



2016 / YEAR IN REVIEW

# Department *of* Medicine

**272**

RESIDENTS  
AND FELLOWS

**130**

ACTIVE  
INVESTIGATORS

**TRANSFORMING**

MEDICAL  
EDUCATION

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## Dear Colleagues and Friends:



**STEVEN B. ABRAMSON, MD**

Frederick H. King Professor of Internal Medicine and  
Chair, Department of Medicine

Senior Vice President and Vice Dean for Education,  
Faculty, and Academic Affairs

*The past year has been one of growth and momentum as we continued to recruit top experts and further develop specialty programs throughout the Department of Medicine.*

We've made great progress in each of those program areas, including autoimmunity, inflammatory bowel disease, heart disease, advanced lung disease, diabetes, and obesity.

We continue to fulfill our core mission of not only advancing clinical care but also enhancing education and training of the next generation of physician-scientists. In keeping with that mission, we have revamped our resident training program. Trainees can now choose among three interrelated tracks focusing on complex care, subspecialty areas, and ambulatory care at our diverse hospital campuses.

I invite you to read the following pages to learn more about the exciting programs, research initiatives, and treatment advances taking place at NYU Langone, Bellevue Hospital Center, and the Manhattan VA Hospital. Some of the accomplishments we're most proud of are:

- New approaches to treating cancers of the chest. Our Pulmonary and Critical Care Program, one of the largest in the country, includes a top-notch team of pulmonologists who work closely with thoracic surgeons and oncologists to develop advanced bronchoscopic techniques to treat peripheral lung cancers, potentially reducing or eliminating the need for invasive surgery.
- Advanced treatments for serious digestive disorders. The recent arrival of Gregory B. Haber, MD, has propelled NYU Langone into the top echelon of centers worldwide that specialize in performing endoscopic techniques to treat complex pancreaticobiliary problems.
- Progress in understanding autoimmune diseases. Our team at the Judith & Stewart Colton Center for Autoimmunity has made significant inroads into our understanding of how changes in the gut microbiota can trigger autoimmune diseases.
- Heart health. Our new Sarah Ross Soter Center for Women's Cardiovascular Research is one of five centers across the country investigating gender differences in heart disease as part of the American Heart Association Go Red For Women Research Network.

Our department—made up of 12 divisions engaged in care at 3 hospital systems and multiple ambulatory practices—is guided by the mission of NYU School of Medicine: “to serve, to teach, to discover.” It is in this spirit that we strive to attain the highest standards in education, research, and clinical care. I extend my sincere appreciation to the many faculty members and staff who have contributed to our success so far and look forward to accomplishing even more in the year ahead.

# Department of Medicine

## Research & Funding

**\$97M**

**TOTAL ANNUAL  
RESEARCH FUNDING**

**\$469M**

**TOTAL RESEARCH  
FUNDING**

**867**

**SCIENTIFIC  
PUBLICATIONS**

## Faculty, Staff & Students

**130**

**ACTIVE  
INVESTIGATORS**

**12**

**SUBSPECIALTY  
DIVISIONS**

**100+**

**PHYSICIAN-SCIENTISTS**

completed our MD/PhD  
medical scientist training  
program over the last 10 years

**168**

**INTERNAL MEDICINE  
RESIDENTS**

**104**

**FELLOWS**

**479**

**STAFF**

**1,800+**

**TOTAL FACULTY**



# NYU Langone Medical Center



## #10

**IN THE NATION**

and nationally ranked in 12 specialties, including top 10 rankings in Orthopaedics, Geriatrics, Neurology & Neurosurgery, Rheumatology, Rehabilitation, Cardiology & Heart Surgery, and Urology. Nationally ranked in Cancer, Diabetes & Endocrinology, Ear, Nose, & Throat, Gastroenterology & GI Surgery, and Pulmonology



## #11

**IN THE NATION  
BEST MEDICAL SCHOOLS  
FOR RESEARCH**

and an innovative leader in medical education including accelerated pathways to the MD degree



## LEADER

**IN QUALITY CARE AND  
PATIENT SAFETY**

and recognized for superior performance as measured by Vizient's nationwide 2016 Quality and Accountability Study





# Leveraging New Strengths, Hardwiring Quality

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## New Recruits

**HASANIAN AL-JILAIHAWI, MD**, an interventional cardiologist and a valve specialist formerly of Cedars-Sinai Medical Center in California, has joined NYU Langone as co-director of Transcatheter Valve Therapies.

**JOSE ALEMAN, MD, PhD**, assistant professor of medicine, joins NYU Langone following his medical research residency and endocrinology fellowship at Cornell Medical Center and time in the Clinical Scholars Program in The Rockefeller University's Breslow Laboratory. Dr. Aleman will combine his expertise in endocrinology and chemical engineering to illuminate the effect of weight loss on the way tissues process nutrients, both in obesity and after weight loss.

**LUIS ANGEL, MD**, has been recruited to NYU Langone as medical director of Lung Transplantation in the Medical Center's new Transplant Institute. Dr. Angel is well known for building one of the most successful organ procurement networks in the country. Dr. Angel had been professor of medicine and director of Interventional Pulmonology and Lung Transplantation at the University of Texas Health Science Center at San Antonio.

**JAMIE BESSICH, MD**, assistant professor of medicine, joins NYU Langone as associate director of the Interventional Pulmonology Program. Previously, Dr. Bessich was an attending physician at the Hospital of the University of Pennsylvania.

**GREGORY B. HABER, MD**, renowned gastroenterologist and advanced endoscopist, has joined the faculty as chief of Endoscopy and director of Advanced Therapeutics and Innovation in the Division of Gastroenterology. Dr. Haber works collaboratively to utilize innovative endoscopic options in the prevention, diagnosis, and treatment of esophageal, gastric, hepatobiliary, pancreatic, small intestinal, and colorectal conditions.

**ELISABETTA MULLER, PhD**, associate professor of medicine and a new recruit to NYU Langone from the National Institutes of Health, is working to define the essential factors that allow cells to become adipocytes, or fat-storing cells. She has identified several transcription factors—cell activation proteins—that allow pre-adipocytes to become adipocytes. As part of her research, she will also use laboratory methods and patient samples to understand how fat tissue develops and expands.

**VIOLETA POPOV, MD, PhD**, assistant professor of medicine, joins NYU Langone after serving on the faculty at Yale School of Medicine. She specializes in gastroenterology, with a focus on the care of patients who are overweight or obese, and is an expert in minimally invasive endoscopic weight loss procedures, endoscopic suturing, upper endoscopy, and colonoscopy.

**FEZA REMZI, MD**, director of the Inflammatory Bowel Disease Center, joins NYU Langone from the Cleveland Clinic, after almost 30 years at the clinic's Digestive Disease Institute, most recently as chair of the Department of Colorectal Surgery and before that in numerous academic roles in the Department of Surgery. Dr. Remzi, an expert in the surgical management of inflammatory bowel disease, is a specialist in pelvic pouch surgery, complex abdominopelvic reoperative surgery, and sphincter-saving surgery for rectal cancer. He is one of the few colorectal surgeons in the world who is specialized in treating problems of prior pelvic pouch, or J-pouch, procedures.

**KWOK-KIN WONG, MD, PhD**, renowned lung cancer expert, is joining NYU Langone's Perlmutter Cancer Center as chief of Hematology and Medical Oncology following a distinguished, decades-long career at Harvard Medical School and the Dana-Farber Cancer Institute.



↑ Patrick M. Cocks, MD, program director (third from the right), together with medical chief residents and Stephen B. Abramson, MD

## New Angles

**NEW MULTI-TRACK MODEL FOR RESIDENT EDUCATION.** NYU Langone's residency training program has undergone tremendous growth in recent years. To accommodate that growth, the addition of NYU Lutheran, and the opening of the Kimmel Pavilion, a new training model has been developed to enhance and deepen residents' educational experience. The new model has three interrelated tracks:

The NYU Langone Bellevue Track, the largest of the three, includes rotations at Bellevue Hospital Center (60 percent)—the city's largest public hospital—and NYU Langone's Tisch Hospital and the Veterans Affairs New York Harbor Healthcare System (40 percent). The track gives residents the opportunity to care for the most complex patients across a variety of systems.

The NYU Langone Tisch/Kimmel Track includes rotations at Tisch-Kimmel (60 percent) and Bellevue and the VA

hospitals (40 percent). At Tisch-Kimmel, residents will work in tertiary and subspecialty care teams focused on cardiovascular disease, lung and liver transplantation, and inflammatory bowel disease.

The expanded Primary Care Track will continue to focus on care for vulnerable populations. Residents will train at Bellevue (60 percent) and Tisch/Lutheran hospitals (40 percent) and engage in population health studies as well as individual community-based care.

**GI FELLOWSHIP TOOLKIT LAUNCHED NATIONWIDE:** The Division of Gastroenterology, in collaboration with the American College of Gastroenterology, has developed a new resource now available to program directors nationwide: "Utilizing OSCEs to Teach and Evaluate Fellows' Performance: A Gastroenterology Fellowship Program Director's Toolkit."

This resource uses challenging simulated clinical scenarios to assess fellows' medical knowledge, communication skills, and professionalism.

**ACHIEVING THE GOLD STANDARD OF EQUALITY IN HEALTHCARE:** For the fourth year in a row, the Human Rights Campaign Foundation, the largest civil rights organization in the country working to achieve equality for the lesbian, gay, bisexual, and transgender (LGBT) community, has recognized NYU Langone as a leader in LGBT equality, in its annual Healthcare Equality Index Report.





↑ Mark B. Pochapin, MD

## Awards & Recognition

→ **Sripal Bangalore, MD**, associate professor of medicine, director of research for the Cardiac Catheterization Laboratory: **Awarded the Douglas P. Zipes Distinguished Young Scientist Award** in recognition of his contributions to cardiovascular research.

→ **Martin J. Blaser, MD**, Muriel G. and George W. Singer Professor of Translational Medicine, and director of the Human Microbiome Program: **Named one of *Time* magazine's 100 Most Influential People in 2015**; chair of the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria; participant/panel leader for the new National Microbiome Initiative.

→ **Joshua Chodosh, MD**, Michael L. Freedman Professor of Geriatric Research and professor of medicine: **Named co-director of NYU Langone's new Alzheimer's Disease and Related Dementias Family Support Program**, funded by a five-year, \$7.5 million grant from New York State's Alzheimer's Caregiver Support Initiative. The new NYU Langone program provides free services and support for 600 caregivers and family members of people with dementia throughout the five boroughs of New York City.

→ **Catherine M. Diefenbach, MD**, assistant professor of medicine and director of lymphoma clinical research at NYU Langone's Perlmutter Cancer Center:

**Selected as one of 13 clinician-researchers nationwide to be awarded a National Cancer Institute grant** aimed at promoting the use of clinical trials to advance new therapies and improve the lives of patients with cancer.

→ **Division of Endocrinology, Diabetes and Metabolism: Embarked on a novel collaborative study with Anhui Medical Center** in China, exploring how lowering blood sugar in people with diabetes affects circulating white blood cells and reduces the cells' propensity to cause injury.

→ **Edward A. Fisher, MD, PhD, MPH**, Leon H. Charney Professor of Cardiovascular Medicine and professor of medicine, pediatrics, and cell biology:



**Recipient of Lifetime Achievement**

**Award**, National Lipid Association; leader of semifinalist team, One Brave Idea Competition.

→ **Glenn I. Fishman, MD**, William Goldring Professor of Medicine and director of the Leon H. Charney Division of Cardiology: **Awarded the American Heart Association's 2015 Basic Research Prize** in recognition of his outstanding contributions to cardiovascular science and groundbreaking discoveries of the molecular defects associated with cardiovascular diseases, including those responsible for heart rhythm disorders and cardiomyopathies.

→ **David S. Goldfarb, MD**, professor of medicine and chief of Nephrology at Veterans Affairs New York Harbor Healthcare System: **Named Nephrologist of the Year by the American Kidney Fund.**

→ **Seth A. Gross, MD**, associate professor of medicine and section chief of Gastroenterology: **Named vice chair of Educational Affairs**, American College of Gastroenterology.

→ **Judith S. Hochman, MD**, Harold Snyder Family Professor of Cardiology, and **Harmony Reynolds, MD**, Saul J. Farber Associate Professor of Medicine: **Selected as co-leaders of the new Sarah Ross Soter Center for Women's Cardiovascular Research.** In addition, Dr. Hochman received the American College of Cardiology's Distinguished Scientist Award—Clinical Domain.

→ **Paula Marchetta, MD**, clinical associate professor of medicine: **Named Treasurer of the American College of Rheumatology.**

→ **Calvin Q. Pan, MD**, clinical professor of medicine in the Division of Gastroenterology: **Received honor of international distinction from the Chinese Medical Association Chinese Society of Infectious Diseases** for his seminal work on hepatitis B transmission.

→ **Mark R. Phillips, MD**, professor of medicine and director of the MD/PhD program: **Elected a Fellow of the American Association for the Advancement of Science.**

→ **Mark B. Pochapin, MD**, Sholtz/Leeds Professor of Gastroenterology, vice chair for Clinical Affairs in the Department of Medicine, and director of the Division of Gastroenterology: **Named Secretary of the American College of Gastroenterology (ACG)**; director and treasurer of the collaborative ACG/American Society for Gastrointestinal Endoscopy Gastrointestinal Quality Improvement Consortium.

→ **William N. Rom, MD**, Sol and Judith Bergstein Professor of Medicine and professor of environmental medicine: **Elected Fellow of the American Association for the Advancement of Science.**

→ **Ann Marie Schmidt, MD**, Dr. Iven Young Professor of Endocrinology: **Received the Harrington Discovery Institute's Harrington Scholar-Innovator Award.**

→ **Howard Weintraub, MD**, clinical professor of medicine: **Elected to Board of Directors as Treasurer of The American Society for Preventive Cardiology.**

→ **Renee Williams, MD**, assistant professor of medicine: **Appointed chair of the Minority Affairs and Cultural Diversity Committee of the American College of Gastroenterology.**

→ **Sondra R. Zabar, MD**, professor of medicine and director of the Standardized Patient Program: **Named director of the Division of General Internal Medicine and Clinical Innovation.**

↓ Judith Hochman, MD,  
ISCHEMIA study chair



**3,477**

**PARTICIPANTS  
RANDOMIZED**

as of October 16 in  
the worldwide ISCHEMIA Trial  
sponsored by a grant from  
the National Heart, Lung, and  
Blood Institute of the NIH

A photograph of a man with short brown hair, wearing a tan and dark blue sweater, smiling in a laboratory. He has glasses hanging from his neck. In the background, there are shelves with various lab supplies and equipment. A person's arm and hand are visible in the foreground, slightly out of focus.

# Discovery & Practice Transformation

CROSS-DISCIPLINARY INITIATIVES AND COLLABORATIONS—OFTEN WITH DEPARTMENT OF MEDICINE EXPERTS AT THE HUB—ARE RESULTING IN SIGNIFICANT INSIGHTS AND BREAKTHROUGHS.

↑ Boris Reizis, MD

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# Rheumatology: Untangling the Roots of Autoimmune Diseases

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NYU Langone's Judith & Stewart Colton Center for Autoimmunity, a major international hub for cross-disciplinary collaboration, is leading efforts to identify the underlying causes of autoimmune diseases—with the ultimate goal of developing innovative treatments. In the past year, Colton Center investigators have made several significant breakthroughs that build on longstanding work across a continuum of autoimmune conditions.

## **PINPOINTING A BACTERIAL TRIGGER FOR AUTOIMMUNE DISEASES**

Colton Center investigators have made major strides in understanding the important role of an altered intestinal microbiota in triggering multiple autoimmune diseases, particularly in people who are already genetically susceptible to these conditions. When an excess of the gram-negative bacterium *Prevotella copri* is present in the intestinal microbiota, it appears to act as a trigger for new-onset rheumatoid arthritis (NORA).

Steven B. Abramson, MD, the Frederick H. King Professor of Internal Medicine, and director of the Colton Center, first identified this association in collaboration with, Daniel R. Littman, MD, PhD, the Helen L. and Martin S. Kimmel Professor of Molecular Immunology, and Jose U. Scher, MD, assistant professor of medicine. They are now working to determine whether *P. copri* is, in fact, the instigating factor in these patients' transition to disease—and whether this and other bacteria could be linked to other autoimmune diseases. They described their work in *Arthritis & Rheumatology* in January 2016.

The gut microbiota also appears to influence the development of psoriasis and psoriatic arthritis (PsA), according to additional findings from Dr. Scher, Dr. Abramson, Dr. Littman, and colleagues. In work published in *Arthritis & Rheumatology* in January 2015, they reported that patients with PsA or psoriasis had a lower relative abundance of multiple intestinal bacteria. This gut microbiota profile in PsA was similar to that previously described in patients with inflammatory bowel disease and was associated with changes in specific inflammatory proteins unique to this group, and distinct from that in patients with skin psoriasis and healthy controls. The Colton Center investigators are

now collaborating with rheumatology groups in Great Britain to sequence the microbiomes of patients with rheumatoid arthritis, ankylosing spondylitis, and juvenile inflammatory arthritis. The NYU Langone team has also reported on the effects of methotrexate on intestinal microbiota in an article to be published in the *Journal of Antimicrobial Chemotherapy*.

## **MAPPING THE MICROBIOME'S PATH TO LUPUS**

Division of Rheumatology investigators are making connections between the intestinal microbiome and systemic lupus erythematosus (SLE), the most common form of lupus. To map the relationships between specific microbes and disease activity, Gregg Silverman, MD, professor of medicine and pathology, and his team profiled 16S bacterial rRNA genes, using next-generation sequencing of stool samples from 83 well-characterized adult SLE patients and 16 healthy controls from the Colton Center's biorepository (see box on next page). The team found that SLE patients have higher levels of Proteobacteria and a decrease in protective bacteria known as Firmicutes, compared with healthy controls. Dr. Silverman theorizes that the inflammatory process of SLE may increase the body's oxidative metabolism. As a result, protective bacteria like Firmicutes become less prevalent, and less friendly bacteria fill the vacuum, promoting breaches of immunological tolerance and loss of regulation by T cells. Dr. Silverman recently presented these findings at a meeting of the American College of Rheumatology and says that they may lead to targeted therapeutic approaches to lupus that tweak the microbiota to short-circuit major inflammatory and pathogenic pathways.

## RHEUMATOLOGY

**A GENETIC HOUSECLEANER FOR LUPUS**

Although changes in the microbiota may provide an environmental trigger for autoimmune conditions such as lupus and rheumatoid arthritis, autoimmune diseases tend to cluster in families, suggesting that there is also a genetic basis for these diseases. Drawing on genetic clues, Boris Reizis, PhD, professor of medicine and pathology, in collaboration with Jill P. Buyon, MD, the Lady Va and Sir Deryck Maughan Professor of Rheumatology and director of both the Division of Rheumatology and NYU Langone's Lupus Center, is investigating whether the protein DNASE1L3 is an important and treatable target in lupus.

"This protein is potentially the thin red line protecting humans from lupus. In those who have a mutation in the gene DNASE1L3 that does not allow the production of the protein, very aggressive lupus develops early in childhood," says Dr. Reizis. "Rare variants of this gene that encode a defective version of DNASE1L3 are also associated with sporadic lupus, which develops in adulthood. From every standpoint, it appears to be an important gene for lupus susceptibility, but very little has been known about why it's so important and what it does to prevent lupus."

In work published this year in the journal *Cell*, Dr. Reizis and Dr. Buyon reported finding that autoantibodies to DNA, a hallmark of lupus, are generated in both mice and humans who do not have DNASE1L3 and also in humans who have poorly functioning DNASE1L3. DNASE1L3 is a "housekeeping" enzyme, which digests DNA released by dying cells. When DNASE1L3 is not functioning or is absent altogether, DNA-containing microparticles accumulate in the circulation, inducing an abnormal immune response to DNA. Antibodies to DNA are highly associated with kidney damage in patients with SLE.

On the basis of these findings, Dr. Reizis's laboratory recently developed three novel measures that offer promise as both diagnostic tools and methods of tracking disease prognosis in lupus. The next step: a possible treatment for lupus based on DNASE1L3. Timothy J. Cardozo, MD, PhD, associate professor of biochemistry and molecular pharmacology, has built a model of the enzyme's structure and is now working

**ABOUT THE COLTON CENTER FOR AUTOIMMUNITY**

NYU Langone's Judith & Stewart Colton Center for Autoimmunity was founded in 2013 to elucidate the immunological and environmental events that trigger autoimmune disease onset and to develop new diagnostics and treatments for these diseases. To accomplish this goal, the Colton Center has established an extensive collaborative research effort among leading physicians and scientists with diverse expertise in science and technology across the Medical Center and throughout the scientific community. Resources from the Colton Center support a robust infrastructure based in the various clinical centers. In addition, collecting and storing specimens and prospectively following patients with autoimmune diseases, the Colton Center's robust clinical databases and biorepositories are an invaluable resource for informing translational research. Colton Center investigators, under the leadership of Dr. Buyon and Dr. Scher, are following more than 1,000 patients with rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, systemic lupus erythematosus, antiphospholipid syndrome, and Behçet's syndrome in the NYU Langone and Bellevue Hospital Center patient populations.

#8

**IN THE NATION**

In *U.S. News & World Report's* 2016-17  
Best Hospitals for Rheumatology

with Dr. Reizis to develop a biological agent that replicates DNASE1L3 and that can be tested as a novel therapy. "The enzyme DNASE1L3 is a good natural candidate to be a drug," says Dr. Reizis. "If we can optimize the molecule so that it stays stable in the body for an extended period of time, it will digest the extra DNA and, we hope, ameliorate—or even prevent—the disease."



↓ Bo Shopsin, MD, PhD, Gregg J. Silverman, MD,  
and Victor Torres, PhD



#### DIABETES AND ANTIBIOTICS: A POSSIBLE LINK?

In recent decades, children's exposure to antibiotics has increased and the incidence of autoimmune diseases such as type 1 diabetes has more than doubled, leading some investigators to question whether there is a connection between the two. With the average American child receiving 10 courses of antibiotics by age 10, Martin J. Blaser, MD, the Muriel G. and George W. Singer Professor of Translational Medicine, professor of microbiology, and director of the Human Microbiome Program, is exploring the possible link with autoimmune conditions. Dr. Blaser recently reported in *Nature Microbiology* that treatment with antibiotics changed the mix of gut microbes in young mice such that their risk for type 1 diabetes increased dramatically. Dr. Blaser's study found that short pulses of antibiotics cause mice that are susceptible to type 1 diabetes to develop the disease more quickly and more frequently than mice not treated with antibiotics. The work used the best animal model of type 1 diabetes to date and doses equivalent to those given to human children to treat common infections.

#### WHEN PARASITES GIVE BACK

Kenneth H. Cadwell, PhD, and P'ng Loke, PhD, both associate professors of microbiology, recently reported in *Science* that the parasitic helminth worm actually plays a helpful role in the intestines of both animals and humans: it enhances the production of Clostridia, a beneficial class of gut bacteria. In both a mouse model

↓ Jill Buyon, MD



#### UNDERSTANDING THE MECHANISM OF A MAJOR LUPUS DRUG

Hydroxychloroquine, an important drug used to treat almost all patients with SLE and some patients with rheumatoid arthritis, is also used to prevent heart damage in fetuses exposed to anti-SSA/Ro, an antibody found in about a third of patients with SLE. Dr. Buyon and Robert Clancy, PhD, associate professor of medicine, are working together to better understand the molecular mechanism of this drug. In work recently published in the *Journal of Autoimmunity*, the team reported that hydroxychloroquine inhibits the production of inflammatory cytokines by altering histone methylation, which under normal circumstances facilitates the binding of transcription factors to the promoter regions of these genes. "While it was known that hydroxychloroquine inhibits ligation of Toll-like receptors in inflammatory cells, it was not known that this results in the decrease of an epigenetic modification of the gene, thereby decreasing inflammatory responses," says Dr. Clancy. It is hoped that this discovery can lead to additional therapies that exploit this mechanism.

and the Orang Asli, a native Malaysian population who live in an area where helminth is common, the worm's presence was shown to maintain a healthy balance of bacteria in the digestive tract, conferring resistance to autoimmune-mediated inflammatory bowel disorders. Dr. Cadwell and Dr. Loke are now studying novel Clostridia strains isolated from the Orang Asli study participants, in the hopes of developing a highly potent probiotic that can target the microbiota in patients with autoimmune diseases.

## Pulmonary and Critical Care Program: Pioneering New Treatments for Cancers of the Chest

As research identifies new approaches to treating lung cancers and other pulmonary disorders, NYU Langone's interventional pulmonology team is playing a leading role, pioneering novel therapies with the potential to significantly improve patient outcomes.

The program, one of the largest in the country, brings together top pulmonologists—who partner with thoracic surgeons and oncologists from NYU Langone's Laura and Isaac Perlmutter Cancer Center—to diagnose and treat cancers of the chest. Together, the team, led by Daniel H. Serman, MD, the Thomas and Suzanne Murphy Professor of Pulmonary and Critical Care Medicine, professor of cardiothoracic surgery, and director of the Division of Pulmonary, Critical Care, and Sleep Medicine, and the surgeons and oncologists are homing in on approaches with the potential to reduce or eliminate the risks of invasive surgery.

### **BRONCHOSCOPES TARGET TREATMENT TO PERIPHERAL LUNG CANCERS**

In a June 2016 article in *Chest*, Dr. Serman and colleagues describe exciting new bronchoscopic approaches to treating peripheral lung cancer. Bronchoscopes, long used in the diagnosis of early-stage lung cancer and the palliation of advanced cancers in the air passages, have only recently been tested as part of new treatment modalities for cancers in the periphery of the lung.

With the use of a bronchoscope, chemotherapy drugs can be delivered directly into tumors, potentially boosting the effectiveness of the drugs while minimizing toxicity to other parts of the body. A bronchoscope can also be used as an aid in the precise placement of guiding devices used in stereotactic radiosurgery, a highly targeted form of radiation therapy.

"When combined with diagnostic bronchoscopic tools to localize tumors, therapies such as guided

radiation, cryoablation, and gene- and immune-based technologies may provide the future capability to treat malignant disease without surgery," says Dr. Serman. "These techniques may lead to better outcomes, with fewer complications, a benefit for all patients and particularly for patients with significant underlying cardiopulmonary disease, who are marginal candidates for surgical resection."

## <1 Day

Time patients spend in the hospital for management  
of their refractory, symptomatic pleural effusion

In his current research, Dr. Serman is using endobronchial ultrasound to analyze the environment inside the lymph nodes of patients with lung cancer. The goal is to discover whether patients have enough cancer-fighting T cells—and not too many inhibitory T cells—to facilitate response to newer immunotherapies, such as programmed cell death-1 (PD-1) inhibitors. Says Dr. Serman, "We may be able to inject agents directly into the lymph node and alter the immune response to activate it against the cancer, potentially boosting the effectiveness of drugs like PD-1 inhibitors. Currently, we have no approved intranodal therapies like this for lung cancer."



↑ Gaetane Michaud, MD

**PULMONOLOGY**

PD-1 blockade has shown promising activity against lung cancer, but may not work in patients whose lymph nodes contain excessive inhibitory T cells or insufficient “killer” T cells. By analyzing the immune environment inside the lymph nodes, Dr. Sterman and colleagues hope to be able to predict which patients are not likely to respond to immunotherapy, so that they can then initiate strategies to stimulate a more successful antitumor immune response.

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*“Therapies such as guided radiation, cryoablation, and gene- and immune-based technologies may provide the future capability to treat malignant disease without surgery when combined with diagnostic bronchoscopic tools to localize the tumor.”*

— Daniel Sterman, MD

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Another study, led by Gaetane C. Michaud, MD, section chief of Interventional Pulmonology and a faculty member in the medicine and cardiothoracic surgery departments, is testing bronchoscope-guided photodynamic therapy for patients with peripheral lung cancer who are not candidates for surgical resection. In a preliminary trial of this technique, patients are injected with a photosensitizing drug that travels through the bloodstream and accumulates in cancer cells. Using a bronchoscope in the periphery of the lung, researchers then shine a laser into the tumor, activating the drug’s toxic effects so it can kill the cancer cells. NYU Langone is one of a handful of sites nationwide participating in the study.

↓ Daniel Sterman, MD

**STUDIES FIND NEW INROADS TO TREAT MESOTHELIOMA**

Daniel Sterman, MD, the Thomas and Suzanne Murphy Professor of Pulmonary and Critical Care Medicine and professor of medicine and cardiothoracic surgery, is a world-renowned expert in the study and treatment of malignant pleural mesothelioma (MPM), a rapidly progressive thoracic neoplasm with a high mortality rate. He and his team are currently engaged in several clinical trials targeting lung cancer and mesothelioma, including:

→ **A pilot and feasibility study** exploring in situ immunogene therapy for MPM. In the study, patients with MPM were injected with a virus that stimulated the immune system, followed by first- or second-line chemotherapy. Overall survival rate was significantly higher than historical controls in the second-line group, according to the results published in *Clinical Cancer Research*. Dr. Sterman is now developing a large randomized controlled trial to confirm the findings.

→ **A multicenter randomized trial** comparing combination immunotherapy with chemotherapy in patients with unresectable MPM. In collaboration with renowned mesothelioma expert Harvey I. Pass, MD, the Stephen E. Banner Professor of Thoracic Oncology and chief of the Division of Thoracic Surgery, and Leena Gandhi, MD, PhD, Jean Lee, MD, and Abraham Chachoua, MD, from Thoracic Medical Oncology, Dr. Sterman is participating in this industry-sponsored clinical trial, which may establish a new standard first-line treatment for patients who are not candidates for multimodality therapy involving surgical resection (pending IRB approval).



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↓ Jamie Bessich, MD



#### MANAGING PLEURAL COMPLICATIONS

Dr. Michaud has also introduced unique, evidence-based clinical protocols to standardize clinical care, evaluation, and management of patients with pleural effusions, a common complication of lung cancers and other malignancies.

Previously, it was common practice to admit these patients for hospital stays of up to five days, but new techniques have dramatically lowered the admission rate and are helping to improve patients' overall quality of life.

With these innovations, applied by some of the most senior interventionalists in the country, many patients are now managed on a fully outpatient basis and spend less than a day in the hospital for management of their refractory, symptomatic pleural effusion. In fact, close to 90 percent of pleural diseases can now be treated in the outpatient setting, says Dr. Michaud.

#### A GROWING TEAM EXPANDS TREATMENT OPTIONS

Since her arrival a little over a year ago, Dr. Michaud, who also serves as vice-chair of education for the American Thoracic Society, has built the Interventional Pulmonology Program at NYU Langone into one of the largest and most respected in the country. The program will soon have five faculty members (three full-time and two part-time) to provide services throughout NYU Langone. The program also has a full-time dedicated physician assistant, Dana Todor, PA, whose contributions to the interventional pulmonology team are invaluable.

In addition to Dr. Sterman, Dr. Michaud, and Jamie Bessich, MD, the program's associate director, the interventional pulmonology team will soon count as a member, Luis Angel, MD, currently professor of medicine and director of Interventional Pulmonology and Lung Transplantation at the University of Texas Health Sciences Center at San Antonio. Dr. Angel, a highly experienced interventional pulmonologist, has been recruited as medical director of Lung Transplantation in NYU Langone's new Transplant Institute, which is led by Robert A. Montgomery, MD, DPhil. Dr. Angel is well known for having built one of the most successful organ procurement networks in the country.

The newly expanded interventional pulmonology team will continue its pursuit of high-potential, noninvasive therapies for complex pulmonary disorders. As Dr. Michaud notes, "Our less invasive approaches have shifted a lot of care from the hospital to outpatient settings, and this has resulted in fewer readmissions, fewer visits to the Emergency Department, better quality of life, and higher patient satisfaction."

A new interventional pulmonology fellowship will begin in July 2017.

## Cardiology: Harnessing Individuals, Populations, and Data Sets to Tackle Heart Disease at Multiple Levels

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Reducing the burden of cardiovascular disease, which is responsible for one of every three deaths in the United States, requires use of very different but complementary approaches. NYU Langone is implementing new initiatives that take an individualized, precision medicine approach to heart disease while simultaneously expanding its use of large, population-based data sets to assess and improve outcomes.

Driven by a team of national leaders in cardiovascular medicine and a robust program of integrated clinical care and research, NYU Langone's Leon H. Charney Division of Cardiology, together with the Department of Cardiothoracic Surgery, has become one of the top 10 cardiology and heart surgery programs in the country, as ranked by *U.S. News & World Report*.

### **DECIPHERING GENDER DIFFERENCES IN HEART HEALTH**

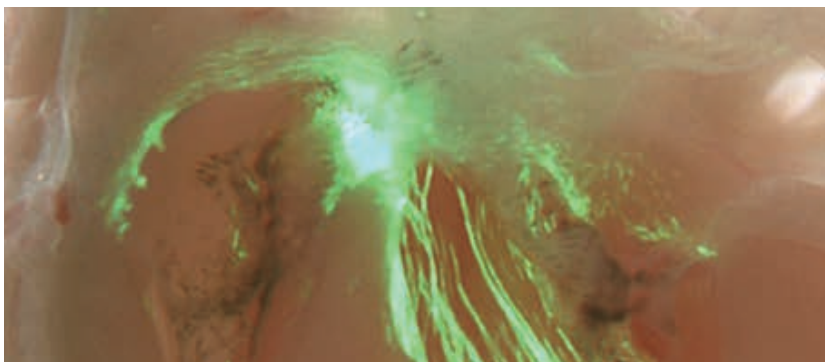
Heart disease is the number one killer of women, but questions persist about the causes of heart attacks in women and how to treat them. NYU Langone is seeking to answer these questions under the auspices of the Medical Center's newly created Sarah Ross Soter Center for Women's Cardiovascular Research, one of the five centers in the nation designated this year as part of the American Heart Association (AHA) Go Red For Women Research Network.

"This research initiative will help us advance knowledge in three important areas: why women have heart attacks, what makes heart attacks different in women, and the best techniques to diagnose, manage, and treat women with heart attacks," says Harmony R. Reynolds, MD, the Saul J. Farber Associate Professor of Medicine and co-leader of the Soter Center. The project's training director, Glenn I. Fishman, MD, the William Goldring Professor of Medicine, professor of neuroscience and physiology and of biochemistry and molecular pharmacology, and director of the Leon H. Charney Division of Cardiology, adds, "The Soter Center builds upon a long tradition of research into the

complexities of heart disease in women at NYU Langone, and promises to provide new answers that will positively impact women's heart health. Moreover, the center will allow us to train the next generation of investigators focused on women's cardiovascular disease."

Investigators at the Soter Center have complementary expertise in basic science, clinical research, and population health. This year, one of these investigators, Jeffrey S. Berger, MD, associate professor of medicine and surgery, presented evidence of gender differences in heart health at the American College of Cardiology Annual Scientific Session. The evidence, based on data collected from more than 3.6 million individuals during community-based preventive health screenings, demonstrated that peripheral vascular disease manifests differently in women than in men. Specifically, Dr. Berger's analysis showed that women have a significantly higher prevalence of peripheral artery disease, while men have a higher prevalence of carotid artery stenosis and abdominal aortic aneurysms.

In a subsequent four-year study, Dr. Berger is examining the influence of genetic and psychosocial factors on inflammation, which can affect platelet clotting. "Our hypothesis is that one reason that heart attacks present differently in women than in men is that women's platelets respond to stress in a different way," says Dr. Berger. His laboratory research will be complemented by a clinical trial led by Dr. Reynolds, following women who have atypical heart attacks and an evaluation by Soter Center population health investigators of whether stress modification in these women will alter the future behavior of their platelets.



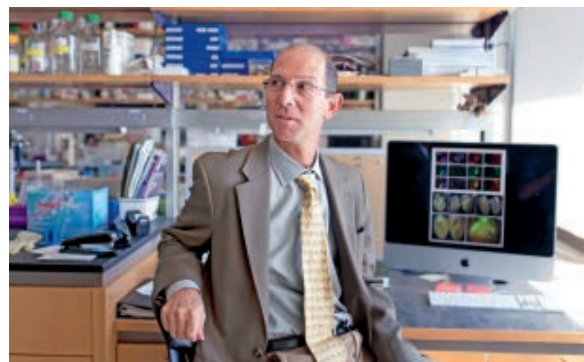
↑ Microscope image of a mouse heart reveals specialized cells known as Purkinje cells

#### **MAPPING HEART RHYTHM, RISK AT THE CELLULAR LEVEL**

For the first time, detailed, three-dimensional (3D) images of intercalated discs—protein structures that connect heart muscle cells into working groups—have been reconstructed, permitting visualization of previously unseen aspects of these discs. A research team led by Mario Delmar, MD, PhD, the Patricia M. and Robert H. Martinsen Professor of Cardiology, combined powerful imaging techniques—among them, focused ion beam-scanning electron microscopy, which creates 3D images at nanometer resolution—and mathematical models to recreate the discs from a mouse model.

The discs have two essential jobs: to pass on electrical signals and to transmit the pumping force needed for the heart to beat normally. Dr. Delmar's group found that the proteins that do these two jobs occur together in clusters and that abnormal separation of these proteins—even by billionths of a meter—may represent a new marker of electrical malfunction that leads to arrhythmias.

Dr. Delmar believes that the images, published in January 2016 in *Nature Communications*, may someday help physicians and genetic counselors more accurately identify people at risk for potentially life-threatening arrhythmias before they develop. His long-term goal is to develop a simple blood test capable of detecting dangerous disc protein structures, and thus arrhythmia risk, that can be used as part of routine screening.



The American Heart Association awarded its 2015 Basic Research Prize to Glenn I. Fishman, MD, for his outstanding contributions to cardiovascular science and groundbreaking discoveries of the molecular defects associated with cardiovascular diseases, including those responsible for heart rhythm disorders and cardiomyopathies.

“Research insights such as these plus our high volume of patients and procedures—we are one of the highest-volume heart rhythm centers in the country—keep us at the forefront of areas such as arrhythmia,” adds Larry A. Chinitz, MD, the Alvin Benjamin and Kenneth Coyle, Sr. Family Professor of Medicine and Cardiac Electrophysiology and clinical director of the Leon H. Charney Division of Cardiology.

#### **USING BIG DATA TO CHALLENGE CONVENTIONAL WISDOM**

Angiotensin receptor blockers (ARBs) are as effective as angiotensin-converting enzyme (ACE) inhibitors developed 10 years earlier, despite previous study results to the contrary, according to a new meta-analysis by NYU Langone researchers of more than 100 published clinical trials of both drugs. The researchers described the results of the meta-analysis in January 2016 in *Mayo Clinic Proceedings*.

“There has been debate for many years over the safety and efficacy of ACE inhibitors compared to ARBs. An ‘ACE inhibitor-first’ approach has been common, with ARBs regarded as less effective,” says Sripal Bangalore, MD,

## CARDIOLOGY

associate professor of medicine in the Leon H. Charney Division of Cardiology, director of research for the Cardiac Catheterization Laboratory, and lead study author. “We believe that our study ends the debate and gives physicians the option to prescribe either drug for their patients.”

The new meta-analysis included 106 randomized trials that enrolled 254,301 patients and is an example of Dr. Bangalore’s and other NYU Langone researchers’ use of large, population-based data sets to assess—and often challenge—accepted paradigms in cardiology. Says Glenn I. Fishman, MD, “Often, the data do not support the things we think are true, the things we do because we ‘always did it that way.’” By challenging the “old way” with new evidence, NYU Langone researchers are helping to shape the next generation of cardiology guidelines.

With the support of a major gift from NYU Langone trustee Richard Richman, the division is developing a comprehensive outcomes tracking system to pool all cardiovascular data across cardiology, cardiac surgery, and vascular surgery. Says Larry A. Chinitz, MD, “by making this major investment in the use of population data, we are seeking to transform patient care.”

#### TAKING THE LEAD IN VALVE REPAIR

NYU Langone’s Heart Value Center, led by Mathew R. Williams, MD, associate professor of cardiothoracic surgery and medicine, chief of the Division of Adult Cardiac Surgery, and director of Interventional Cardiology and the Heart Valve Center, has grown dramatically over the past year. Dr. Williams, an expert in valve repair, was the first physician to be cross-trained in both interventional cardiology and cardiac surgery, and he is still one of only a handful of specialists with this dual expertise.

NYU Langone’s Heart Valve Center is using new technology to treat patients with aortic stenosis who are at high to extremely high surgical mortality risk. In June 2016, the center became the world’s first to implant the new Medtronic CoreValve™ Evolut™ PRO TAVR (transcatheter aortic valve replacement) System in a

## 25+ Years

of published data on the safety and efficacy of **DISOPYRAMIDE** (Norpace CR) for symptoms of obstructive hypertrophic cardiomyopathy

#### RECOMMENDED

In 2014, the European Society of Cardiology published HCM guidelines giving disopyramide a IB recommendation for use in obstructive HCM, meaning “Is recommended.”

“The guidelines were based in part on data from several large non-randomized studies conducted by NYU Langone researchers,” says Mark Sherrid, MD, director of the Hypertrophic Cardiomyopathy Program at NYU Langone.

patient with severe aortic stenosis. The patient was discharged home the next day.

Expanding the Medical Center’s breadth of expertise, Hasanian Al-Jilaihawi, MD, an interventional cardiologist and valve specialist formerly of Cedars-Sinai Medical Center in California, has joined the NYU Langone team as co-director of Transcatheter Valve Therapies. Dr. Al-Jilaihawi’s significant contributions to the advancement of minimally invasive valve repair include developing a new platform for optimal mitral valve placement and a device to improve imaging during TAVR. He is heavily involved in all aspects of interventional cardiology and has special interests in innovative methods of imaging structural heart disease, complex percutaneous coronary intervention, and procedural planning in the field of TAVR. He trained in Scotland, England, France, Canada, and the United States (at Brigham and Women’s Hospital and Cedars-Sinai Medical Center). In 2007, he was one of the two doctors who performed the UK’s first TAVR procedure.



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# Endocrinology: Expanding the Model of Diabetes Care

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Insights, technology, and a rigorous program of diabetes research help the Center for Diabetes and Metabolic Health accelerate efforts to shape new standards for research, screening, progression, and treatment of complications.



↑ Michael Bergman, MD (left)

## ONE-HOUR GLUCOSE TOLERANCE TEST BEATS HbA1c

For patients at greatest risk for developing diabetes, early identification is critical; research has shown patients who are diagnosed and treated promptly have a 29 percent reduced risk of death from cardiovascular disease over five years, compared with those whose diagnosis and treatment are delayed by just five years. With new research on diagnostic approaches, Michael Bergman, MD, clinical professor of medicine, is helping to set a new standard for accurately identifying people who have defects in insulin action and are therefore at greatest risk for developing the disease.

In an article published in the August 2016 issue of *Acta Diabetologica*, Dr. Bergman and colleagues

demonstrated that the one-hour glucose tolerance test better identifies patients with abnormalities in blood glucose levels than the current gold standard test, hemoglobin A1c (HbA1c). The one-hour post-load glucose level, they found, is a more precise correlate for insulin sensitivity and beta-cell function.

Although the International Expert Committee (IEC) and the American Diabetes Association (ADA) recommend HbA1c for diagnosing diabetes, its utility as a screening tool is controversial given the known discordance between the results of the HbA1c test and those of the two-hour oral glucose tolerance test. The one-hour glucose tolerance test has been recommended for prediabetes screening, although Ira J. Goldberg, MD, the Clarissa and Edgar Bronfman, Jr. Professor of Endocrinology and director of the Division of Endocrinology, Diabetes, and Metabolism, believes that Dr. Bergman's findings may ultimately change routine practice nationwide. "It is critical that we identify these people earlier, and this appears to be a more effective way to do that," says Dr. Goldberg.

## REDUCING DIABETES RISK BEFORE IT STARTS

NYU Langone's new Center for Diabetes and Metabolic Health, led by Steven Hodak, MD, professor of medicine and director of the Center for Diabetes and Metabolic Health, launched an intensive ambulatory diabetes prevention program for patients at risk for developing the disease. To help these patients manage risk factors and control their blood sugar, Dr. Bergman, a prediabetes expert and the prevention program's director, and his team work with them to create a personalized lifestyle plan that includes healthy eating, weight reduction, and exercise.

ENDOCRINOLOGY

↓ Ann Marie Schmidt, MD, Kathryn J. Moore, MD, Ira J. Goldberg, MD, and Edward A. Fisher, MD, PhD



Patients who have already progressed to significant insulin resistance may be prescribed medication such as metformin as well. “We are intervening more aggressively and more pre-emptively in patients who appear to be at the highest risk,” says Dr. Hodak.

#### NEW CLUES UNCOVER DIABETES PROGRESSION AND POSSIBLE TREATMENT

During the final stage of progression from prediabetes to diabetes, the body converts from the overproduction of insulin to the death of the pancreatic islet cells that make insulin. “Nobody knows exactly why conversion happens,” says Dr. Goldberg. Research published this year by Ann Marie Schmidt, MD, the Dr. Iven Young Professor of Endocrinology, and colleagues identified a possible pathway: advanced glycation end products—proteins or lipids that become glycated as a result of exposure to sugars—appear to cause islet cells to produce a protein toxic to the islet cells themselves. “Much like in Alzheimer’s disease, the cells form clumps and tangles that interact with the receptor for the advanced glycation end products, or RAGE, which Dr.

Schmidt first identified—and that causes the islet cells to die,” says Dr. Goldberg.

Dr. Schmidt and her team have also identified two novel small molecule compounds that block the intracellular actions of RAGE and could lead to disease-modifying therapies for diabetic retinopathy and wound healing. For this promising work, Dr. Schmidt received Harrington Discovery Institute’s Harrington Scholar-Innovator Award this year, an honor that recognizes physician-scientist innovators whose research has the potential to change the standard of care.

At the Center for Diabetes and Metabolic Health, a unique collaboration links teams from diabetes and preventive cardiology who actively seek ways not only to lower glucose but also to prevent cardiovascular disease complications in patients with type 1 and type 2 diabetes. Teams meet weekly to review and discuss current literature, identify research opportunities, and review select patient cases—all in an effort to break the cycle of diabetes and heart disease in their patients.

#### UNDERSTANDING THE OBESITY-DIABETES CONNECTION

Most people with type 2 diabetes are overweight or obese—but not all people who are overweight or obese have diabetes. So, although obesity is a known risk factor for diabetes, the precise mechanisms that link the two conditions remain unclear. A growing area of research focuses on inflammation in white adipose tissue; such inflammation has been linked to the pathogenesis of obesity-linked diseases such as type 2 diabetes and cardiovascular disease. Jose Aleman, MD, PhD, assistant professor of medicine, combines his expertise in endocrinology and chemical engineering to help understand how weight loss produces changes in the way these tissues process nutrients, both in obesity and after weight loss. As a member of a multi-institutional team, he contributed to recently published research elucidating the first technique for detecting white adipose tissue inflammation noninvasively.

The technique uses Raman spectroscopy—a predictive tool that could be used to help identify both normal-weight and overweight or obese individuals’ risk of cardiometabolic complications.

At the center and across NYU Langone, researchers are actively seeking to understand the relationship between obesity and disease. A new recruit to NYU Langone, Elisabetta Muller, PhD, associate professor of medicine, is working to define the essential factors that allow cells to become adipocytes, or fat-storing cells. She has identified several transcription factors—cell activation proteins—that allow pre-adipocytes to become adipocytes. As part of her research, she will also use laboratory methods and patient samples to understand how fat tissue develops and expands.

#### **DIABETES SELF-CARE: NEW TOOL ENCOURAGES ADHERENCE**

Diabetes management, with its many medical visits and frequent blood sugar checks, can be overwhelming and inconvenient for patients. NYU Langone is piloting programs that use text messaging to make it easier for patients to control their disease.

This year, NYU Langone became the first clinical site nationwide to conduct a controlled behavioral intervention study with a new diabetes management text messaging tool called CareSmarts. CareSmarts pushes out reminder texts and questions to patients several times a day on various aspects of diabetes care. The tool also periodically asks open-ended questions, such as “Diabetes management can be really difficult. Do you feel like you’d benefit from speaking with a diabetes educator?” If the patient responds yes, the care team is alerted and a diabetes educator promptly contacts them.

“The time we spend face to face with a patient is less than 1 percent of the waking hours any individual person has,” says Dr. Hodak. “We have a very limited ability to make a dramatic impact on a chronic disorder that patients live with every day.” In the management of diabetes, lifestyle management is critical, but the encouragement of patient adherence to self-care strategies and healthy habits represents a significant challenge for caregivers.

#### **LEVERAGING MOBILE TECHNOLOGY**

At Bellevue Hospital Center, patients who need their insulin dose titrated to control their insulin levels have benefited from the Mobile Insulin Titration Intervention (MITI). “Finding the optimal dose of basal insulin can take multiple clinic visits over months,” explains Natalie Levy, MD, assistant professor of medicine and director of Bellevue’s primary care diabetes program. With MITI, instead of visiting the clinic, patients receive regular weekday text messages asking for their fasting blood glucose values. Diabetes nurse educators monitor their responses daily for alarm values and call patients once a week to adjust their basal insulin dose. In a study published in July 2015 in the *Journal of Medical Internet Research*, 87 percent of MITI patients reached their optimal insulin dose, compared with just 37 percent of usual care patients, and the MITI patients also reported higher levels of satisfaction. “They also saved copay costs and hours of travel time,” Dr. Levy says. MITI is now available at Bellevue to all Adult Primary Care Center patients in need of insulin titration.



↑ Natalie Levy, MD

An uncontrolled pilot study at The University of Chicago, where the tool was developed, found that patients using CareSmarts lowered their HbA1c by 1 percent. “That’s equivalent to the reduction we would expect from a fairly potent oral medication for diabetes,” says Dr. Hodak. “Our study will provide additional insight through a rigorous assessment of the tool in our heterogeneous ambulatory practice population.”

# Therapeutic Endoscopy Recruit Expands Options for Patients with Complex GI Disease

Gregory B. Haber, MD, is helping to pioneer advances in endoscopy that promise to revolutionize diagnosis and treatment of conditions that once required major surgery.

This year, NYU Langone recruited Gregory B. Haber, MD, an internationally renowned expert in therapeutic endoscopy, as section chief of Endoscopy and director of Advanced Therapeutics and Innovation in the Division of Gastroenterology. “The addition of Dr. Haber builds on our team’s already considerable strengths in advanced diagnosis and treatment for complex digestive conditions,” says Mark B. Pochapin, MD, director of the Division of Gastroenterology. Working collaboratively with other experts, Dr. Haber uses innovative endoscopic options in the prevention, diagnosis, and treatment of esophageal, gastric, hepatobiliary, pancreatic, small intestinal, and colorectal conditions. Dr. Haber comes to NYU Langone after being on the faculty the University of Toronto, for 25 years and also after having led the Center for Advanced Therapeutic Endoscopy at Lenox Hill Hospital in New York City. He has published more than 100 peer-reviewed studies and was an associate editor of the journal *Gastrointestinal Endoscopy*. As part of his educational efforts, Dr. Haber has launched an advanced fellowship program at NYU Langone Medical Center.

**51M**

## ANNUAL VISITS

to physician offices, hospital outpatient settings, and emergency departments, with diseases of the digestive system as the primary diagnosis.

Source: CDC

## MINIMALLY INVASIVE, ADVANCED TREATMENT OPTIONS

Dr. Haber and his colleagues provide such advanced endoscopic procedures as Zenker’s cricopharyngeal myotomy and peroral endoscopic myotomy (POEM), which offer effective, minimally invasive treatment options. Where major surgery once was the only option, patients can now be treated endoscopically with no external excisions. As a result, they often spend less time in the hospital and recover more quickly. Similarly, Dr. Haber performs endoscopic full thickness resection to remove tumors that have penetrated the wall of the stomach and other areas of the gastrointestinal tract. “Instead of performing resection laparoscopically from outside the gastric wall, we can do it from inside,” says Dr. Haber. “We can remove the entire wall to ensure complete tumor excision and close off the defect using endoscopic suturing. Devices are also now available that allow us to do full thickness resection in the colon.”

## REVERSING CHALLENGING BLEEDS

Because Dr. Haber’s has extensive experience using over-the-scope clips to halt major GI-related bleeds, he is often consulted on these challenging cases. For example, Dr. Haber recently used such a clip to successfully stop bleeding from the duodenum in a patient whose physicians had exhausted other treatment options and were preparing to perform surgery. “Often, stopping the bleeding has to do with how you find the source, as well as with making the necessary interventions to close the vessels,” says Dr. Haber. “It’s a combination of understanding the disease and knowing how to apply the clip.”





↑ Gregory B. Haber, MD

## Complex Case

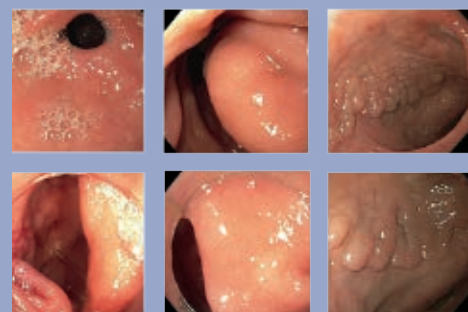
### LARGE FLAT POLYP WITH HIGH-GRADE DYSPLASIA REMOVED BY ESD

Dr. Haber is much sought after for his expertise in a variety of techniques, including endoscopic submucosal dissection (ESD), which is used to treat premalignant and early-stage cancers of the esophagus, stomach, and colon. In the past, patients often underwent major surgery to remove these lesions. “Now, we can use high-definition optics and dissect the tumors millimeter by millimeter from the wall of the esophagus, stomach, and colon,” says Dr. Haber. It’s a meticulous technique; it can take four to eight hours to remove the cancer or premalignant lesion while preserving the organ’s integrity.

Recently, Dr. Haber was called in to review the case of an elderly male patient with a large polyp and high-grade dysplasia in the stomach who also had a history of coronary artery disease and two previous coronary stent placements. Upper endoscopy and ultrasound had revealed a large, superficial, spreading lesion along the lesser curve of the stomach. The entire gastric polyp measured 13 x 10.5 cm. With the patient seeking to avoid a gastrectomy as a way to prevent progression to cancer, Dr. Pochapin consulted with Dr. Haber and they agreed that Dr. Haber would perform an ESD.

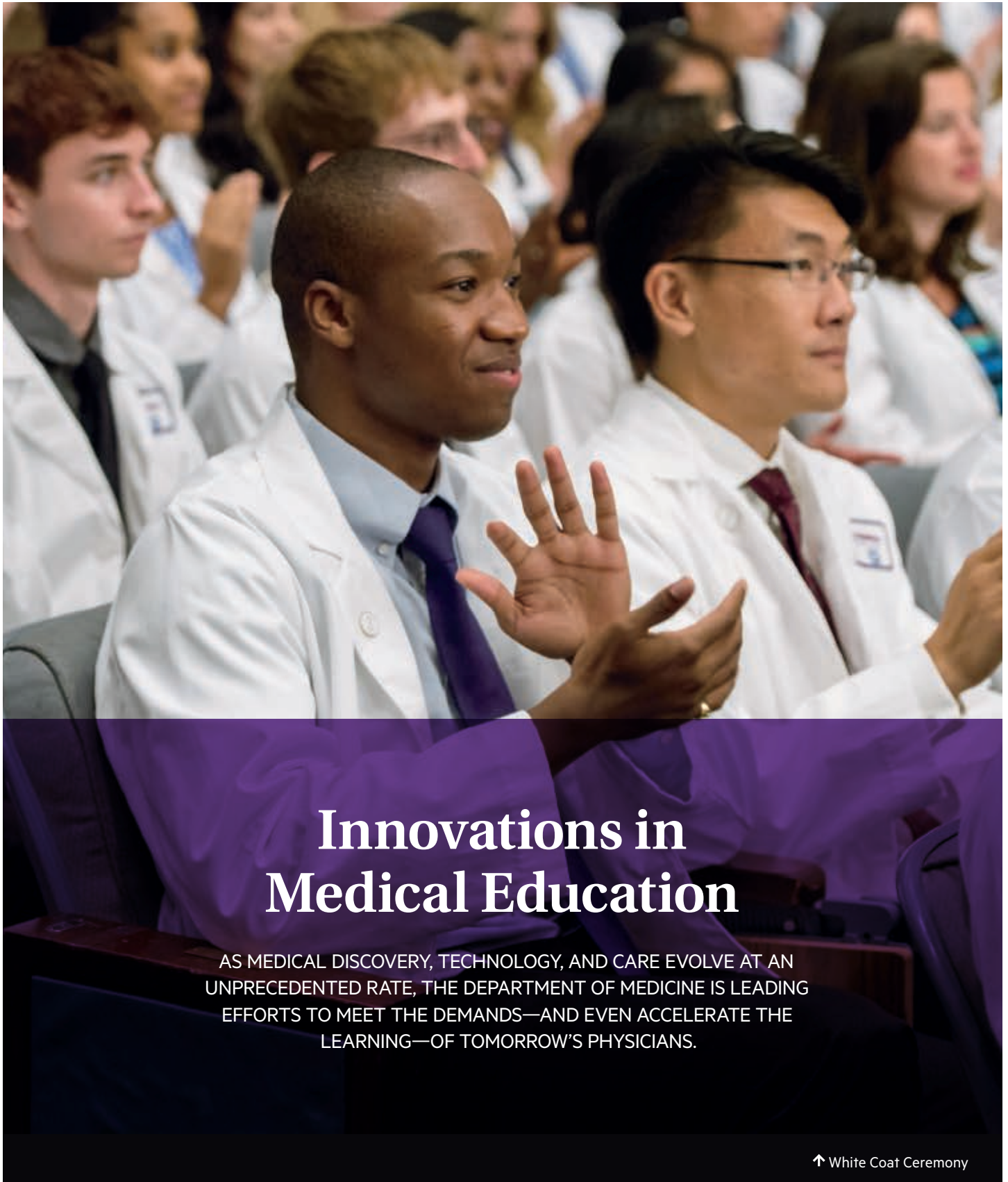
In the procedure, Dr. Haber first inserted an endoscope through the esophagus to the stomach and cauterized the borders of the lesion to define the resection margins of the tissue. Hyaluronic acid was then injected to raise the lesion and obtain an appropriate resection cushion. After obtaining a proper lift of the periphery of the lesion, Dr. Haber began the dissection,

working from the periphery to the center. He used several dissection devices throughout the procedure, including an electrosurgical knife, a hook knife, and an insulated tip knife, and he cauterized several bleeding vessels. After completing the dissection, he placed three resolution clips in the center of the submucosal defect and cauterized scattered vessels with a hot biopsy forceps. The procedure took approximately eight hours to complete. At a recent follow-up visit, the patient had increased appetite, weight, and energy and his biopsies tested negative for *Helicobacter pylori* and any residual tumor or dysplasia. The patient’s condition continues to be monitored with surveillance upper endoscopy.



↑ Sample endoscopic images:

Top row (from left): pre-pyloric stomach; 2nd portion of the duodenum; gastric polyps  
Bottom row (from left): 2nd portion of the duodenum, 2nd portion of the duodenum; gastric polyps



# Innovations in Medical Education

AS MEDICAL DISCOVERY, TECHNOLOGY, AND CARE EVOLVE AT AN UNPRECEDENTED RATE, THE DEPARTMENT OF MEDICINE IS LEADING EFFORTS TO MEET THE DEMANDS—AND EVEN ACCELERATE THE LEARNING—OF TOMORROW'S PHYSICIANS.

↑ White Coat Ceremony

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# Diverse Goals, Multiple Pathways

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With the School of Medicine's Curriculum for the 21st Century and new tools and training programs, students have more information and resources at their fingertips than ever before. Teams across the Department of Medicine are driving many of these changes along with the school's Institute for Innovations in Medical Education, a multidisciplinary team of faculty educators, education scientists, informaticians, and developers, directed by Marc M. Triola, MD, associate professor of medicine.

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## Global Thought Leadership

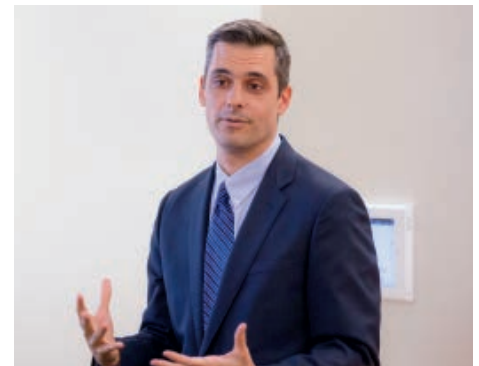
**INDIVIDUALIZING AND ACCELERATING MEDICAL EDUCATION.** NYU School of Medicine is leading a consortium of 12 U.S. and Canadian medical schools that have begun accelerated pathways to the MD degree that are working to identify and disseminate best medical education practices, along with the Josiah Macy Jr. Foundation's Consortium for Accelerated Pathway Programs in Medical Education. Following up on recent recommendations for individualizing medical education and suggestions for shortening it to three years, these U.S. and Canadian medical schools have been developing accelerated programs and making them available to select students.

**Principal Investigator:** *Steven B. Abramson, MD, Frederick H. King Professor of Internal Medicine and vice dean for Education, Faculty, and Academic affairs, Joan Cangiarella, MD, associate dean for Education, Faculty, and Academic Affairs, and Marc M. Triola, MD, associate dean for Educational Informatics and founding director of the Institute for Innovations in Medical Education*

**IDENTIFYING EXPECTATIONS FOR RESIDENTS ON DAY 1.** Under the auspices of the Association of American Medical Colleges Entrustable Professional Activities (EPAs) Consortium, NYU School of Medicine is one of 10 pilot schools identifying what graduating medical students should be entrusted to do without direct supervision on day 1 of residency. Feasibility studies on curriculum development, assessment of competency using the EPA framework, the path to entrustment, and faculty development are under way.

**Collaborators:** *Patrick Cocks, MD, Abraham Sunshine Assistant Professor of Clinical Medicine and director of the internal medicine residency training program, Colleen Gillespie, PhD, assistant professor of medicine and director of the Division of Education Quality, and Melvin Rosenfeld, PhD, senior associate dean for Medical Education*

↓ Marc M. Triola, MD



**TRANSFORMING PHYSICIAN TRAINING.** The American Medical Association (AMA) Accelerating Change Consortium consists of 32 medical schools working together to create the medical school of the future and transform physician training. NYU School of Medicine was one of the original 11 founders of the consortium in 2013 and received grants from the AMA for major medical education innovations.

**Principal Investigator:** *Marc M. Triola, MD, associate dean for Educational Informatics and founding director of the Institute for Innovations in Medical Education*



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### Accelerated Pathways, a Continuum of Learning

#### ANNOUNCING THE FIRST 15

**GRADUATES.** In spring 2016, the School of Medicine's innovative *Three-Year MD Pathway program* graduated its first 15 students. The accelerated curriculum allows select students to complete their undergraduate medical studies in just three years, which means they are able to enter high-demand care settings more quickly and with less accumulated debt. The program allows graduates to pursue a career in either primary care or the medical specialty of their choice. "NYU School of Medicine is the first nationally ranked academic medical center in the United States to offer such a program," says Joan Cangiarella, MD, director of the

Three-Year MD Pathway program and associate dean for Education, Faculty, and Academic Affairs, "The program isn't just a fast track. It's a unique opportunity to follow and assess learners across the continuum of undergraduate-graduate medical education."

**FOSTERING DIALOGUE.** A survey of deans and educational program directors helped identify critical success factors for continued adoption and acceptance of the accelerated programs. Program directors were primarily concerned with whether three-year programs can cultivate the needed maturity, depth of clinical exposure, and competency of the students.

### Training for Academic Careers

**INTERNAL MEDICINE CLINICAL INVESTIGATOR TRACK.** This track is designed to provide in-depth training and mentoring for physicians who aspire to academic careers in translational, clinical, and population-based research. The program entails three years of residency training, with dedicated research time. Successful trainees will have the opportunity to continue their research as fellows at NYU Langone. Our first class of six residents in this track are among the top graduates from across the country. "This track provides a novel pathway for residents to develop both their clinical and research skills in the context of a traditional 3-year program," says David Stern, MD, PhD.

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### Global Perspectives and Evidence-Based Practices

#### MASTER'S DEGREE IN HEALTH PROFESSIONS EDUCATION (MHPE).

Launched in 2015, this two-year program, a collaboration with Maastricht University in the Netherlands, trains physicians to use innovative evidence-based practices in the classroom, positioning the physicians as educational leaders for the next generation of students. "These scholars are an amazing array of award-winning teachers committed to furthering their knowledge of education leadership, policy, and research," says David Stern, MD, PhD, professor of medicine and vice chair for Education and Academic Affairs, who co-directs the master's program with Adina Kalet, MD, MPH, professor of medicine and surgery. The program is funded by a generous grant from the Lucius N. Littauer Foundation.

### Professional Collaboration to Help Teach and Evaluate Fellows

#### GASTROENTEROLOGY FELLOWSHIP

**TOOLKIT.** Elizabeth H. Weinshel, MD, professor of medicine, and NYU Langone's Division of Gastroenterology recently teamed up with the American College of Gastroenterology (ACG) to develop a toolkit aimed at helping gastroenterology fellowship program directors use objective structured clinical examinations as an aid in teaching and evaluating fellows. The free resource, available through the ACG's GI Training Pathway, provides challenging simulated clinical scenarios to help assess fellows' medical knowledge, communication skills, and professionalism through the lens of Accreditation Council for Graduate Medical Education milestones.



↑ Elizabeth H. Weinshel, MD (right), with standardized patient (left) and Max Pitman, MD (center)



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# Putting Knowledge into Practice

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NYU School of Medicine provides students, residents, and fellows with a broad range of clinical training sites—NYU Langone Medical Center (including Tisch Hospital and NYU Lutheran), NYC Health + Hospitals’ Bellevue Hospital Center, and Veterans Affairs New York Harbor Healthcare System—that serve diverse patient populations and are each administered through healthcare systems with a varied mix of payers, governance, policy, and practice infrastructures. Students working at these three training sites engage in a uniquely varied healthcare training experience.

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## Promoting Professionalism

### **PRACTICING THE WARM HANDOFF.**

David Stern, MD, PhD, professor of medicine and vice chair for Education and Academic Affairs, is leading an effort to incorporate structural changes to training programs that reinforce the professional values expected in physicians. For example, incoming residents

have begun practicing the “warm handoff.” In the past when incoming residents took over care of a patient during monthly rotations, they received only a written summary the patient’s case. Under the new system, the outgoing resident introduces the incoming resident to the patient and briefs

the new resident on the nuances of the patient’s care. Says Dr. Stern, “This teaches residents an important lesson about teamwork and making a personal connection with patients, values that are hard to communicate in a classroom.”

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## Forging Community, Leveraging Expertise

**EDUCATOR COMMUNITY.** Designed to support educators through skills development, mentoring, innovation and scholarship, and recognition, this initiative will help leverage the institution’s breadth and depth of expertise and create “opportunities to cross-pollinate learning among educators across the institution,” says Michael Poles, MD, PhD, co-director of the Educator Community alongside Crystal

Mainiero, executive director of the Institute for Innovations in Medical Education. In addition to enhancing core communication channels, the community will encourage educator interaction by means of an ongoing series of community events, interdisciplinary task forces, and networking opportunities. “We think this is an important turning point at NYU Langone,” said Steven B. Abramson, MD, senior vice

president and vice dean for Education, Faculty, and Academic Affairs, speaking to educational leaders from around the institution. He continued, “The institution has demonstrated leadership and gained a national reputation for its educational research and innovations. We now want to leverage that local expertise to ensure our educators, and thus our learners, can thrive.”

### LEARNING ACROSS MULTIPLE PRIVATE AND PUBLIC HEALTH SYSTEMS.

In April 2016, students participated in a panel discussion with leaders from NYU Langone Medical Center (including Tisch Hospital and NYU Lutheran), NYC Health + Hospitals' Bellevue Hospital Center, and Veterans Affairs New York Harbor Healthcare System as part of the AMA Accelerating Change Consortium to explore how differences in patient populations, faculty and staff, practice cultures, financial and administrative structures, and healthcare systems are related to clinical care outcomes and cost.

### LEVERAGING MOBILE TECHNOLOGY.

At Bellevue Hospital Center, patients who need their insulin dose titrated to control their insulin levels have benefited from the Mobile Insulin Titration Intervention (MITI). "Finding the optimal dose of basal insulin can take multiple clinic visits over months," explains Natalie Levy, MD, assistant professor of medicine and director of Bellevue's primary care diabetes program. With MITI, instead of visiting the clinic, patients receive regular weekday text messages asking for their fasting blood glucose values. Diabetes nurse educators monitor their responses daily for alarm values and call patients once a week to adjust their basal insulin dose. In a study published in July 2015 in the *Journal of Medical Internet Research*, 87 percent of

MITI patients reached their optimal insulin dose, compared with just 37 percent of usual care patients, and the MITI patients also reported higher levels of satisfaction. "They also saved copay costs and hours of travel time," Dr. Levy says. MITI is now available at Bellevue to all Adult Primary Care Center patients in need of insulin titration. "The program also serves as an ideal example of the powerful transformation occurring in chronic disease management. Programs such as this can easily be integrated across hospitals and healthcare settings and become a shared standard throughout our multiple care settings," says Douglas B. Bails, MD, clinical associate professor of medicine and chief of medicine, Bellevue Hospital Center.

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## Shaping New Learning Models

**NEW LEARNING MODELS.** Beginning in 2015, NYU Langone internal medicine residents no longer rotate every four weeks to a different inpatient experience. Instead, they follow a 4+2 education model, in which they spend four weeks on an inpatient service, followed by two weeks in an outpatient setting. This approach has reduced the risk of error associated with frequent patient handoffs and gives students the opportunity to work at additional outpatient clinical sites suited to their career goals.

**SIMULATION.** The New York Simulation Center (NYSIM), a partnership between the City University of New York (CUNY) and NYU Langone Medical Center, is one of the largest urban health science simulation teaching facilities in the country. Launched in 2011 in a 25,000-square-foot wing of Bellevue Hospital, NYSIM offers simulation courses for NYU and CUNY medical, nursing, and dental students, residents, physicians, and other clinical staff, as well as training for firefighters and emergency medical service personnel. Studies are also under way at NYSIM to determine how best to assess all 13 of the Association of American Medical Colleges' core entrustable professional activities that medical students should be able to perform without direct supervision on day 1 of residency.

↓ Learners at NYSIM



Sondra R. Zabar, MD, professor of medicine, is director of the Standardized Patient Program and director of the Division of General Internal Medicine and Clinical Innovation.

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# Tapping Technology's Potential

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The Institute for Innovations in Medical Education harnesses the diverse intellectual capital of NYU School of Medicine to drive the discovery, development, and validation of new information technologies for medical education.

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## Hardwiring Innovation

**INSTITUTE FOR INNOVATIONS IN MEDICAL EDUCATION (IIME).** With 23 full-time staff and more than 30 affiliate faculty, IIME is one of the largest medical education innovation groups in the country. IIME combines advances in education

strategies with new informatics solutions to connect the three missions of NYU Langone—patient care, research, and education—resulting in a translational research and innovations program that can provide direct benefits to patients. IIME's

director is Marc M. Triola, MD, associate professor of medicine and associate dean for educational informatics, and its executive director is Crystal Mainiero.

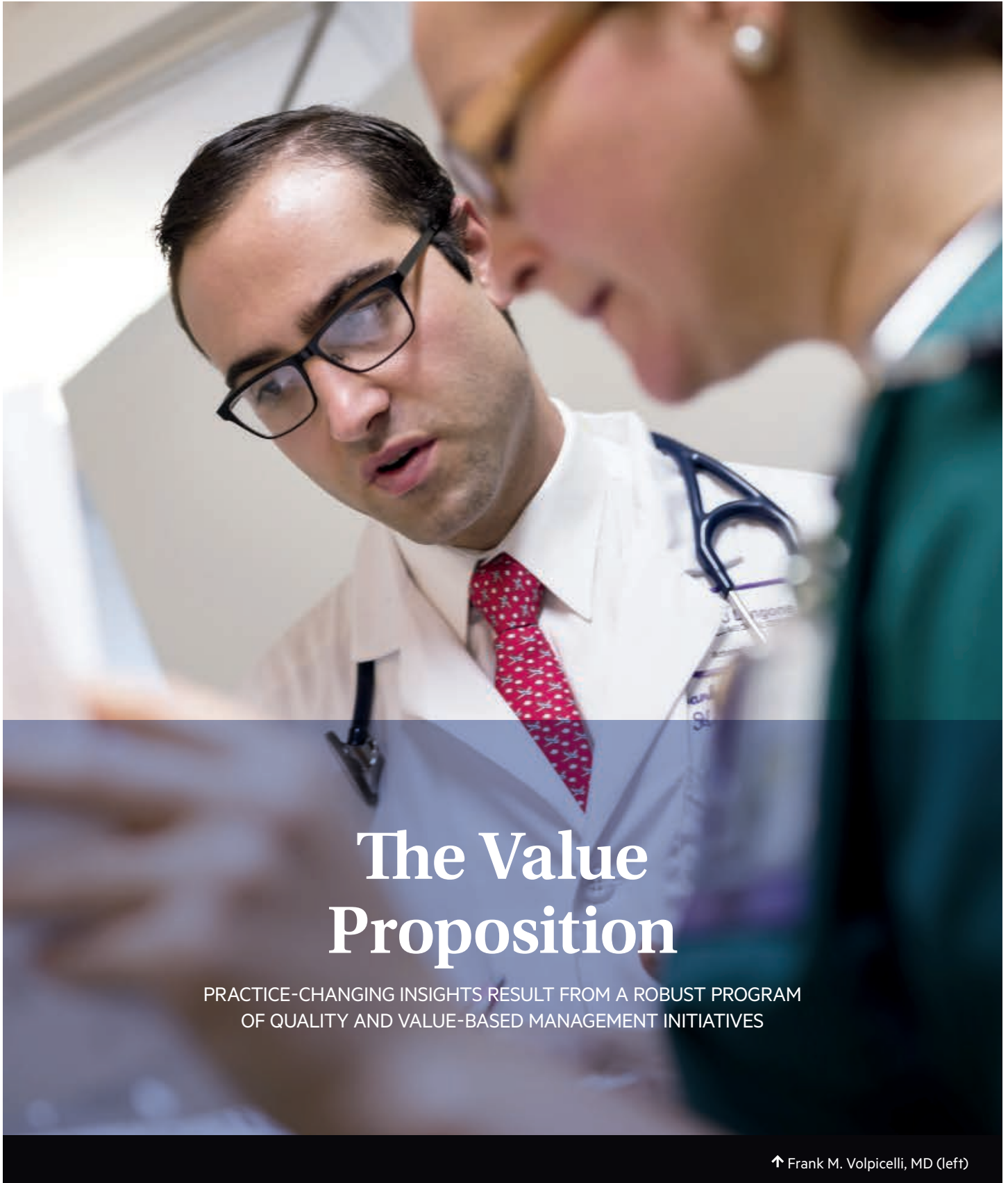
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## Infusing Technology

**PROFESSIONAL DEVELOPMENT.** NYU Langone's Marc M. Triola, MD, and Medical University of South Carolina's Gail Stuart, PhD, RN, co-chaired the April 2015 Josiah Macy Jr. Foundation conference on technology for education in the health professions. The conference proceedings are recorded in the report *Enhancing Health Professions Education through Technology: Building a Continuously Learning Health System*. Recommendations focused on "the use of technology for the individualization of education, for faculty development, for competency-based education, for the linkage of education and healthcare delivery, for the use of individual and population data to inform education, and for sharing and scaling educational materials to achieve greater efficiency and equity."

**BIG DATA.** NYU School of Medicine has created Health Care by the Numbers, a flexible three-year, individualized, technology-enabled curriculum to train medical students in the increasingly vital art and science of using clinical data to improve decision making, care coordination, and care quality. The program, funded by a grant from the American Medical Association, aims to harness the massive stores of data about what works for which patients and to realize the potential of those data to improve the way medicine is practiced. "That's how we make decisions, based on the truth and the evidence that are present in those data," says Dr. Triola, the faculty lead on this curriculum.

**MOBILE EDUCATION ECOSYSTEM.** Teams are working to create a ubiquitous and uniform e-learning environment. This involves facilitating mobile access to educational and clinical resources, as well as providing residents with timely workplace-based assessments and feedback across the learning continuum. Attending physicians and house staff can now use an iPad application called COMET, developed in collaboration with Louis H. Miller, MD, senior associate program director, as well as Harry Saag, MD. Residents have also piloted the use of iOS apps in resident conferences to create an engaging and interactive experience.



# The Value Proposition

PRACTICE-CHANGING INSIGHTS RESULT FROM A ROBUST PROGRAM  
OF QUALITY AND VALUE-BASED MANAGEMENT INITIATIVES

↑ Frank M. Volpicelli, MD (left)



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# Quest for Value Drives Improvements in Hospital Care

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Physicians and hospitals are increasingly being judged on the value—as opposed to the volume—of the services they provide.

## OPTIMIZING CARE WITH GUIDELINE-DRIVEN TRANSFUSIONS

Although some may equate increasing value with just cost-cutting, and possibly a resulting loss in quality, at NYU Langone, increasing value in fact goes hand in hand with increasing quality of care, says hospitalist Frank M. Volpicelli, MD, assistant professor of medicine and clinical lead of Value-Based Management (VBM) at NYU Langone.

“The benefits for patients of what we do are very clear,” says Dr. Volpicelli. “I see my role as helping to optimize the patient care we provide, and the cost reductions will follow.”

Dr. Volpicelli focuses on finding discrepancies between quality and cost. Blood transfusions, for example, represent a significant cost to the hospital—about \$9 million annually. Yet, when given liberally, blood transfusions are associated with higher inpatient mortality. Therefore, a multispecialty team of clinicians led by Dr. Volpicelli examined NYU Langone transfusion data—and uncovered a need to improve adherence to evidence-based guidelines when deciding which patients should receive transfusions.

“Inappropriate transfusions actually hurt patients and add excess cost to the system,” Dr. Volpicelli explains. “We wanted to make sure that our clinicians were ordering transfusions according to the evidence-based indications.”

The most recent clinical guidelines issued by the American Association of Blood Banks recommend a hemoglobin concentration of 7 grams per deciliter as a threshold for ordering a transfusion for most hospitalized patients. However, other factors, such as a heart attack in progress, might lead a physician to order a transfusion for a patient with a hemoglobin concentration above the threshold.

Dr. Volpicelli convened a team of oncologists, hematologists, surgeons, critical care specialists, hospitalists, and others to examine the evidence.

The result was a list of four key indications that now guide all orders for adult inpatient transfusions at NYU Langone:

1. Hemoglobin <7 g/dL
2. Hemoglobin <8 g/dL and active ACS (acute coronary syndrome/heart attack) or active non-gastrointestinal bleed
3. Hemoglobin <8 g/dL and bone marrow suppression with anticipated patient discharge in the next 24 hours
4. Major or emergent surgery

“We then built a dashboard that links the chosen indication for a transfusion with the associated blood counts,” says Dr. Volpicelli. In addition, led by Harry Saag, MD, a hospitalist who just completed a year as chief resident in charge of quality and safety for the Department of Medicine and, as medical director for the Greater New York City Practice Transformation Network (GNYC-PTN), a key driver of the initiative, an educational program was developed and delivered to care teams in the service areas where transfusions were ordered most frequently. The upshot: With the new internal indicators, the dashboard, and the education campaign, the percentage of blood transfusion orders made according to national guidelines has risen from 57 percent to more than 90 percent.

Furthermore, motivated by these results, Dr. Saag has shared the project data with clinical staff throughout the hospital and with colleagues at industry conferences. The transfusion project is the type of initiative that drew him to join the faculty at NYU Langone in 2016 and to seek out Dr. Volpicelli as a mentor.

“Working with Dr. Volpicelli solidified my interest within the space where clinical medicine and healthcare delivery intersect,” says Dr. Saag. “I wanted to be involved with people who are making changes happen on the front lines of VBM.”

### STANDARDIZING CARE FOR PATIENTS WITH HEART FAILURE OR PNEUMONIA

Dr. Volpicelli has also been looking closely at the clinical pathways that guide physicians' management of common conditions such as heart failure and pneumonia.

"We wanted to find out what the ideal course of hospitalization would be for patients with acute decompensated heart failure or pneumonia—and where we were falling down in that care," he says. "For example, in the vast majority of cases of heart failure, patients were being admitted because of excess fluid. But in our investigation, we found that often we were not giving evidence-based doses of diuretics and not re-dosing aggressively enough."

As a result of the investigation—conducted in partnership with Stuart D. Katz, MD, the Helen L. and Martin S. Kimmel Professor of Advanced Cardiac Therapeutics and director of the Heart Failure Program, and Alex Reyentovich, MD, assistant professor of medicine, clinical director of the Heart Failure Program,

and medical director of the Left Ventricular Assist Device Program—the care of hospitalized heart failure patients is now standardized and nurses know what to expect at every phase of the patient's stay. Dr. Volpicelli adds that since the standardized system was implemented, the hospital has seen shorter stays and reduced readmission rates for patients with heart failure and pneumonia.

"As a patient progresses through NYU Langone, there is a seamless course that's predictable," Dr. Volpicelli says. "We get patients to the point of heart failure management faster than ever before." Data collection for similar activities continues not only at the Medical Center's main campus but throughout its network.

Dr. Volpicelli adds that although VBM faces challenging perceptions, its benefits for patients cannot be ignored. To increase VBM's acceptance and adoption, he notes, "we need to convince our colleagues that what we are promoting is good patient care and not destruction of their autonomy and that the old way of doing things simply is not sustainable."

↓ Nicole Adler, MD (center)



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# National Initiative Aims to Transform Patient Care

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As quality and affordability continue to occupy center stage in national healthcare transformation efforts, NYU Langone is leading the Greater New York City Practice Transformation Network (GNYC-PTN), part of a national initiative to improve outpatient care.

The Medical Center has received a grant of \$6.9 million over four years to provide technical support and coaching to help equip 1,800 NYC-area primary and specialty care clinicians with the tools needed to improve quality of care.

“Our overall mission is to transform ambulatory healthcare delivery to produce better outcomes and reduce costs,” says Harry Saag, MD, medical director of the GNYC-PTN. “We’re meeting with clinicians, learning about their pain points in providing care, and finding solutions to help them improve.”

The GNYC-PTN is one of 29 networks across the country selected to participate in the Centers for

Medicare & Medicaid Services (CMS) Transforming Clinical Practice Initiative, launched earlier this year. Leora Horwitz, MD, MHS, associate professor of population health and medicine and director of the Center for Healthcare Innovation and Delivery Science at NYU Langone, is the principal investigator for the GNYC-PTN grant.

A major aspect of the initiative is helping practices implement and use technology in new ways to measure, track, and report on patients’ clinical progress and outcomes, says Dr. Saag. “Our current vision is to create reliable dashboards for real-time tracking of patients’ progress,” he says. “Everyone will be able to see the gaps in care and work as a team to make sure they’re being addressed.”

A dashboard with six key clinical metrics is expected to go live this year. It will allow the care teams to view real-time data on their patients, such as whether or not they are achieving clinical targets, adhering to prescribed medications, and keeping scheduled appointments.

Eventually, that information will be used as an analytical tool to drive clinical decision making. Physicians and their care teams will also be able to look at broader trends in population-level data, which will help them predict which patients might be at risk for serious health problems or complications of chronic diseases.

“Using these rich data, we can figure out which patients are struggling and intervene earlier,” says Dr. Saag. “As our inpatient and outpatient networks continue to grow, our goal is to continually find ways to help clinicians and their care teams use data and technology to improve patient health and outcomes.”

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*“I became interested in the healthcare delivery system when I majored in economics as an undergraduate. When I entered medical school, I knew I wanted to learn more about the system and work to fix the many cracks in it,” says Dr. Saag.*

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The GNYC-PTN is

**1 of 29**

**NETWORKS**

across the country participating in CMS’s  
Transforming Clinical Practice Initiative

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# Department of Medicine Leadership

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# Recent Large Research Grants

RESEARCH GRANT TITLE	FUNDING	PRINCIPAL INVESTIGATORS	SPONSORS	PROJECT START DATE
HARP (Heart Attack Research Program)	\$3,705,808	Hochman, Judith S.	American Heart Association	04/01/2016
Antigen Export in M. tuberculosis Evasion of CD4 T Cells	\$2,827,899	Ernst, Joel D.	National Institute of Allergy and Infectious Diseases (NIAID)	07/20/2016
RAGE/mDia1, Macrophage Trafficking and Inflammation in High Fat Feeding	\$2,617,015	Schmidt, Ann Marie	National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	04/01/2016
Role of Desmosomes in Cardiac Electrical Function	\$2,560,688	Delmar, Mario	National Heart, Lung, and Blood Institute (NHLBI)	08/15/2016
Molecular Regulation of Atherosclerosis Regression	\$2,516,836	Fisher, Edward A.	National Heart, Lung, and Blood Institute (NHLBI)	04/01/2016
HDL and Atherosclerosis Regression	\$2,440,983	Moore, Kathryn J.	National Heart, Lung, and Blood Institute (NHLBI)	04/01/2016
Purkinje Cells and Arrhythmia Mechanisms	\$2,365,916	Fishman, Glenn I.	National Heart, Lung, and Blood Institute (NHLBI)	07/01/2016
Macrophage Trafficking, Inflammation & Metabolism in Obesity: Role of Guidance Cue Molecules	\$2,118,750	Moore, Kathryn J.	National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	07/19/2016
Novel Mechanisms Regulating PD-1 Signaling and Function	\$2,118,750	Mor, Adam	National Institute of Allergy and Infectious Diseases (NIAID)	06/20/2016
RAGE Mediates LPA Induced Pulmonary Inflammation	\$2,111,800	Nolan, Anna	National Heart, Lung, and Blood Institute (NHLBI)	09/07/2016
Molecular Regulation of Apoprotein B Degradation	\$1,652,087	Fisher, Edward A.	National Heart, Lung, and Blood Institute (NHLBI)	12/01/2015
Regressing Atherosclerosis by Resolving Plaque Inflammation	\$1,604,144	Fisher, Edward A.	Department of Defense	07/01/2016
Evolution of Risk Factors for Lung Function Decline in WTC Exposed Firefighters	\$1,499,999	Weiden, Michael D.	Centers for Disease Control and Prevention	09/01/2016
Small Airway Chronic Obstructive Disease Syndrome Following Exposure to WTC Dust	\$1,460,478	Berger, Kenneth I.	Centers for Disease Control and Prevention	09/01/2016
Microbial, Immune, Metabolic Perturbations by Antibiotics (MIME study)	\$1,238,694	Blaser, Martin J.	National Institute of Allergy and Infectious Diseases (NIAID)	04/01/2016
Control of Atherosclerosis Regression by PRMT2 in Diabetes	\$1,061,966	Fisher, Edward A.	Department of Defense	08/01/2016
<b>GRAND TOTAL</b>	<b>\$33,901,813</b>			





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