living in food deserts.

or two for a gastric bypass, procedures that once required three weeks in the hospital now involve an overnight stay.

“Patients come out of surgery with almost no pain,” Dr. Salzberg says, “and they’re back up and on their feet within four hours of coming out of anesthesia.”

The long-term results can be remarkable. Tananchai Lucktong, M.D., a bariatric and general surgeon at Carilion, notes that with gastric bypass, for example, patients typically maintain about a 30-percent weight reduction even a decade after surgery.

“Following a procedure,” Dr. Lucktong says, “not everybody can come off their diabetic medications. But most can.”

Despite those results, Drs. Lucktong and Salzberg emphasize that bariatric surgery is no easy fix. Benefits require a lifelong commitment from the patient to significant changes in diet and lifestyle.

“If we do surgery without giving patients an idea of the addiction that is causing them to overeat and without giving them the tools to fight weight gain in the future,” Dr. Salzberg says, “they will regain the weight 100 percent of the time.”

Ancient Hunger, Modern Abundance

While clinicians treat patients in the here and now, Carilion is using its robust research capabilities in partnership with Virginia Tech to study the causes of overeating and learn what combinations of treatment, education, and behavior modification might help more people achieve sustained weight loss.

Biologically speaking, we inhabit bodies still hardwired for ancient times of scarcity, compelling us to gobble up calorie-laden foods and storing fat as protection against lean days ahead.

Those urges have hardly abated now that food, by historical standards, is plentiful and cheap. On the contrary, our brains just keep resetting expectations.

“A pound of chocolate is 2,500 calories; a pound of fruit is 300 calories. So we’re going to feel much better eating chocolate than eating an orange,” says Richard Seidel, Ph.D., director of research for Carilion’s department of Psychiatry and Behavioral Medicine.

At the Center for Transformative Research on Health Behaviors, based in the Fralin Biomedical Research Institute at VTC, the emphasis is on translational research—studies with the potential to translate directly into benefits for patients. One of the center’s co-directors, Matthew Hulver, Ph.D., says the goal is to create “a hub where we can bring together Carilion physicians and Virginia Tech scientists to go after these big problems.”

Dr. Hulver, who studies how and why the body’s metabolism changes as a result of overeating and lack of exercise, says the relationship among researchers, physicians, and subjects is one of mutual benefit with a clear, overriding goal: healthier patients and better lives. “That could be controlling diabetes,” he says, “or it could be weight loss, or better eating strategies.”

Take, for example, the challenge of helping obese patients stick with healthy regimens, when temptations abound and they may live miles from the nearest clinic. Could technology provide an answer?

That’s the focus of Dia-BEAT-it, a multiyear study involving nearly 600 morbidly obese, prediabetic subjects from southwestern Virginia. Working with Carilion’s department of Family and Community Medicine, Dr. Seidel and other researchers from Carilion and Virginia Tech looked at how subjects responded to various combinations of clinic-based group sessions, instructional DVDs, and interactive voice response programs—an evolving technology enabling people to interact with computers over their personal phone.

While subjects in all groups lost weight, those who combined DVD and interactive voice response training saw especially positive results, with 27 percent losing at least 5 percent of their body weight,

according to preliminary results. If those results hold up over time, the tech-aided approach could offer a cost-effective solution for clinics whose staffs are stretched thin. More important, it could help patients who might otherwise drop out of weight-loss programs achieve long-term results.

Another study is examining the decision processes and associated brain activity that contribute to prediabetes and may eventually lead to diabetes. That decision process refers to the preference for short-term rewards instead of a later reward with greater benefits, a phenomenon known as delay discounting. The study—conducted by Warren Bickel, Ph.D., director of the Fralin Biomedical Research Institute’s Addiction Recovery Research Center, and Leonard Epstein, Ph.D., division chief of behavioral medicine at the University at Buffalo Jacobs School of Medicine and Biomedical Sciences—is building on Dr. Bickel’s research into substance abuse, with the aim of halting the progression of diabetes.

Delay discounting is associated with drug abuse, but the underlying principle can apply to many unhealthy behaviors, according to Dr. Bickel. Importantly, delay discounting can be improved by vividly envisioning several successive future events. In one study, he found that cigarette-deprived smokers indulged less when they listened to recordings of themselves describing future events of importance, such as friends’ weddings or the birth of grandchildren.

“They changed their behavior when they heard their own voice describe the future, and that allowed them to escape their preoccupation with immediate gratification,” says Dr. Bickel. “This allows us to start developing an approach to treatment that may be useful whenever someone is choosing unhealthy options now, instead of healthy options that are more delayed.”

Dr. Bickel’s goal is to understand how people shift from one end of the spectrum to the other, and how to better mitigate the overeating and under-exercising behaviors that can lead to obesity and type 2 diabetes.

Community Outreach

The frontline in Carilion’s battle against obesity and type 2 diabetes runs from the city of Roanoke to small towns and rural areas spread across southwestern Virginia. With its clinic model and strong history of community-based medicine, Carilion is meeting that challenge head-on with programs aimed at helping residents.

One such program, Fresh Foods Rx, aims to improve nutrition for some of the estimated 1.7 million Virginians now living in food deserts. Paradoxical as the term “food desert” sounds in relation to obesity, many urban and rural neighborhoods lack ready access to markets offering the *right kinds* of foods, namely, fresh fruits


and vegetables. The default options—cheap fast food and processed items from convenience stores—are fueling the obesity crisis, says Dr. Greenawald.

Individuals at risk for type 2 diabetes receive weekly classes and vouchers for fresh produce from a weekly mobile market. The program, operated with Healthy Roanoke Valley, has helped nearly two-thirds of participants lower their body-mass index and improve hemoglobin A1C levels, a measure of blood sugar used to diagnose diabetes.

Such results could be just the start, Dr. Greenawald believes. He envisions working with regional schools to help improve food choices and educate kids on nutrition. If Fresh Foods Rx can succeed in raising demand, organizers might encourage store owners to make room on their shelves for healthier items.

“If you knew people were going to be regularly buying black beans and brown rice,” Dr. Greenawald asks, “wouldn’t you be more willing to stock those?”

A bag of rice may seem like a tiny step against problems as all-encompassing as obesity and type 2 diabetes. In the end, though, success may be defined as the ability to improve one life at a time.

“It’s not just a number on the scale,” Dr. Klawonn says. “If you normally eat fast food every day, but last week you had it only twice, or if you never go for a walk and last week you walked for 10 minutes, that’s progress.” 

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BODIES OF EVIDENCE



In a twist on the proverb, “Physician, heal thyself,” Carilion Clinic recently tapped its own workforce to test the effectiveness of its “Fit Rx” weight loss and fitness program, offered at five regional Carilion Wellness centers. Eighteen members of Carilion’s police and security forces volunteered for a 90-day program including use of Carilion Wellness facilities, as well as group and personal training on exercise and nutrition. They were offered small cash incentives for achieving weight loss, attendance, and other goals.

Of the 13 officers who completed the program, six lost a clinically significant 3 percent or more of body weight. Participants increased their lower- and upper-body strength, and gained better aerobic endurance, agility, and body flexibility. After just three months, while A1C blood glucose levels were unchanged, participants saw modest decreases in triglycerides and LDL (“bad” cholesterol) and a modest increase in HDL (“good” cholesterol).

The results, while preliminary, were encouraging enough that Carilion plans to target other employee groups with similar programs.

WALKING THE TALK

Medical students take a public health walk to learn about their patients.

BY PAULA BYRON

FOR INCOMING STUDENTS AT THE VIRGINIA TECH CARILION SCHOOL OF MEDICINE, the longest journey indeed begins with a single step.

As part of their critical mission of understanding how to provide patients with the best possible care, first-year students participate in a walking tour that seeks to teach the value of public health, one literal step at a time, during a stroll through Roanoke, Virginia.

At designated stops along the walk, experts provide students with examples of both health hazards and interventions that can improve the well-being of local residents.

"Many people view a doctor's purview only in the clinical context," says Cynda Johnson, M.D., M.B.A., founding dean of the school. "Yet zip codes are one of the biggest predictors of health outcomes. Neighborhoods may be only a mile away from one another, but when it comes to health concerns, they may be worlds apart. We want our students to understand the many factors that affect their patients' health."



1

Socioeconomic Status

The annual public health walk always begins at the Virginia Tech Carilion School of Medicine, where students learn how strongly education correlates with positive health outcomes and how income can serve as an insulator against many health hazards.

2

Safe Places to Play

Physical exercise is essential to good health. The region's greenways system, which offers more than 20 miles of paved trails snaking through the city, intersects with playing fields and provides both children and adults with ample opportunities for exercise.

3

Mental Health Support

Mental health is critical to physical health. The Dr. Robert L.A. Keeley Healing Arts Garden near Carilion Roanoke Memorial Hospital provides patients, families, and staff with a calming and restorative setting, complete with the soothing sound of moving water.

4

A Sense of Community

Something as simple as easy access to a bicycle can make a difference. Carilion Clinic has a Zagster station that allows employees and community members alike to cycle, improving exercise, air quality, and a feeling of belonging, all of which improve health.

5

Fresh Food Access

Convenience stores may serve as the primary source of groceries for residents who, because of income or transportation limitations, may have infrequent access to nutritious food. Alternatives include Fresh Foods Rx, a prescription Carilion doctors can write for healthful choices.

6

Healthy Environment

The built environment has a tremendous impact on community health. Stormwater management affects water quality, for example, while the presence of trees affects air quality. Busy streets with no sidewalks can be deadly.

7

Access to Services

CHIP—the Child Health Investment Partnership—promotes the health of medically underserved children, while the Bradley Free Clinic brings volunteer health care professionals together to offer free medical and dental services to community members who cannot afford them.

8

Safe Shelter

The Rescue Mission of Roanoke, a crisis intervention center, provides the homeless with shelter, hot meals, and social services. The homeless are not the only ones vulnerable, though; those with poor-quality housing may face such hazards as lead, radon, and mold.

E

Enhanced

Recovery

R

A

After

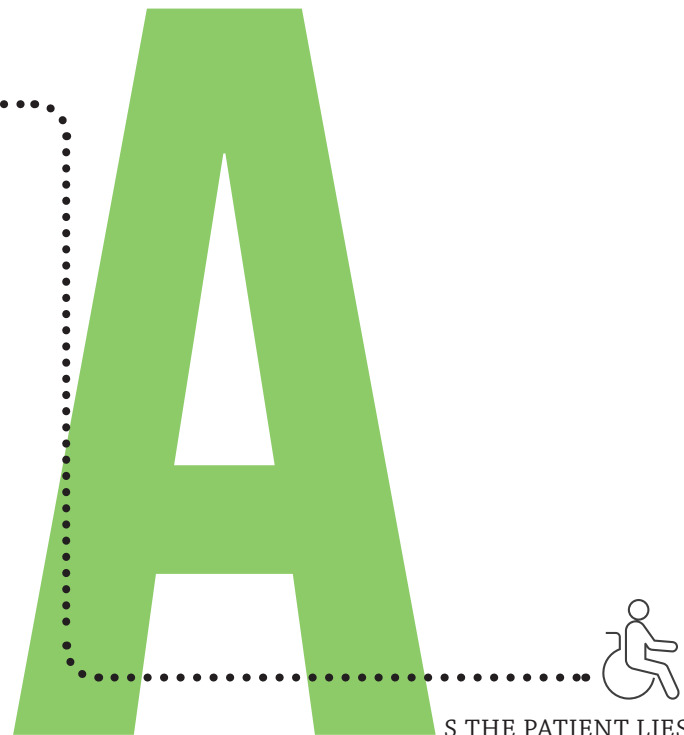
Carilion Clinic is at the forefront of an inspired approach that helps patients recover quickly.

BY JESSICA CERRETANI

Surgery

S





AS THE PATIENT LIES on the operating table, his medical team prepares for a morning of surgery—in this case, a bowel resection to help treat his Crohn’s disease. But even before the anesthesia takes effect, he and his clinicians have laid a strong foundation for successful recovery. In the months leading up to the elective procedure, the patient has stopped smoking, started walking every morning, and even attended a nutrition class. Just a few hours ago, he drank a carbohydrate-rich beverage aimed at preventing postoperative insulin resistance. And when he emerges from surgery, he may begin on oral fluids—and be taken off intravenous fluids—that same day.

Such approaches may seem to fly in the face of traditional clinical wisdom. Indeed, the protocol, known collectively as Enhanced Recovery After Surgery, or ERAS, represents a paradigm shift in care. It’s also increasingly being shown to improve patient outcomes, dramatically reducing complication rates and shaving days off of postoperative hospital stays.

“This is a revolution in surgical care,” says Sandy Fogel, M.D., a general surgeon at Carilion Clinic who is largely credited with helping make the health care system an early adopter of ERAS.

A Paradigm Shift

ERAS has its roots in Denmark, where elements of the protocol have been implemented and studied for nearly two decades. The approach turns traditional perioperative dogma on its head, questioning the benefit of tenets such as prolonged fasting, mobility limitations, and a slow return to normal eating and drinking after surgery. In fact, ERAS draws from evidence that suggests that avoiding such tactics may actually reduce the metabolic stress, fluid overload, and insulin resistance typically associated with surgical procedures, which can lead to such postoperative complications as cardiovascular problems and infections.



5.33 Days

Patients undergoing colorectal procedures who participated in Carilion’s Enhanced Recovery After Surgery protocols had an average hospital stay of 5.33 days, compared to an average of 7.93 days for those who didn’t.



Rather than turning to opioid drugs immediately, clinicians are using a multimodal approach to pain management, which can include such alternatives as epidurals, nerve blocks, intravenous acetaminophen, and low-dose drips of lidocaine.

Instead, ERAS focuses on nearly three dozen techniques, including preoperative counseling, optimizing nutrition, standardizing analgesia without opioid use, minimizing electrolyte and fluid imbalance, using the most minimally invasive approaches, and promoting early ambulation and feeding (see “ERAS at a Glance”). The evidence is intriguing: Results of large studies on ERAS show decreased recovery times, shortened hospital stays, reduced hospitals costs, and increased patient satisfaction.

Despite such positive results, ERAS didn’t catch on in the United States until recently. It has been offered at Carilion since 2014, when Dr. Fogel and colon and rectal surgeon Farrell Adkins, M.D.—both of whom had become increasingly impressed by the literature—began working on a plan to implement an ERAS protocol. The method was first applied in patients undergoing colorectal surgical procedures, such as bowel resections used to treat cancer or inflammatory bowel disease. In the past, the nature of these operations necessitated lengthy hospital stays and difficult recoveries.

“We wanted to make that experience better for patients and assist in their healing so that they were able to return home more quickly,” explains Dr. Adkins.

As with any major change, the process was challenging at times: Every clinician involved in a surgical patient’s care had to learn new ways of doing things. Yet bringing ERAS to life also presented a remarkable opportunity for Carilion’s staff, says Deborah Copenig, M.S.N., R.N., senior director of surgical services quality.

“We had participation from many departments, from surgery to pharmacy to housekeeping,” she says. “The organization really rose to the occasion by committing to this protocol and following through. It’s a great example of multidisciplinary teams working together.”

Udeniable Outcomes

In just five years, this persistence is paying off. Carilion’s ERAS protocol includes a step known as prehabilitation, an approach that includes a class where surgical candidates learn about the importance of oral care to help prevent infections, nutrition, physical activity, and other aspects of good health. And the data support its use: A recent study published in *American Surgeon* by Dr. Fogel and his colleagues found that patients undergoing colorectal procedures who participated in Carilion’s ERAS protocol with prehabilitation had an average hospital stay of 5.33 days, compared to an average of 7.93 days for those who didn’t receive the approach.

“The process has paid for itself many times over by now,” says Dr. Fogel. “But the most important benefit is to patients.”

ERAS also appears valuable for patients who undergo emergency procedures. Because these patients are unable to plan for

surgery, they miss most aspects of prehabilitation. Yet Dr. Fogel’s research suggests that this population can still gain some advantages from ERAS, too.

“Even if we can’t use all aspects of ERAS, we can still employ some elements to improve outcomes for patients undergoing emergency operations,” says Michael Nussbaum, M.D., Carilion’s chair of Surgery. “We’re focusing on what we can do, not on what we can’t.”

One aspect of ERAS that’s of particular interest to patients and their families is its decreased reliance on narcotic pain medication. Rather than turning to opioid drugs immediately, clinicians are using a multimodal approach to pain management, which can include such alternatives as epidurals, nerve blocks, intravenous acetaminophen, and low-dose drips of lidocaine. As a result, patients feel less groggy, less nauseated, and better able to move around and eat by mouth after surgery, all of which can speed recovery. And there’s another benefit.

“The risk of opioid dependence and abuse has become a huge concern for many people,” says Dr. Adkins. “This gives them peace of mind that they won’t need to take these drugs for long—or at all.”

Forging Ahead

Based on its success in colorectal patients, Carilion has expanded the use of ERAS to other surgical specialties—including bariatric surgery, gynecology, and procedures on the head, neck, breast, liver, pancreas, and bladder—with impressive results.


In 2017, for example, Carilion’s enhanced recovery protocol for all patients undergoing hysterectomy, championed by Janet Osborne, M.D., Carilion’s chief of Gynecologic Oncology, tied for first place in the Council on Patient Safety National Improvement Challenge on Prevention of Surgical Site Infections in Major Gynecologic Surgery.

While not all surgeons are following the ERAS protocol yet, proponents say the advantages are obvious.

“It’s not a mandate at Carilion, but we highly recommend that staff use it,” says Dr. Nussbaum. “When we look at outcomes data, we can see the difference it makes.”

The institution is also making strides to ensure that quality control for ERAS remains high. A quality control council composed of multidisciplinary staff meets regularly to manage challenges that can arise, such as process gaps and medication shortages. Enhancements—such as protocols tailored to specific patient populations, better identification of patients at risk for deadly postsurgical blood clots, and inclusion of ERAS data into electronic medical records—are also in the works, says Copenig.

Beyond faster recovery, fewer complications, and improved costs, the true value of ERAS is evident in the patients themselves.

“It’s not just about shorter hospital stays,” says Dr. Fogel. “When someone succeeds with ERAS, they tell me they feel normal at their first postoperative appointment. Patients are our biggest advocates.” 

ERAS at a glance

A standard ERAS protocol comprises more than 30 elements, based on the idea that together these approaches can prevent the development of insulin resistance, which has been shown to prolong recovery and increase complications after surgery. Some of the most common aspects of ERAS include:

+	Preadmission education and planning
+	Reduced duration of preoperative fasting
+	Carbohydrate loading
+	Prevention of deep vein thrombosis
+	Prophylactic antibiotics
+	Warming techniques to increase body temperature
+	Opioid-sparing pain management
+	Perioperative fluid management
+	Avoidance of prophylactic nasogastric tubes and drains
+	Early oral nutrition after surgery
+	Early ambulation after surgery
+	Early catheter removal
+	Prevention and management of postoperative nausea and vomiting

THE POWER OF



Carilion Clinic uses a dyad
model across levels to create
a better health care system.

BY
ANITA SLOMSKI



IN GOOD COMPANY:
Dr. Michael Jeremiah and Kim
Roe work together to ensure
Carilion Clinic's department
of Family and Community
Medicine runs smoothly.

As

AT MOST URBAN HEALTH CENTERS, THE EMERGENCY Department of Carilion Roanoke Memorial Hospital can be hectic. By 2016, a facility designed to accommodate 65,000 patient visits per year was handling 85,000, resulting in waits to see a doctor of up to 90 minutes at peak times. Excessive delays caused 6 percent of patients to leave without being seen.

Today, the Emergency Department has 16 additional beds, and an improved triage system ensures the sickest patients are seen first. Working together, physician and administrative leaders monitor data about current usage to forecast future demand, and they are held accountable for smooth, efficient patient flow. Although the department now handles an additional 3,000 patients annually, its wait times have dropped dramatically, and only 1.7 percent of patients leave without being seen.

Providing faster, more efficient emergency care would not have been possible without intense daily collaboration, says John H. Burton, M.D., chair of Emergency Medicine at Carilion Clinic. Dr. Burton cites his administrative partner, Paul Davenport, M.B.A., vice president of emergency services and care management, as a key catalyst in those achievements.

“Durable success doesn’t happen,” Dr. Burton says, “without a thriving partnership between clinicians and administrators who push their teams to achieve the same goal.”

MEDICINE AS A TEAM SPORT

At Carilion, this carefully cultivated approach is called “dyad leadership,” and it happens everywhere—in the C-suite, in departments and sections, and in individual clinics throughout the system, with leadership pairs collaborating on every aspect of Carilion’s operations.

“Dyad leadership isn’t unique to Carilion, says Patrice M. Weiss, M.D., chief medical officer and

“**If clinicians don’t have easy access to the right information when patients are in front of them, the opportunity to improve care may be missed.**

—Michael Jeremiah, M.D., Chair of Family and Community Medicine at Carilion Clinic

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executive vice president of Carilion. “Yet the extent to which we use dyads across the organization and our deep belief in their importance in collective decision-making is unusual.”

All of medicine is a team sport today, according to Dr. Weiss. “Hospital rounds involve teams of medical specialists—from doctors and nurses to care management experts and pharmacists—conferring at the bedside to provide the best clinical outcomes for the patient,” she says. “Likewise, we need the contributions of both physicians and administrators to make the best operational decisions and to be collectively responsible for the care Carilion provides.”

One decision on how to improve patient care can affect 20 different areas of a health system. The dyad model gives administrators crucial insights into patient care, Dr. Weiss says. “They need to understand the clinical implications of budgetary and other operational decisions.”

At the same time, physicians get an equally important view of administrative concerns. The financing of health care has also become too complex for hospitals and clinics to function as they once did, with physicians focused solely on taking care of patients while administrators handled the business decisions.

“Today, physicians have to manage patient care in a fiscally responsible way, or no one gets paid,” says David Musick, Ph.D., associate dean of faculty affairs at the Virginia Tech Carilion School of Medicine. “There are financial penalties if patients stay in the hospital too long or develop complications after leaving the hospital. Hospital administrators need the partnership of physicians to make decisions in today’s market.”

TEAMWORK IN ACTION

During the past year, dyad leaders at Carilion have launched several quality improvement projects. When the department of Orthopaedics created Bone Health, a new clinic devoted to preventing fractures, disability, and death from osteoporosis, physician-administrator teams consulted on space requirements, capital expenses, workflows, and hiring. In the department of Pediatrics, dyad teams developed a sepsis alert project to identify children with signs of sepsis rapidly so appropriate antibiotics could be administered immediately along with more intensive care.

And in the department of Family and Community Medicine, paired administrators and physicians have launched quality and patient-safety initiatives that have dramatically improved patients’ blood pressure control, prevented kidney complications in patients taking high-risk medications, increased the percentage of Medicare patients getting recommended preventive screenings, and reduced opioid prescriptions for patients who no longer needed them.

“Quality patient care comes from highly trained professionals who intend to do the right thing every time they see a patient,” says Michael Jeremiah, M.D., chair of Family and Community Medicine for Carilion. “Yet if clinicians don’t have easy access to the right information—say, prompts from the electronic medical record to follow a particular clinical protocol—when patients are in front of them, the opportunity to improve care may be missed.”

That’s where Dr. Jeremiah’s dyad partner, Kim Roe, M.B.A., plays a role.

“My job as the administrator is to remove any barriers that stand in the way of efficiency and the quality outcomes we’re trying to achieve,” says Roe, vice president of Family and Community Medicine.

DEVELOPING LEADERS

Carilion leaders consider the dyad model so essential to the clinic’s culture and future that they are creating a comprehensive, formal program to develop leadership and teamwork. “We don’t want to leave it to chance that a dyad is functioning well,” says Mark Greenawald, M.D., vice chair of Family and Community Medicine.

“Our goal is to provide consistently excellent care across the entire health system,” says Dr. Greenawald, who serves as medical director for physician leadership and professional development at Carilion, in part through the newly forming Carilion Leadership Institute. “That means our leadership must have consistently high effectiveness across all departments, with no dyads performing without a healthy chemistry.”

“**My job is to remove any barriers that stand in the way of efficiency and the quality outcomes we’re trying to achieve.**

—Kim Roe, M.B.A., Vice President of Family and Community Medicine at Carilion Clinic

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At a recent retreat, for example, physicians and administrative partners analyzed how their personality types affected their leadership styles and discussed the importance of communicating their expectations for the dyad to avoid misunderstanding and resentment.

“We want to leverage the strengths people bring to their dyad relationships while raising awareness of people’s blind spots as leaders,” says Dr. Greenawald. “This is about rolling up your sleeves to figure out how to work together effectively.”

GETTING TO COMMON GROUND

Dyad partners must do more than communicate honestly and openly with each other; they must also speak the same language. While many Carilion administrators have clinical backgrounds in addition to master’s degrees in business administration, physician leaders may need training in business plans, hospital finances, and marketing, as well as the principles of managing and motivating people.

As a physician-led organization, Carilion has always invested in helping physicians gain the skills they need to excel as leaders. For years, Carilion’s human resources department has offered classes, coaching, and mentoring about the dynamics of Carilion’s organization and governance as well as about the broader health-care landscape. Topics such as emotional intelligence, listening and communication skills, effective hiring, and conflict management are also covered.

“We have a simulation lab in which we videotape physician leaders practicing a board presentation or role-playing a challenging situation with an employee,” says Tara Wiedeman, Carilion’s senior director of human resources. “We will offer strategies for improvement or provide a coach who works with a physician long-term to eliminate the limitations impeding that leader’s performance.”

Physician leaders also receive business and operational training customized for them through the Section Chief Leadership Academy.

“Physicians have been socialized to always look competent,” says Dr. Greenawald. “We’re creating a safe space for them to learn business skills with each other so they don’t feel vulnerable while getting up to speed.”

The leadership capabilities of an organization are absolutely essential to achieving that organization’s goals, says Paul Hudgins, Carilion’s senior vice president and chief human resources officer. “We believe developing and nurturing the right leadership traits can inspire everyone to work together collaboratively to deliver the highest quality clinical care and patient safety.”

Ultimately what drives all of these developments at Carilion, Hudgins adds, is a commitment to fulfill its promise to provide care that is in the best interest of its patients and the communities it serves. **CM**



Mindful Medicine

Laurie Seidel is leading Carilion Clinic's efforts to build a more mindful community one meditative moment at a time. **BY MARYA BARLOW**

LAURIE SEIDEL HAD ALWAYS FOUND SOLACE IN PRACTICING mindfulness as an antidote to the everyday stresses of working in health care. But after a fractured vertebra landed her in the hospital in 2013, she discovered a population in need of mindfulness that had been right under her nose.

"As I lay in that hospital bed, I observed the stress levels and time pressure of the health care professionals taking care of me," she says. "I realized I had some self-care skills that I needed to be sharing with my colleagues."

That hospital-bed epiphany led Seidel to launch, in 2014, a mindfulness practice at Carilion Clinic that allowed harried clinicians the opportunity to engage in voluntary mindfulness workshops, presentations, and group practice. Over the past five years, her work as an educator in the department of Psychiatry and Behavioral Medicine has extended further into mindfulness—both by design and demand. As a certified mindfulness teacher, she holds weekly drop-in practice sessions for employees, leads



research studies on how mindfulness affects health care professionals' well-being, and teaches an elective course on the foundations of mindfulness practice to Virginia Tech Carilion School of Medicine students.

With strong support from Carilion leadership—especially Robert Trestman, M.D., Ph.D., chair of the department of Psychiatry and Behavioral Medicine—Seidel also shares the gift of mindfulness with schools, public agencies, and non-profit partners throughout the Roanoke Valley. It's a labor of love she calls "building a mindful community."

"I weave mindfulness into everything I do," she says. "The reward is seeing how much people benefit from just a few minutes of self-care. When we sit down to practice mindfulness together, I can actually see them becoming more at ease. It's an effective reboot."

Healing the Healer

Health care professionals are notoriously negligent when it comes to self-care. A 2015 study published in *Mayo Clinic Proceedings* revealed that more than half of all U.S. physicians experience professional burnout, a state defined by emotional exhaustion associated with work-related stress, feelings of detachment toward patients, and a low sense of personal accomplishment. A similar study of medical students published in the *Annals of Internal Medicine* reported that 50 percent had symptoms of burnout before even starting their careers.

Mindfulness—the practice of focusing attention on the present moment and accepting it without judgment—can

be a powerful remedy. Once the domain of meditators and yogis, mindfulness gained popular acceptance after being introduced to mainstream American medicine in 1979 by Jon Kabat-Zinn, Ph.D., and validated by hundreds of subsequent studies confirming its mental and physical health benefits.

One study in the *Annals of Family Medicine*, for example, revealed that physicians who participated in an eight-week mindfulness training course were able to reduce feelings of burnout, depression, anxiety, and stress. In a follow-up study nine months later, those same physicians reported lasting benefits and increased well-being. Another *Annals of Family Medicine* study found that clinicians who practiced mindfulness not only had better patient-centered communication but also more satisfied patients.

"We're seeing more and more the side effects of practicing medicine," says Dr. Trestman. "That's driving us not only to try to eliminate sources of stress, but also to find alternatives that can genuinely address issues of pain, stress, and burnout. Interventions like mindfulness can empower us as health care providers and help our patients and their families stay healthy."

"We as a field have placed a great deal of emphasis on technology and efficiency," Dr. Trestman adds. "For that to work, we can't forget the fact that the goal is humanity. We have to use health care as a way to encourage creativity and meaning and to encourage people to lead full and vibrant lives. Mindfulness is one component of living a healthy life."

Seidel's research at Carilion focuses on how even short-term exposure to mindfulness training and practice can significantly alter the well-being of busy health care providers.

One minute to mindfulness: STOP practice

Laurie Seidel shares the following tips for a minute of self-care:

Stop. Pause.

Take a few slow, deep, calming breaths and then let your breathing settle into a natural rhythm. Notice your in-breath and your out-breath.

Observe and notice thoughts, emotions, and bodily sensations. Check in with yourself in a caring, nonjudgmental, curious way.

Proceed with awareness and kindness toward yourself and others. Ask yourself: "What is most important for me to pay attention to right now?"

In a four-week mindfulness course that Seidel developed for nurses in 2015, participants reported improved mindful attention and awareness, decreased emotional exhaustion, and improved quality-of-life measures—including physical health, psychological health, and overall quality of life—upon completing the course and again in a six-month follow-up.

A subsequent randomized, controlled trial broadened the same course to a group of 83 health care professionals. Results showed improvements in mindful attention and awareness, personal accomplishment, and social quality of life upon course completion and again in six months.

For her next research project, "Mindfulness in the Operating Room," Seidel has teamed up with Terri-ann Wattsman, M.D., a Carilion pediatric surgeon who was a subject in Seidel's 2015 study on mindfulness in health care providers. The team plans to measure the effects of four-minute mindfulness interventions for surgeons, surgical residents, and anesthesiologists in the operating room.

"I think mindfulness could have great utility in the operating room environment," Dr. Wattsman says. "Research has shown that even the smallest distraction can affect a case outcome. Mindfulness teaches you how to focus on the here and now and move on from distractions. It's a tool that could potentially cut down on near-misses and patient errors and, ultimately, improve patient care."

Do You Have a Minute?

To encourage clinicians to take time to care for themselves, Seidel ensures that mindfulness sessions are short, supportive, and strictly science-based. At weekly half-hour "drop-ins," open to all Carilion staff, clinicians duck in and out freely while learning mindfulness techniques grounded in three decades of research. Each week, Seidel leads participants in practicing a mindfulness-based skill, such as breath awareness, body scans, self-compassion, or mindful walking.

"I always say, 'Do you have one minute?' If you can weave in a minute here and a minute there as you go through your day, it can have an impact on your well-being," Seidel says. "Notice the transitions in your day, moments when you can practice deep-belly breathing, whether it's sitting in your car in the parking lot before going in to work or before beginning an important interaction or meeting. Mindful walking between meetings is another good choice. It's in those moments that I've seen my colleagues really make progress."

"People are actively seeking out opportunities to participate and recognizing they feel better when they do," adds Dr. Trestman. "The investment is worthwhile if we can keep clinicians engaged in productive work in their careers for another five to 10 years. That will go a long way toward addressing burnout and workforce shortage problems."

John BuAbbud, M.D., a third-year resident in psychiatry and behavioral medicine, started practicing mindfulness in medical school and now attends Seidel's drop-in sessions.

"I can't imagine going through residency training without mindfulness," Dr. BuAbbud says. "Every day, we encounter a

"**EVERY DAY**, we encounter a patient who may be in the most desperate moment of his life, who may be facing a massive loss, who may have just tried to end her own life. Mindfulness allows me to be totally present for that patient." —JOHN BUABBUD, M.D.

patient who may be in the most desperate moment of his life, who may be facing a massive loss, who may have just tried to end her own life. Mindfulness allows me to be totally present for that patient in the moment when I sit with him or her. Often, I can do nothing but listen. When I really embrace that mindset, I find myself noticing things about the patient that I was too anxious to see before. I can also see that the patient feels heard and acknowledged."

Building a Mindful Community


Seidel's efforts to share the gift of mindfulness extend throughout the Roanoke Valley. She's an in-demand speaker, providing mindfulness education and practice opportunities for people of all ages in venues ranging from classrooms and conferences to staff and leadership retreats.

This year, Carilion and Roanoke City Public Schools partnered to introduce mindfulness to educators and students—a response to research showing that mindfulness can boost student performance and help alleviate teacher burnout. Still in its infancy, the pilot program brings Seidel into Roanoke City Schools eight hours a week, where she works with administrators, faculty, and students on practicing mindfulness skills and finetuning a curriculum that will soon be available to all city schools.


Seidel kicks off each morning at Hurt Park Elementary with a four-minute mindful awareness practice during the morning announcements heard by all teachers, staff, and students. She also attends faculty meetings to share classroom mindfulness techniques, receive feedback, and offer a mindful awareness practice for the teachers' own well-being.

"The gateway to a mindful school is the classroom door and the teacher," she says. "The faculty has been very receptive. Many teachers are saying, 'My class is calmer; the children can calm themselves better now.' I think once we analyze the data, we're going to be pleased."

Still, despite the mounting research confirming its benefits, Seidel acknowledges that mindfulness isn't for everyone.

"It's not a panacea," she says. "Everything I do is by invitation to create opportunities for staff, faculty, and students to come together and practice. My goal is to help my colleagues take a few moments to practice self-care—whatever that means to them—whether it's mindfulness practice, exercise, playing music, or time spent in nature. To have greater well-being in our own lives, we need to treat ourselves as well as we'd treat our children or our patients." 





WINDOWS OF OPPORTUNITY: Dr. Joshua Adams, who leads Carilion Clinic's Aortic Center, prepares to perform a fenestrated endovascular aneurysm repair, or FEVAR. The location of the patient's aneurysm near the renal arteries requires a stent graft that includes "windows"—or fenestrations—that correspond precisely to the location of the arteries. Here, Dr. Adams sews a femoral conduit that will deliver the device. A board-certified vascular surgeon and fellowship-trained vascular interventional radiologist, Dr. Adams is one of only a handful of such trained surgeons in the country.

photo essay

Threading the Needle

A day in the life of the hybrid operating room at Carilion Roanoke Memorial Hospital

PHOTO ESSAY BY JARED LADIA

IF IT'S TUESDAY, IT'S TAVR. Other days of the week feature other acronyms: TCAR, EVAR, FEVAR.

For those who work in Carilion Roanoke Memorial Hospital's hybrid operating room, which opened in 2012, the schedule of sophisticated heart and vascular procedures has become routine, the acronyms familiar. For patients with aortic stenosis, atrial fibrillation, carotid artery disease, or even the most complex aortic aneurysms, it's life-changing.

"These procedures historically involved large surgical incisions, typically longer anesthesia time, and the postoperative complications of open surgery, not to mention prolonged hospital stays and recovery times," said Michael Abbott, vice president of the Carilion Clinic Cardiovascular Institute. "Now our patients can often be discharged the next day."

New-generation implantable devices—such as artificial aortic heart valves—delivered by catheters inserted into large blood vessels give new hope for patients not healthy enough to undergo traditional open-heart surgery.

And the hybrid operating room, with its latest imaging technologies offered in a sterile environment, is tailor-made for these surgeries. Physicians with dual competencies can perform complex procedures with minimal invasiveness, and multiple physicians from different disciplines can collaborate seamlessly.

The space is so versatile, in fact, that it's even seen an expectant mother whose urgent need for a vascular procedure led to her delivery and hysterectomy also taking place there. What would have otherwise taken a separate trip to Labor and Delivery, three sedations, and three surgeries took place in a single visit.



TAILORED APPROACHES

Clockwise from right, Dr. Joshua Adams views images in three-dimensional voxels to determine exactly where to implant a stent graft; a surgical technician holds a manifold as Dr. Jason Foerst and Dr. Mark Joseph perform a transcatheter aortic valve replacement, or TAVR; Dr. Joseph Baker, chief of cardiothoracic surgery, accepts a dilator while removing a pacemaker lead; Dr. James Callis (left) performs both an endovascular aortic aneurysm repair, or EVAR, and a bilateral iliac angioplasty with the assistance of nurse Jamie Puckett; Dr. James Drougas (right) and Dr. William H'Doubler prepare to perform an iliac artery revascularization.



X-RAY VISION

Dr. Jason Foerst, right, and Dr. Mark Joseph review a patient's X-ray to determine the best point of entry during a transcatheter aortic valve replacement, or TAVR.

FACES OF THE EPIDEMIC

The opioid crisis has transformed the lives of families, care providers, and first responders.

PHOTOS BY JOSH MELTZER

HOW DID 19-YEAR-OLD JESSE BOLSTRIDGE, a construction worker who had been a high-school football star, become a heroin-overdose statistic? His mother, Kristi Fernandez, became consumed with trying to answer that question.


She urged local drug detectives to investigate every detail of her son's death, so she could learn enough to help others. She also pleaded with journalist Beth Macy to tell her son's tale, which had spiraled downward from pain killers for a sports injury, to a rapid descent into addiction, to a fatal overdose on a bathroom floor.

At Fernandez's request, Macy visited Bolstridge's drug dealer in prison, an encounter that opens her now-bestselling book, *Dopesick: Dealers, Doctors, and the Drug Company That Addicted America*. The author teamed up with photojournalist Josh Meltzer to tell the stories of the casualties of the epidemic—not just the users, but their families, care providers, and first responders.

Together, Macy and Meltzer captured the words and photographs of those casualties in a Carilion Clinic-sponsored exhibit, "Portraits from the Frontline of the Opioid Epidemic," at the Taubman Museum of Art in Roanoke, Virginia.

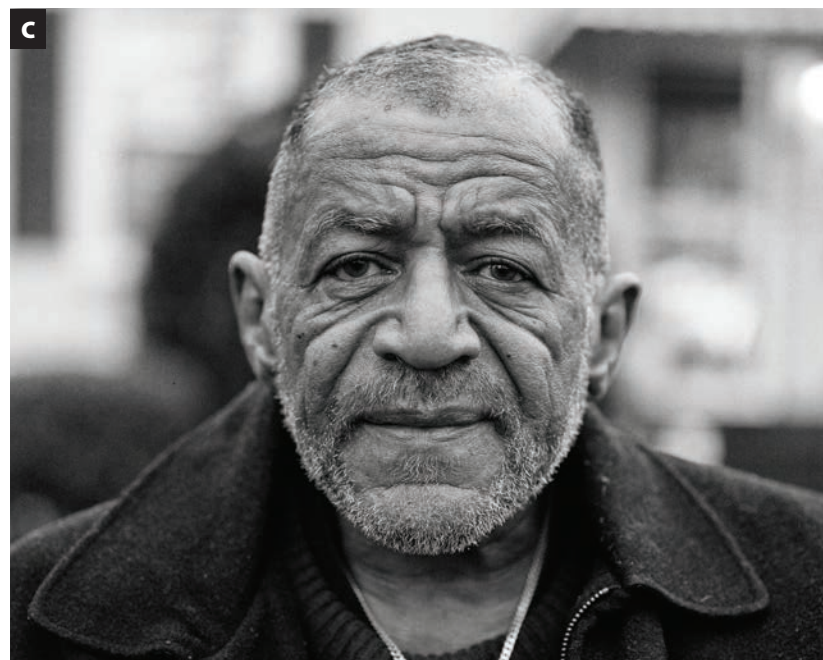
Among the compelling stories told is that of Patricia Mehrmann and her 28-year-old daughter, Tess Henry, whose addiction began with codeine-laced cough syrup for bronchitis and ended in her burned body being found in a Las Vegas dumpster on Christmas Eve.

Mehrmann, a Roanoke nurse, tried for six years to get services for her daughter, but frequently encountered treatment barriers and bureaucratic hurdles. When Henry checked herself out of a Nevada rehabilitation facility, Mehrmann tried frantically to find her. Ultimately, though, nothing she did could save her daughter.

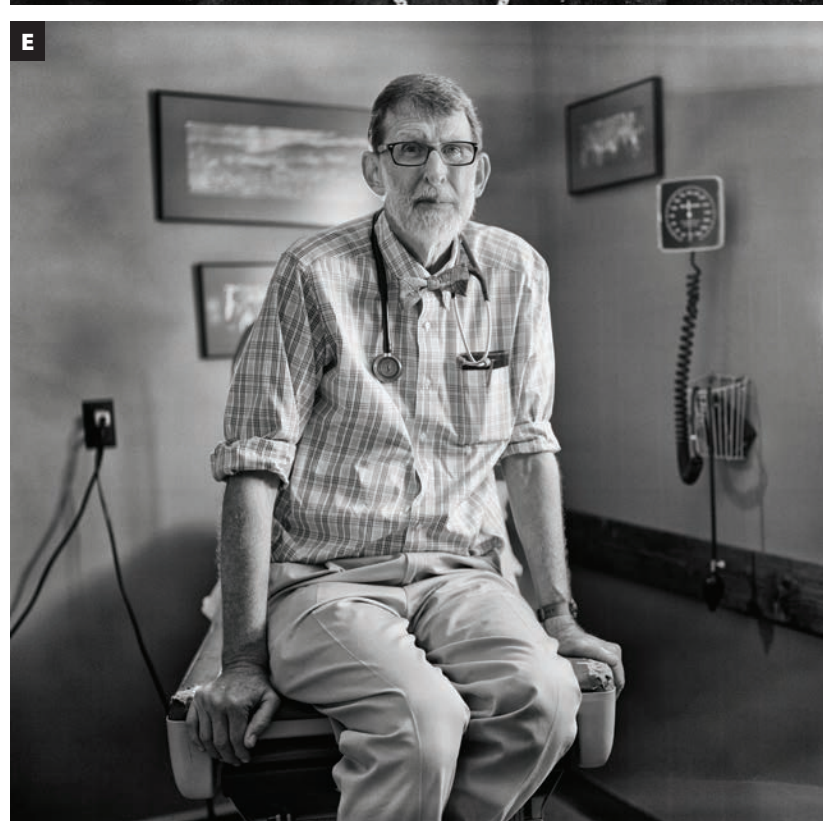
"There is no love you can throw on them," Mehrmann said, "no hug big enough, that will change the power of that drug." 



A



E



ON THE FRONTLINES

A. After the death of her 19-year-old son, Kristi Fernandez became obsessed with understanding his swift descent into addiction. **B.** As an activist nun, Sister Beth Davies had spent decades standing up to coal-mining operators; now in her mid-eighties, she confronts an even more formidable foe as an addiction counselor. **C.** For three decades, before court-ordered treatment put him on the path to sobriety, Vinnie Dabney had been a mostly functioning heroin user; he now draws on those experiences in his role as a substance-abuse counselor. **D.** Roanoke nurse Patricia Mehrmann tried desperately to save her 28-year-old daughter, Tess, who ultimately lost her life not to her addiction but to murder. **E.** From the small, sliding-scale clinic where he practices in Virginia's westernmost and poorest county, Dr. Art Van Zee was among the first U.S. physicians to warn people about the dangers of OxyContin.



B



D



Emergency Medicine

JOEL BASHORE, P.A., presented at the American Academy of Physician Assistants annual conference in New Orleans in May. His presentation was titled, “Hey! That’s Not What They Taught Me in School! Dogma-lysis in Clinical Medicine.”

Family Medicine

JOHN EPLING, M.D., has been active as a member of the U.S. Preventive Services Task

Force, for which he coauthored recommendations on interventions to prevent falls in community-dwelling older adults, vitamin supplementation to prevent fractures in community-dwelling adults, and screening women for intimate-partner violence. *JAMA: The Journal of the American Medical Association* published the final recommendations.

MARK GREENAWALD, M.D., vice chair for academic affairs for Family and Community Medicine, along with **DAVID MUSICK, PH.D.**, associate dean for faculty affairs at the Virginia Tech Carilion School of Medicine, and **CHRISTIE WILLS, M.P.A.**, then

education and faculty development manager with Continuing Professional Development, received first prize for their poster in the Organizational Policies and Leadership Development category at the Association of American Medical Colleges Group on Faculty Affairs national meeting in St. Louis in July. Their poster was titled “Developing Physician Leadership ‘in the Trenches’ at a Newer Medical Center.”

MICHAEL JEREMIAH, M.D., chair of Family and Community Medicine, was invited to serve as a test question writer for the American Board of Family Medicine’s certification and in-training exams.

Medicine

PAUL DALLAS, M.D., was named to the Accreditation Review Committee of the Accreditation

Council for Continuing Medical Education. Dr. Dallas also presented two courses at the 2018 American College of Physicians meeting on point-of-care ultrasound for internists.

GREG DEHMER, M.D., Cardiology, served on a Centers for Medicare & Medicaid Services

panel of the Medicare Evidence Development and Coverage Advisory Committee. The panel focused on recommendations for procedural volume requirements for hospitals and heart team members to begin and maintain transcatheter aortic valve replacement (TAVR) programs.

JASON FOERST, M.D., Cardiology, presented at the CRT Mastering Cardiac and Vascular Complications course in Wash-

ington, D.C., in May. Dr. Foerst’s sessions were titled “You Don’t Have to Use It Just Because You Opened It,” “Bicuspid Coronary Arteries Can Be Very Fragile,” and “Post-Infarct VSD Repair After the Repair.” Dr. Foerst also gave five presentations at the Appalachian Structural Heart Symposium in August.

DARIO SORRENTINO, M.D., Gastroenterology, chaired the first National Inflammatory Bowel Disease Conference, held at Virginia Tech in May. The conference was attended by physicians from across the nation. Dr. Sorrentino gave a presentation titled “Pre-Clinical Crohn’s Disease: The VTC Study and Beyond.” **MAITHILI CHITNAVIS, M.D.**, Gastroenterology, and **VU NGUYEN, M.D.**, Gastroenterology, presented “The Issue of Diagnostic Delay in IBD” at the conference.

Obstetrics and Gynecology

EMILY EVANS-HOEKER, M.D., chief of Reproductive Medicine and Fertility, is a co-investigator for a project that recently received a grant from the National Institutes of Health. The R25 TOUR (Translational Obesity Undergraduate Research) goal is to prepare undergraduates for careers in obesity science by providing research opportunities for students to work with faculty mentors during a research-intensive immersion.

TAMERA HOWELL, M.D., co-chief of Obstetrics and Gynecology at Carilion New River Valley Medical Center, was one of 18

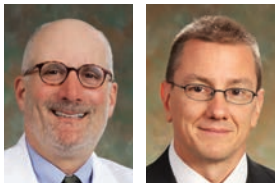
women leaders nationally to be named a 2019 Carol Emmott Fellow. The honor, which goes to accomplished professionals who have demonstrated significant leadership potential, is named for a pioneer in the expansion of the role of women in health careers.

Surgery

BRYAN COLLIER, D.O., chief of Trauma Surgery, was selected to serve on the National Quality Forum’s Trauma Outcomes Committee, which is responsible for developing measurements of trauma care.

ELLEN HARVEY, R.N., D.N.P., was inducted into the American College of Critical Care Medicine. She also received a Presidential Citation from the Carolinas/Virginia regional chapter of the Society for Critical Care Medicine.

MARIA HIRSCH, C.R.N.A., coauthored “A Content and Thematic Analysis of Closed Claims Resulting in Death,” which was published in the *American Association of Nurse Anesthetists Journal* in August.



MICHAEL NUSSBAUM, M.D., chair of Surgery, and **SHAWN SAFFORD, M.D.**, vice chair for research in Surgery and associate program director of the General Surgery residency, were inducted into the inaugural class of the Academy of Master Surgeon Educators of the American College of Surgeons. Developed under the auspices

spotlight on International Presentations

NANCY HOWELL AGEE, president and chief executive officer of Carilion Clinic, participated in a panel discussion at the International Hospital Federation in Brisbane, Australia. The session was titled “Partnering and Leading in Our Communities: Hospitals as Change Agents—Lessons for the USA.” She spoke on the topic of innovation and leadership’s role in solving the issue of affordability.

KIMBERLY DUNSMORE, M.D., chair of Pediatrics, presented her research, “COG AALL0434: A Randomized Trial Testing Nelarabine in Newly Diagnosed T-Cell Malignancy,” at the International Society for Pediatric Oncology in Kyoto, Japan, where her abstract received the top rating among more than 1,500 submissions. Her research was chosen for the Press Program at the 2018 annual meeting of the American Society of Clinical Oncology in May. She has given several other presentations on the research, including at the Children’s Oncology Group National Meeting in Dallas and at the American Society of Clinical Oncology in Chicago, where it was chosen a top presentation.

MARK PATTERSON, M.D., PH.D., gave a keynote address at the 29th International Conference on Sleep Disorders and Psychiatry in London. His address was titled “Narcolepsy’s Underappreciated Symptom: Cataplexy.” He also led a workshop on “Practical Approaches to Pediatric Sleep Disorders.”

ROBERT TRESTMAN, M.D., PH.D., chair of Psychiatry and Behavioral Medicine, spoke at the Virginia Nordic Precision Neuroscience Conference in Oslo, Norway. His talk was titled “Beyond Symptom Suppression: The Emerging Transformation of Psychiatry.” Dr. Trestman was also elected to serve on the American Hospital Association’s Section for Psychiatric and Substance Abuse Services Council. His three-year term begins in January 2019.

of the ACS Division of Education, the academy recognizes surgeon educators who have devoted their careers to surgical education.

Affiliated Institutions

CYNDA JOHNSON, M.D., M.B.A., founding dean of the Virginia Tech Carilion School of Medicine,

received the Medical Society of Virginia Foundation’s 2018 Salute to Service Award. Dr. Johnson was celebrated for her service to the health care profession. In addition to her regional leadership, she has served on committees for such national organizations as the Association of American Medical Colleges and the Society of Teachers of Family Medicine.

Provider Excellence

Each fall, the Carilion Clinic Provider Excellence Awards recognize providers who demonstrate dedication and exceptional care to patients, families, staff, and fellow providers. Recent awardees include:

GARY SIMONDS, M.D., chief of Neurosurgery, received the Provider Excellence Award for Physician.

HEATHER SCHOPF, P.A., a physician assistant with Otolaryngology,

received the Provider Excellence Award for Advanced Clinical Practitioners.

LINDSAY BORDEN, M.D., a resident with Obstetrics and Gynecology, received the Provider Excellence Award for Residents and Fellows.



CELEBRATED: Award recipient Dr. Gary Simonds, center, is flanked by Carilion’s chief medical officer, Dr. Patrice Weiss, and chief operating officer, Steve Arner.

FIELD OF DREAMS

When she was tasked with starting a medical school from the ground up, a physician realized she had found her dream job. **BY CYNDA JOHNSON, M.D., M.B.A.**

WE THINK YOU SHOULD BE A DEAN.” Those words came from my bosses when I was just six months into my new job as chair of family medicine at the University of Iowa.

In the more than two decades prior, I practiced family medicine and obstetrics and gynecology at the University of Kansas. Babies I had delivered early in my career were beginning to come to me to deliver their own babies.

My husband, Dr. Bruce Johnson, and I had made a conscious decision we would not move until our two sons finished high school. Our careers were busy and demanding enough. I watched my colleagues from medical school become chairs and hold other leadership positions across the country. They would ask, “What’s next for you?” I would respond with, “Same ol’, same ol’, not going anywhere!”

Bruce and I each took on progressive leadership roles right where we were, but it was hard sometimes not to compare. With our older son in college and the second nearly launched, we took our own leap and I applied for the family medicine chair position at Iowa.

Still, despite my hope to one day take on larger leadership roles, the abrupt declaration at my six-month review floored me.

My bosses, Dr. Robert Kelch and R. Edward Howell, stared back unflinchingly and told me they were going to give me the experiences they thought I needed to be a dean. And they did.

Two years later, I ran all primary care across the state associated with the University of Iowa, held additional hospital leadership positions, and successfully navigated

some budgeting challenges. My mentors declared me “ready” to go find a dean’s job.

They were right. I applied for and became dean of the Brody School of Medicine at East Carolina University in 2003. After my deanship, I was named senior associate vice-chancellor for clinical and translational research at East Carolina.

In 2008, I got my dream job as founding dean of the Virginia Tech Carilion School of Medicine.

The school didn’t even exist yet—no building, no faculty, no curriculum, no students. I—the “accidental dean”—was hired to start the school and build it from scratch.

A decade later, the school has graduated five classes totaling 201 students, all of whom matched to residency programs.

They experienced a unique patient-centered, problem-based curriculum with a robust research requirement and exposure to interprofessional training. The medical school’s graduates are well prepared for health care of the future.

Now, I have prepared myself to leave this dream job for the next: retirement. It has been bittersweet—even though the plan is mine—to experience my time as an accidental dean coming to an end.

I wonder where I would be today had my mentors not seen something in me that even I didn’t know was there. I try to pay that spirit forward today, particularly mentoring other women to pursue leadership opportunities. You never know what may become of people when you inspire them with a dream and give them the experiences and confidence to make it a reality. **CM**

Cynda Johnson, M.D., M.B.A, founding dean of the Virginia Tech Carilion School of Medicine, retired in December 2018.



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40 | DREAM TEAM

Dr. Joshua Adams, right, an aortic and endovascular surgeon, and Dr. Caleb Cuthrell, a fourth-year general surgery resident, place a femoral arterial conduit while performing a complex fenestrated endovascular aortic repair. Carilion Clinic's hybrid operating room allows surgeons to perform complicated procedures with minimal invasiveness.

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Opioid Crisis



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A hospital pharmacy offers patients bedside delivery before discharge.



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