Beth Israel Lahey Health

Beth Israel Deaconess Medical Center | HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Always

at the cutting edge

Department of Medicine
2019 Annual Report

Acknowledgments

The Department of Medicine would like to extend gratitude to the many people who contributed to this report, including Department leadership, Division Chiefs, administrators, and faculty members. We also thank Gigi Korzenowski and Jerry Clark of Korzenowski Design, and Kallie Gregg and Sophie Afdhal of the Department of Medicine. Much of the photography and photo research for this report were conducted by BIDMC's James Derek Dwyer and Danielle Duffey. Jane Hayward, Lindsay Oslund, Heather Derocher, and Ann Plasso all provided expert copy editing and design consultation. We also thank the Communications and Marketing Department. Last but not least, we wish to thank all of the individuals featured in these pages for their collaboration and for all they do for the Department of Medicine, our patients, and the medical center.

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From the Chair

As I write this message, we are completing a several month journey through the first—and we hope the only—crisis phase of the COVID-19 pandemic. The report in your hands describes the achievements of one of America's premier Departments of Medicine prior to the onset of the COVID-19 epidemic.

During this past academic year, the Department continued its tradition of providing superb, high quality care to ever-increasing numbers of outpatients and inpatients, both on BIDMC's main campus and at an ever-growing number of community health centers. We continued to expand our structural heart and congestive heart failure programs, we enhanced our interdepartmental collaborative efforts in transplantation, and we continued to expand our innovative approaches towards immunotherapy in cancer care. At the same time, we continued the planning for our new inpatient building and we have accelerated our collaborative clinical efforts throughout the Beth Israel Lahey Health network.

Our educators led the way in developing new curricula at Harvard Medical School and continued to recruit and train superb classes of interns, residents, and fellows. Again, our educators were honored repeatedly for their dedication, ingenuity, and effectiveness.

Our researchers continued to break new ground in cancer, vaccine development, rheumatologic, metabolic, renal, and cardiac diseases, and we continued to strengthen our mentoring of young investigators and junior faculty members of all types. We welcomed Gyongyi Szabo, BIDMC's new Chief Academic Officer, to our Department. As a truly outstanding Hepatologist and liver investigator, Dr. Szabo will collaborate with Dr. Afdhal and colleagues in the Division of Gastroenterology, Hepatology and Nutrition to further develop a comprehensive liver research program of international stature.

Although this Annual Report describes the year's events prior to the pandemic, reflecting on the past year from this new perspective renews the pride we have in our missions and our confidence that these missions will endure and flourish, no matter what challenges the pandemic has in store.

Mark L. Zeidel, MD
Chair, Department of Medicine

Departmental Organization

As of 2020

Administration

Mark Zeidel, MD
Department Chair

Kevin Maguire, MS
Chief Administrative Officer

Mark Aronson, MD
Vice Chair, Quality

Donald Cutlip, MD
Vice Chair, Clinical Care in the Community

Grace Huang, MD
Vice Chair, Career Development and Mentoring

Barbara Kahn, MD
Vice Chair, Research Strategy

Eileen Reynolds, MD
Vice Chair, Education

C. Christopher Smith, MD
Associate Vice Chair, Education

Anjala Tess, MD
Associate Vice Chair, Education

Peter Weller, MD
Vice Chair, Research

Tim McDermott, MHA
Executive Director, Finance and Business Operations

Paul Hart Miller
Director, Business and Network Development

Scot Sternberg, MS
Director, Quality Improvement

Clinical Divisions

ALLERGY AND INFLAMMATION

Peter Weller, MD
Division Chief

Amanda Yano-Litwin, MHA
Division Administrator

CARDIOVASCULAR MEDICINE

Robert Gerszten, MD
Division Chief

John DiGiorgio, MPS-HHS
Division Administrator

ENDOCRINOLOGY, DIABETES AND METABOLISM

Evan Rosen, MD, PhD
Division Chief

Amanda Yano-Litwin, MHA
Division Administrator

GASTROENTEROLOGY

Nezam Afdhal, MD
Division Chief

Sara Montanari
Division Administrator

GENERAL MEDICINE

Eileen Reynolds, MD
Division Chief

Blair Bisher, MHA
Division Administrator

GERONTOLOGY

Lewis Lipsitz, MD
Division Chief

Kerry Falvey
Division Administrator

HEMATOLOGY AND HEMATOLOGIC MALIGNANCIES

David Avigan, MD
Division Chief

Christine VanDeWege, MA
Division Administrator

INFECTIOUS DISEASES

Peter Weller, MD
Division Chief

Amanda Yano-Litwin, MHA
Division Administrator

MEDICAL ONCOLOGY

David F. McDermott, MD
Division Chief

Christine VanDeWege, MA
Division Administrator

NEPHROLOGY

Martin Pollak, MD
Division Chief

Kerry Falvey
Division Administrator

PULMONARY, CRITICAL CARE AND SLEEP MEDICINE

Richard Schwartzstein, MD
Division Chief

Renee Wheeler
Division Administrator

RHEUMATOLOGY AND CLINICAL IMMUNOLOGY

George Tsokos, MD
Division Chief

Patricia Harris
Division Administrator

Research Divisions

CLINICAL INFORMATICS

Yuri Quintana, PhD
Division Chief

CLINICAL NUTRITION

Bruce Bistrian, MD, PhD, MPH
Division Chief

EXPERIMENTAL MEDICINE

Jerome Groopman, MD
Division Chief

HEMOSTASIS AND THROMBOSIS

Robert Flaumenhaft, MD, PhD
Division Chief

IMMUNOLOGY

Cornelius Terhorst, PhD
Division Chief

INTERDISCIPLINARY MEDICINE AND BIOTECHNOLOGY

Ary Goldberger, MD
Division Chief

SIGNAL TRANSDUCTION

Alex Toker, PhD
Division Chief

TRANSLATIONAL RESEARCH AND TECHNOLOGY INNOVATION

Steven Freedman, MD, PhD
Division Chief

CENTER FOR VIROLOGY AND VACCINE RESEARCH

Dan Barouch, MD, PhD
Division Chief

From the CAO

Since coming together as part of Beth Israel Lahey Health last year (for more information, visit page 14), the Department of Medicine has been proud to be an integral part of the new system as we continue to emphasize our mission: providing extraordinary care to our patients, training the next generation of physicians and scientists, and engaging in groundbreaking research across all of our Divisions.

It has been an incredibly eventful beginning for our new system, and I could not be more proud of how BILH and the Department of Medicine has responded to the many challenges we faced and continue to face.

Throughout the entire coronavirus pandemic, from our early preparedness plans and managing the surge in Massachusetts, to recovering and beginning to adapt to a 'new normal,' the Department acted quickly, effectively, and collaboratively to care for our patients and for one another during unprecedented times.

Every member of our Department contributed to managing this crisis: the Vaccine and Virology lab is at the forefront of the race to develop a vaccine, faculty provided surge coverage for inpatient COVID-19 floors, staff converted clinical spaces to accommodate additional patients on ventilators, and residents developed a program to donate iPads to connect loved ones with isolated patients. These are just a few examples, among many, that demonstrate the versatility, talent, and commitment we have within the Department and at BIDMC.

It's been a year of ups and downs met by change and innovation, and I'm eager to see what the coming months bring for the Department of Medicine, BIDMC, and Beth Israel Lahey Health. I hope you are as well.

Kevin Maguire, MS,
Chief Administrative Officer, Department of Medicine

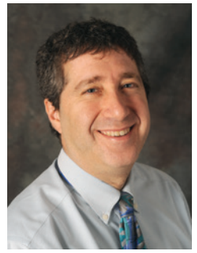
New Leadership

Nezam Afdhal, MD

Nezam Afdhal, MD, was named Chief of the Division of Gastroenterology, Hepatology and Nutrition. He is the Charlotte and Irving Rabb Professor of Medicine at Harvard Medical School. His new role is a continuation of his 19 years at BIDMC as a clinician, researcher, educator, and mentor within the Division. He succeeds J. Thomas Lamont, MD, who led the Division for over 20 years and continues to work at BIDMC as Emeritus Chief of the Division.

Dr. Afdhal is a distinguished clinical leader and for 15 years was the Director of Hepatology at BIDMC, where he created both the Liver Center and the innovative inpatient Epstein-Trey service to provide specialized clinical care to BIDMC patients with liver diseases. Dr. Afdhal was an NIH-funded researcher for 20 years, conducting both basic and translational research on liver fibrosis, as well as multiple collaborative NIH-funded clinical trials on viral hepatitis. His work has resulted in many clinical innovations such as the application of vibration-controlled Transient Elastography to stage liver fibrosis. This technology has effectively replaced liver biopsy for fibrosis staging in the US. Dr. Afdhal also was the lead investigator on multiple global clinical trials evaluating direct-acting anti-viral therapy for Hepatitis C Virus (HCV) resulting in the cure of many patients with HCV. He continues to be a leader in developing global eradication strategies for HCV.

Dr. Afdhal has served on multiple state, national, and international advisory boards for liver disease. He is also an editor of the Journal of Viral Hepatitis, a member of multiple editorial boards, and a reviewer for many major journals in gastroenterology and liver diseases. He is the author of more than 250 original manuscripts, reviews, and editorials, and his work has been featured in the New England Journal of Medicine, Hepatology, Gastroenterology, and the Journal of Hepatology, among other leading journals. In 2016, he delivered a TEDx Talk entitled "25 Years from Discovery to Cure: The Hepatitis C Story." Dr. Afdhal has received numerous awards, including the American Liver Foundation Award for Excellence, a Fulbright Scholarship, and an Honorary Doctor of Science from the Royal College of Surgeons in Ireland.



David Avigan, MD

David Avigan, MD, has been appointed Chief of the newly created Division of Hematology and Hematologic Malignancies, part of the Leon V. & Marilyn L. Rosenberg Clinical Cancer Center. Within the Division, he will lead an accomplished group of clinicians and researchers, working tirelessly to offer the highest level of patient care and seek better treatments as they design personalized therapies that improve quality of life for patients with blood cancers and disorders.

Dr. Avigan is an internationally recognized researcher for his groundbreaking work in developing novel immune therapies based on personalized vaccines and their advancement into clinical trials and the clinic. He is a widely published scholar and his investigations have focused on tumor immunotherapy and its incorporation into bone marrow transplantation. His ongoing work is developing a tumor vaccine model in which patients undergo vaccination with dendritic cells fused with autologous tumor cells resulting in the potent induction of anti-tumor immunity and disease regression.

A Professor of Medicine at Harvard Medical School, Dr. Avigan leads the Cell Therapy and Bone Marrow Transplant Program at BIDMC and also serves as Co-Director of the Immunotherapy Institute, alongside David McDermott, MD, and Jacalyn Rosenblatt, MD. The Immunotherapy Institutes' work is already making a dramatic impact on scientific discovery and advancing patient care with its hallmark integration of clinical and translational research.

Nationally, Dr. Avigan serves as principal investigator and leader in a first-of-its-kind national trial involving 10 leading cancer centers. The trial is working on a cancer vaccine model developed by Dr. Avigan, in which patient derived tumor cells are fused with dendritic immune cells to form a hybridoma, forming the basis for a patient-specific vaccine. He was named a Game Changer in 2015 by The Boston Globe for this research.

Dr. Avigan has made an ongoing impact in the fields of cancer therapies and cancer care during his time at BIDMC and will continue this work at the cutting edge as Division Chief.

David F. McDermott, MD

David F. McDermott, MD, has been named Chief of the Division of Medical Oncology at the Leon V. & Marilyn L. Rosenberg Clinical Cancer Center at BIDMC. In his new role, Dr. McDermott will serve as the head of a distinguished faculty of medical oncologists and physician leaders with a diverse array of clinical, educational, and research expertise in innovative research and treatment approaches for solid tumors. The Medical Oncology Division will further the delivery of high-caliber cancer patient care by incorporating targeted immunotherapy for a growing list of cancer diagnoses.

Dr. McDermott is a nationally and internationally recognized medical oncologist, clinical researcher, and expert in three fields of research and clinical management: cancer immunotherapy, melanoma, and kidney cancer. Dr. McDermott is a renowned clinical oncologist and researcher whose pioneering work focuses on finding novel therapies to enhance the immune response to cancer. He has made significant contributions to the application of checkpoint inhibitors for renal cell carcinoma and melanoma and has focused on developing "targeted" immunotherapies for patients with solid tumors.

Alongside David Avigan, MD, Dr. McDermott serves as co-Director of the Immunotherapy Institute, also a part of the Cancer Center. With Deputy Director, Jacalyn Rosenblatt, MD, they are working on harnessing the potential of immunotherapy as it revolutionizes the way cancer and ultimately other diseases are treated and diagnosed.

Dr. McDermott is the Director of the Immuno-Oncology and Cutaneous Oncology Programs at BIDMC, Leader of the Dana Farber/Harvard Cancer Center Kidney Cancer Program, co-Principal Investigator of the National Cancer Institute, the recipient of a Specialized Programs of Research Excellence grant focusing on kidney cancer, and a Professor of Medicine at Harvard Medical School.

Dr. McDermott is a demonstrated innovator in his field and will continue to be an integral leader in cancer care at BIDMC through his new role.

Richard Schwartzstein, MD

Richard M. Schwartzstein, MD, was named Chief of the Division of Pulmonary, Critical Care and Sleep Medicine.
Dr. Schwartzstein assumes this leadership role after 33 years in the Division, including 14 years as Associate Chief. He succeeds J. Woodrow Weiss, MD, Professor of Medicine at Harvard Medical School, who was appointed Chief of the Division in 1999.
Dr. Schwartzstein earned his medical degree from HMS and trained at what was then Beth Israel Hospital, ultimately serving as chief medical resident. He completed his training in the then-combined program between the Brigham and Women's and Beth Israel Hospitals in Pulmonary and Critical Care Medicine. Prior to the official recognition of the discipline known as Emergency Medicine, Dr. Schwartzstein directed the emergency department at the former Beth Israel Hospital, ultimately transforming it into a division of the Department of Medicine before it became an independent department.

As a clinician-researcher, Dr. Schwartzstein investigates the biology of dyspnea, and helped develop and validate the Multidimensional Dyspnea Profile to assess overall breathing discomfort and emotional responses to air hunger. A teacher of physiology and pathophysiology for more than 20 years at HMS, he is the recipient of multiple national teaching awards and the author of more than 130 peer-reviewed articles. His textbook, Respiratory Physiology: A Clinical Approach, received the 2006 Dr. Frank H. Netter Award for Special Contributions to Medical Education.

In addition to his clinical and research activities, Dr. Schwartzstein has also worked to enhance BIDMC's reputation as a leading center of medical education. Since 2004, he has served as the Vice President for Education and Executive Director of the Shapiro Institute for Medical Education. The Shapiro Institute develops talent among clinician-educators through its Rabkin Fellowships and has provided a model for the Academies of Medical Education at medical schools and other hospitals nationally and internationally. Dr. Schwartzstein's education research focuses on the development of pedagogical approaches to enhance analytical reasoning, techniques to maximize the benefits of small group teaching, and assessment of the role of simulation in medical education. For nine years, Dr. Schwartzstein directed the Academy at HMS and led the steering committee for the medical school's new curriculum, which was implemented in 2015.

Gyongyi Szabo, MD, PhD

Gyongyi Szabo, MD, PhD, Hon. ScD, a highly recognized leader in education and the field of immunology, was appointed Chief Academic Officer at BIDMC. In her new role, Dr. Szabo spearheads the medical center's robust research and teaching programs while identifying and supporting a broad range of basic, translational, and clinical research priorities. Succeeding Interim CAO Jeffrey Saffitz, MD, her work will further BIDMC's considerable scientific, research, and education curricula. BIDMC currently has more than 2,500 clinical research studies underway and trains more than 650 residents and fellows annually. Dr. Szabo's priorities include exploring new opportunities and building partnerships to serve the academic community, enhancing the depth of translational and clinical sciences, supporting faculty development, and broadening educational opportunities.

An accomplished researcher, Dr. Szabo continues her own work in the Department of Medicine within the Division of Gastroenterology, Hepatology, and Nutrition. Her research and clinical interests include innate immunity of the liver and the gut-liver axis, with investigations focused on alcoholic hepatitis, non-alcoholic fatty liver disease, and viral hepatitis. She has received uninterrupted National Institute of Health (NIH) grant support since 1989, including the MERIT Award, and currently has six NIH grants. She has published more than 200 peer-reviewed journal articles and is a fellow of several professional associations, including the American Gastroenterological Association, the American College of Physicians, and the American Association for the Study of Liver Diseases.
Dr. Szabo is a member of the Hungarian Academy of Sciences and serves on advisory boards of several federal agencies and leading academic institutions. She served as President of the American Association for the Study of Liver Diseases in 2015 and she is the inaugural Editor-in-Chief of Hepatology Communications.

Dr. Szabo will further our top-tier research and educational programs, fostering our work with her exemplary expertise.

Vice Chair Updates

Education

Eileen Reynolds, MD
Vice Chair for Education

C. Christopher Smith, MD
Associate Vice Chair for Education

Anjala Tess, MD
Associate Vice Chair for Education

Education has always been one of the many areas in which our Department shows innovation, expertise, and passion – work that is always at the cutting edge! The Department's educational programs serve 164 residents, over 100 fellows, and hundreds of medical students, including over 150 in Harvard Medical School clinical clerkships annually. Nearly 200 of our faculty members teach in undergraduate HMS courses, and both our clinical clerkships and clinical are award-winning.

Each year, we engage in many new education projects. Below, we've highlighted just a few of the most exciting new ideas and educational enhancements that are underway:

AMA Residency Innovation Grant: With the support of this grant, the educational leadership team for ambulatory training is transforming the way ambulatory training is designed and implemented, moving our residents toward a population health strategy. The project will develop a novel educational and clinical dashboard to track the impact of their innovations and also measure the health of our training program. The project explores the intersection of education and clinical

care for our residents and their patients, implementing resident population health team meetings and pre-visit huddles. Finally, the project will develop a novel Health Systems Curriculum to train residents in the most important domains of Population Health. The curriculum includes a comprehensive high value care component, a broad health equity curriculum, and training on physician wellness.

Resident as Leader Curriculum: Clinical leadership is essential to post-graduate medical training, yet skills for clinical leaders have historically been taught through an apprenticeship model, resulting in variable resident readiness to lead teams. To address this training gap, the residency program implemented a longitudinal Resident-as-Leader curriculum for rising PGY2 residents and is developing a novel, validated, direct observation-of-leadership instrument. Direct observations of residents following curricular intervention have revealed a significant increase in clinical leadership skills and reduced performance variation across residents.

BI Innovation Group (BIG) Hack-a-thon: Developed and led by a group of residents, BIG provides a community, resources, and training for residents interested in improving medicine and healthcare delivery through innovations in technology, business, and health systems. The wildly successful Hack-a-thon was the first BIG event of 2019, an intensive brainstorming event bringing together students and residents across the Harvard Medical School network and MIT to consider novel approaches to healthcare informed by artificial intelligence.

Live Model Simulations: Over the past few years, internal medicine has seen an increase in the use of bedside ultrasound imaging to enhance the care of our patients. While BIDMC has been teaching and using ultrasound for years, we designed a new ultrasound training using live models as part of our academic half day curriculum. During each four-hour session, residents rotate through five different stations, utilizing ultrasounds to evaluate live models. With expert faculty guidance, each resident has ample time to practice obtaining different ultrasound views, including basic echocardiogram, pleural ultrasound, and abdominal ultrasound.

The BIDMC Clinician Educator Track for Fellows: This is the first focused education track for internal medicine fellows in the nation. Recognizing the unique challenges in subspecialty education, our program combines a longitudinal didactic curriculum, mentored research in medical education, and teaching experiences across the medical center. Participants have come from seven different BIDMC subspecialty fellowships, and graduates of the program have gone on to hold leadership roles in medical education and publish in the medical education literature.

Trauma-Informed Care (TIC): The leaders of our Harvard student clinical skills curriculum course are incorporating the principles of TIC into history-taking and physical exam skills. Students are first taught the fundamental concepts of TIC via didactics and online materials, then practice these skills with observation and coaching by faculty preceptors. The TIC curriculum is also being rolled out to residents and across the department's non-physician clinical staff.

Primary Care Innovation Laboratory: The primary care program and our clinical practice leadership have created an innovation lab for residents who are members of the primary care track. This novel program aims to use our primary care annual operating plan to train residents in health systems research, primary care innovation, and quality improvement, by combining education and practice operations into an interdependent and mutually beneficial team that produces better care for patients, better training for residents, and sustainability to our large academic primary care practice. Over the past year, with the support of the laboratory practice and mentorship from local experts, residents developed an innovative transitional care management program and a predictive model for patient retention in primary care.

Research

Barbara Kahn, MD, MS
Vice Chair, Research Strategy

Peter Weller, MD
Vice Chair, Research

A core component of the Department of Medicine's mission is cutting-edge research. Discoveries by our investigators lead to the prevention, cure, and improved treatment of human diseases, as well as enhancement of the quality of life for those who live with chronic diseases. In our roles as Vice Chairs of Research and Research Strategy, we consider it of the utmost importance to develop and support an outstanding research program at the forefront of discoveries that will further medical care.

One way the Department ensures that research continues to thrive is through our support for young investigators. The Franklin Epstein Society, directed by Dr. Steve Freedman, mentors over 30 young researchers with active Career Development (K) Awards from the National Institutes of Health as they transition toward Research Project (RO1) Grants to launch their independent academic careers. The Epstein Society not only develops a collaborative community of new investigators, but also offers institutional support and feedback related to career development in basic, translational, clinical, and outcomes research.

In addition to the K-Grant awardees, nearly 300 faculty

members in the Department of Medicine have active grants, by which they mentor hundreds more trainees and laboratory staff. Our research funding in the 2018-2019 Fiscal Year was over $180 million, consisting of government, foundation, corporate, and donor sources. (See funding details on page 36). We continue to be one of the best-funded medical school departments of medicine in the nation, and BIDMC consistently ranks as a national leader among independent hospitals in National Institutes of Health funding. The Department of Medicine plays a large role and accounts for nearly 70% of that funding.

This year, our faculty published paradigm-shifting research in the world's leading scientific and medical journals, including Nature, Science, Cell, Lancet, and the New England Journal of Medicine (see more publications on page 37). Our investigators also continue to be recognized for their excellence in research, both via honors and awards from national organizations, as well as through elections to academic societies such as the American Academy of Arts and Sciences (see more accolades on page 18).

Quality

Mark Aronson, MD
Vice Chair, Quality

As Vice Chair for Quality, I'm proud of our Department's Quality Improvement and Patient Safety program, which is among the most widely respected in the country. We have strived to create an organization that ensures highly reliable care, with follow-up on all tests and referrals using closed-loop methods. Some recent examples of our QI program's interventions include developing systems to reliably offer Lung Cancer Screening to all appropriate patients based on their smoking history and age, building medication safety guidance programs into Provider Order Entry systems, tracking all consults for timely responses, and monitoring procedures for safety, complications, and efficacy.

For nearly 20 years, all of our medical residents have learned the language and methodology of analyzing cases from a QI perspective as part of a QI rotation. Throughout the QI rotation, residents participate in all hospital QI conferences and work with their preceptors and colleagues on QI projects. During their rotation, residents perform a root cause analysis of an adverse event or medical error with guidance from an expert faculty preceptor and then report their findings to the Department's Medical Peer

Review Committee. These analyses often lead to significant changes in how we deliver care, and in many cases, the resident is the key to enacting the transformation. Many of our trainees go on to leadership positions in healthcare quality, both at BIDMC and elsewhere, as a result of their experiences here.

Another venue for our trainees to learn about optimizing medical care is the weekly Morbidity & Mortality conference run by the Chief Medical Residents. The M&M conference not only reviews clinical teaching points, but also analyzes how care was delivered and focuses on whether we could have done better.

Our goal is to make QI and patient safety integral to all of our residents' education, because we believe this is one of the best ways to ensure the care we provide is of the highest quality.

Career Development and Mentoring

Grace Huang, MD
Vice Chair, Career Development and Mentoring

As the Vice Chair for Career Development and Mentoring, my goal is to serve the professional development needs of our faculty as they advance their careers in cutting-edge clinical care, education, and research. One way we support our colleagues is by offering one on one Harvard Medical School CV consultations, which nearly 60 faculty members in the Department availed themselves of over the last year. Dr. Thomas Lamont, Emeritus Chief of the Division of Gastroenterology, Hepatology and Nutrition, will also assist with CV reviews going forward, particularly for investigators.

This year, we implemented a revised annual faculty review process, in order to best make use of faculty's career conference meetings with their Division Chiefs. We also plan to pilot an electronic version of this process going forward.

Additionally, we instituted writing groups for faculty, where colleagues working on similar paper formats committed to meeting regularly to support each other in the process of writing a manuscript from start to finish. We're excited that this popular service will continue in the coming academic year.

Another avenue for career development and mentoring at BIDMC is The Franklin Epstein Society, led by Dr. Steven Freedman. As our Research Vice Chairs noted in their message, the Epstein Society supports the needs of our researchers from their time as residents through their mid-career stages. As the group continues to grow in size and scope, Dr. Freedman reviews grant applications, co-writes institutional letters of support, and hosts monthly seminars that cover a wide range of topics, from mentorship to seeking industry support.

Clinical Care in the Community

Donald Cutlip, MD
Vice Chair, Clinical Care in the Community

Our Department has a long history of providing clinical care at the cutting edge. Traditionally, for our patients living in communities outside of the Boston area, receiving these state-of-the-art therapies required traveling into Boston. With the growth of our network, patients' desire for local care, and limited capacity at the medical center, we've undertaken an effort to extend these higher-level services from our academic medical center into the community.

Extending BIDMC's medical care to the community involves multiple layers of collaboration. Many times, we need to increase treatment capabilities in the community through physician recruitment. In other cases, physicians based primarily in the medical center may need to travel to the community to provide care or direct new services. The overarching objective is that care received in the community is of the same high quality that would be received at the medical center. By combining these strategies alongside

collaborations with affiliated partners to share resources and manage efficiencies, we've had demonstrated successes in shifting cutting edge care to the community.

We're also working to provide access to the medical center when an even higher level of care becomes necessary. Providing the right care at the right place will improve the health of our overall population as well as the institutions engaged in this shared mission.

Breaking Ground on a Cutting-Edge New Inpatient Building

At a world-class institution like BIDMC, innovation is a constant – be it in a lab, in a clinic, or at a Grand Rounds lecture. Rarely is the innovation quite so physical as a ten-story structure, but at last June's groundbreaking ceremony, BIDMC began its latest cutting-edge addition to the medical center.

That addition will be an approximately 345,000 square foot inpatient building. The new space will be a modern, state-of-the-art environment where patients will receive the highest caliber of healthcare. It will be the medical center's first new building in 20 years, located on the corner of Francis Street and Pilgrim Road on West Campus. With cognizance of our role in a rapidly changing healthcare environment, the medical center is developing more resources to meet the needs of our patients and their communities.

"This new building will further strengthen our ability to deliver the highest quality care to our patients and fully support our committed physicians, nurses, and staff," said Peter Healy, President of BIDMC. "This new structure will propel Beth Israel Deaconess Medical Center forward in delivering on our commitments to the people and communities we serve. We are proud to be at the forefront of innovation in healthcare — for the benefit of our patients, our communities, and our region."

The building was designed with careful attention to key considerations, including thoughtful input from physicians, staff, patients, and the Longwood area community. Their collaboration helped to inform the sophisticated design. "This groundbreaking is the culmination of two years of planning and community engagement," said Walter Armstrong, Senior Vice President Capital Facilities and Engineering at BIDMC.

The pillars of the building design focus on integration within West Campus, incorporating both patient-friendly spaces and environmental sustainability. The building will connect to the Rosenberg Building and the Farr Building Bridge at multiple locations to facilitate access for patients, families, and caregivers.

The location will also facilitate the sharing of clinical support services with existing inpatient programs on West Campus.

The facility will include up to 128 single-bedded, family-friendly patient rooms. An expansion of single patient rooms will replace the double-bedded rooms currently on West Campus. There will also be 30 intensive care unit (ICU) rooms to facilitate delivery of the highest quality care to patients in critical condition. To make the new building a comprehensive patient space, the design expanded past the hospital room and up to the roof, where there will be an accessible rooftop green space and a healing garden for patients, families, and caregivers.

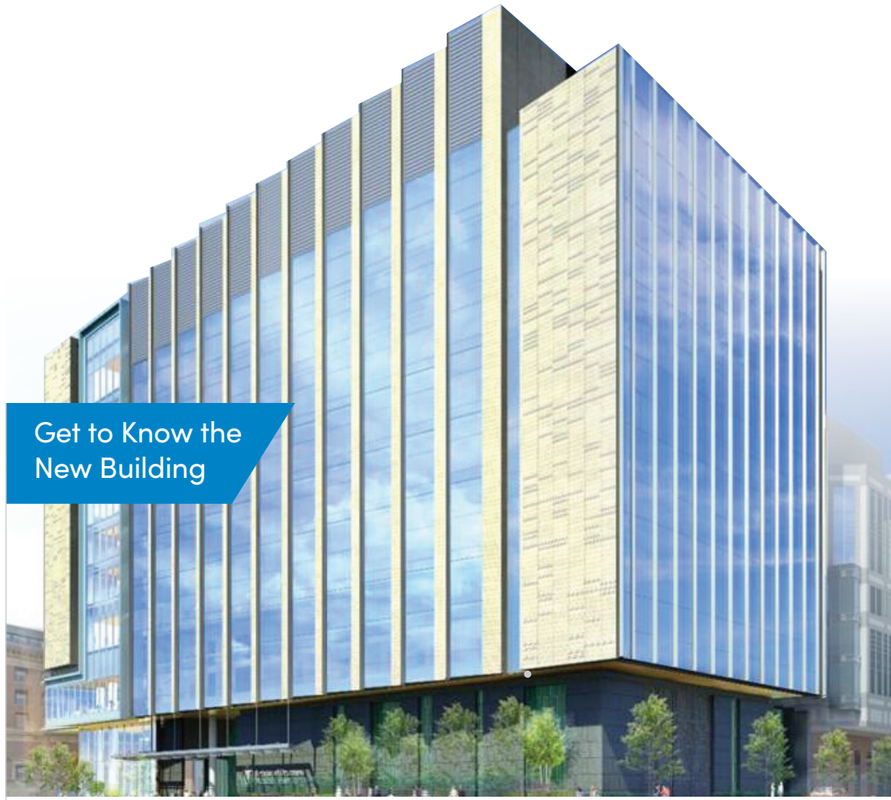
The building design is wired for the future, accommodating sophisticated technology, advanced treatments, and team-based care. Advancing the cutting-edge work of our specialists, the building will have surgical suites large enough to accommodate the most advanced surgical procedures and imaging technology, as well as versatile diagnostic and procedural suites with state-of-the-art equipment to handle the most acute patient needs. The same attention has been paid to the role of sustainability, as the building will be energy efficient and environmentally conscious, consistent with BIDMC's commitment to environmental stewardship.

> "This new structure will propel BIDMC forward in delivering on our commitments to the people and communities we serve."
>
> *—Peter Healy, President of BIDMC*

The new building will also include a medical helicopter landing pad, relocating from the current location on the roof of the adjacent Rosenberg Building. Helicopter access is crucial to support BIDMC's important role as a major Level 1 Trauma Center for our region.

"This new building will rise from BIDMC's extraordinary ability to collaborate and innovate, our research and educational missions and our primary commitment to exceptional, compassionate care for all," said Kevin Tabb, MD, President and CEO of Beth Israel Lahey Health.

The competition of construction and opening of the new addition are expected in 2022. With its development at the start of the new decade, BIDMC is positioning itself for continued success as a leader in patient care.



Get to Know the New Building

- **10-STORIES**
- **APPROXIMATELY 345,000 SQUARE FEET**
- **ENERGY-EFFICIENT AND ENVIRONMENTALLY SUSTAINABLE DESIGNS**
- **UP TO 128 SINGLE-BED, FAMILY-FRIENDLY PATIENT ROOMS**
- **30 INTENSIVE CARE UNIT (ICU) ROOMS**
- **LEADING-EDGE SURGICAL SUITES** large enough to accommodate the most advanced surgical procedures and imaging technology
- **VERSATILE DIAGNOSTIC AND PROCEDURAL SUITES** with state-of-the-art equipment to handle the most acute patient needs
- **AN ACCESSIBLE, ROOFTOP GREEN SPACE AND HEALING GARDEN** for patients, families and caregivers
- **CONFERENCE SPACE WITH TECHNOLOGY** that fosters the sharing of innovative scientific and medical knowledge, modern teaching methods, and multidisciplinary teamwork
- **A MEDICAL HELICOPTER LANDING PAD** — relocated from its current location on the roof of the adjacent Rosenberg Building — *to support BIDMC's important role as a major Level 1 Trauma Center for our region*

Beth Israel Lahey Health

Coming Together as a New System

On March 1st, 2019, BIDMC and the Department of Medicine became part of Beth Israel Lahey Health (BILH) – a new healthcare system that brings together academic medical centers and teaching, community, and specialty hospitals in a shared mission to expand access to exceptional healthcare for more than 1.3 million people in Eastern Massachusetts.

As part of BILH, BIDMC joined colleagues from Addison Gilbert Hospital, Anna Jaques Hospital, Beth Israel Deaconess Hospital—Milton, Beth Israel Deaconess Hospital—Needham, Beth Israel Deaconess Hospital—Plymouth, Beverly Hospital, Lahey Hospital & Medical Center, Lahey Medical Center—Peabody, Mount Auburn Hospital, New England Baptist Hospital, and Winchester Hospital to form the new system. Combined, these institutions include four academic and teaching hospitals affiliated with Harvard Medical School and Tufts University School of Medicine.

Alongside BILH's 13 hospitals and numerous affiliates, BIDMC and the Department of Medicine are committed to the idea that everyone deserves high quality healthcare. BILH is a population health enterprise, working to strengthen both quality of care and patient health outcomes, as well as addressing health disparities and public health issues. Within the new system, patients have access to more than 800 primary care doctors and 3,500 specialty physicians. Notably, patients are increasingly able to see their care teams closer to their homes and communities.

Additionally, BILH facilitates access to community healthcare through affiliates in Eastern Massachusetts, which include Atrius Health, the Cambridge Health Alliance, the Community Care Alliance (Bowdoin Street Health Center, Charles River Community Health, and The Dimock Center), Fenway Health, Outer Cape Health Services, South Cove Community Health Center, HCA Parkland Medical Center, HCA Portsmouth Regional Hospital, Hebrew SeniorLife, Joslin Diabetes Center, King Edward Memorial Hospital, Lawrence General Hospital, Signature Healthcare, Southern New Hampshire Medical Center, and St. Joseph Hospital.

"With the creation of Beth Israel Lahey Health, we have an unprecedented opportunity to care for our patients and our communities in new and better ways," said Kevin Tabb, MD, President and CEO of Beth Israel Lahey Health, on March 1st, 2019, the day the new system launched. "This is just the beginning of our journey to transform health care in Massachusetts into what we know it can and should be."

"We believe everyone should have access to high-quality, affordable care, whether they live on Cape Cod, the North Shore or somewhere in between," he added. "Through local and system partnerships, as well as the enthusiasm and talent of all our employees and providers, we will invest in and strengthen community-based care, informed by innovation and discovery."

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>
> *—Kevin Tabb, MD, President and CEO of Beth Israel Lahey Health*

BILH's leadership team has shaped the legacies of its member organizations. This team includes Gyongyi Szabo, MD, PhD, Hon. ScD, Chief Academic Officer of BIDMC and BILH, who began her new role in July of 2019. Dr. Szabo is a member of the Division of Gastroenterology, Hepatology and Nutrition within the Department of Medicine, as well as an accomplished physician, scientist and mentor. (Read more about Dr. Szabo and the Department's other new leaders on page 8).

Over the last year, the new system has begun to implement some of the many plans to provide high-quality, affordable care to patients across Massachusetts. In October, BILH announced plans to bring a broad range of new health care services to the City of Quincy. The new initiative provides highly-specialized and nationally-recognized models of orthopedic care developed by New England Baptist Hospital to the community hospitals in Newburyport and Beverly. In December, Anna Jaques Hospital and Beverly Hospital began offering the New England Baptist Hospital model of care for inpatient joint replacement surgery on the hip and knee, as well as spine surgery.

In 2018, after the definitive agreement was signed and the various member hospitals began preparations to form the new system, Massachusetts Attorney General Maura Healey imposed a number of conditions before approving the creation of BILH. Now, a year into the merger, the first report on those conditions found that BILH is meeting every imposed standard, including reaching out to low-income patients and expanding the availability of mental health care.

In a recent interview with the Boston Globe, Dr. Tabb reflected on the last year's progress. "We said we were going to do a whole host of things, and we're doing them. We're moving pretty quickly."

BILH by the numbers

13 **HOSPITALS, INCLUDING...**

4 **ACADEMIC AND TEACHING HOSPITALS** with Harvard Medical School and Tufts University School of Medicine Affiliations

8 **COMMUNITY HOSPITALS**

SPECIALTY HOSPITALS for orthopedics and behavioral health

COMPREHENSIVE AMBULATORY AND URGENT CARE CENTERS

4,300 **PHYSICIANS, INCLUDING...**

800 **PRIMARY CARE PHYSICIANS**

3,500 **SPECIALISTS**

9,000 **NURSES**

35,000+ **EMPLOYEES**

1.3 MILLION+ **PEOPLE CARED FOR**

The Beth Israel Lahey Health logo represents the three core elements of our vision.

- **Care delivery**
- **Education/**
- **Integration discovery**

Mark Andermann, PhD

A Pioneer of Perception

A principal investigator in the Division of Endocrinology, Diabetes and Metabolism and an Associate Professor of Medicine at Harvard Medical School, Mark Andermann, PhD, is supported by an NIH Director's Pioneer Grant as his lab seeks to understand how the needs of the body are sensed, learned, and remembered.

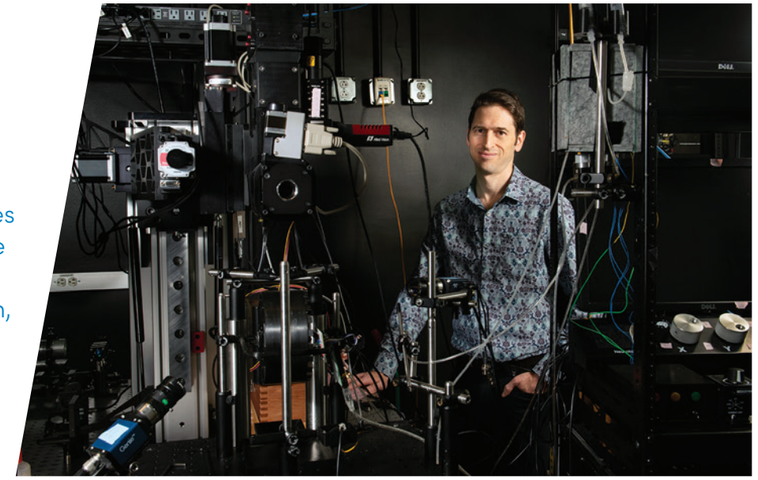


Photo by Anna Olivella

"At any given moment, our brains must choose to pay attention to the world around us, or to the world inside us."

This is a fact that Dr. Mark Andermann knows well. As he describes that inner world, laboratory activity hums around him. A mouse moves within the confines of a massive microscope, so large it fills the entire room. The scope's screens light up with movies of hundreds of individual cells in the mouse's brain, each flashing as it becomes active. In this given moment, choosing to pay attention to the world around us provides a peak into the world inside of something else.

Each time someone asks how we're feeling, we direct our focus away from external stimuli and turn it inward, becoming aware of any number of salient signals from our bodies—a headache, a stomach cramp—through a process called interoceptive awareness.

Interoception is how we are able to tell when we crave a meal, need a glass of water, or are sated of hunger and thirst. For researchers, pivotal understanding of precisely how the brain can estimate our body's state and react accordingly remains elusive.

"Despite the broad relevance of interoceptive awareness to both medicine and psychiatry, we know shockingly little about the conditions that regulate our awareness of different body signals," Andermann says. "We know even less about the precise brain circuits that underlie this awareness."

In the flurry of daily activity within Andermann's lab, researchers are working to unravel those intricate processes.

In 2019, Andermann received a 2019 National Institutes of Health (NIH) Director's Pioneer Award. The NIH Director's Pioneer Award challenges investigators at all career levels to pursue new research directions and develop groundbreaking, high-impact approaches to a broad area of biomedical, behavioral, or social science. The Pioneer Award is one of four awards introduced by the NIH's High-Risk, High-Reward Research program to fund highly innovative and unusually impactful biomedical or behavioral research proposed by extraordinarily creative scientists.

Andermann, a neuroscientist by training, was also a past recipient of another NIH High-Risk, High-Reward Research program honor: the New Innovator Award for outstanding young investigators.

With the support of the Pioneer Award, Andermann and his team will continue their research to further investigate the role of the brain's insular cortex in interoception.

Andermann and his team have developed a mouse model within the Department of Medicine's Division of Endocrinology, Diabetes and Metabolism that involves monitoring the activity of hundreds of individual brain cells in the insular cortex. This model aims to determine exactly what is happening in the brain when a hungry animal is eating a meal and feeling increasingly full.

In a January 2020 paper in Neuron, Andermann and colleagues demonstrated how the insular cortex region of the brain orchestrates the interpretation of and reaction to signals received from the body. The study observed that when mice were not fed for many hours, the activity pattern of insular cortex neurons reflected current levels of hunger. Once they did eat, this pattern shifted gradually over hours to reflect satiety.

When mice saw visual clues predicting impending availability of food—not unlike a hungry human seeing a sign for a nearby restaurant—the insular cortex appears to simulate a future sated state for a few seconds, before returning to the activity pattern related to hunger. These findings represent initial steps towards understanding the neural basis of interoception, which could allow future research to address key questions for a host of medical issues, including eating disorders, drug addiction, and obesity. Their findings provided direct support for human studies that hypothesized the insular cortex is involved in imagining or predicting how we will feel after eating or drinking.

"Dr. Andermann is developing unparalleled, technologically-advanced approaches for understanding how the brain receives and processes signals from inside the body. This award provides the means to greatly expand efforts in this important, unmet research area," says Bradford Lowell, MD, PhD, a member of the Division of Endocrinology, Diabetes and Metabolism and a Professor of Medicine at HMS.

Andermann and Lowell are frequent collaborators; Lowell's lab at BIDMC studies how the brain senses the body's energy stores and subsequently uses that information to stimulate hunger and compel one to eat. The neural circuits involved in those processes interface with the same neural circuits and processes that Andermann investigates.

Currently, Andermann's lab is working to directly manipulate specific patterns of activity in the insular cortex. They are attempting to change the brain's simulation of a future sated state when presented with food or water, thus making eating and drinking more or less rewarding.

"If successful, our approach might provide an intervention that could reduce seeking of unhealthy rewards—processed foods, drug abuse—without affecting seeking other, healthier rewards," Andermann explains. "This research could ultimately provide a roadmap to regulate human interoceptive awareness and predictions across a range of medical and psychiatric diseases."

> "At any given moment, our brains must choose to pay attention to the world around us, or to the world inside us."
>
> *—Mark Andermann, PhD*

Awards & Honors

Each year, BIDMC and members of the Department of Medicine earn many local, national, and international awards for their cutting-edge work. This is a sampling of honors received during the 2018-2019 Academic Year.

BIDMC

Named LGBTQ Healthcare Equality Leader by the Human Rights Campaign Foundation for the ninth consecutive year.

Recognized by Boston Magazine, which named 190 physicians and surgeons from 45 medical specialties affiliated with BIDMC in its "Top Doctors" guide.

CARDIOVASCULAR MEDICINE

Lorraine Britting, NP, received the 2019 Society of Hospital Medicine's Award for Excellence for Nurse Practitioners/ Physician Assistants.

Robert Gerszten, MD, received the 2019 William Silen Lifetime Achievement Award, part of the Excellence in Mentoring Awards given by Harvard Medical School.

Kimberly Guibone, NP, received the American College of Cardiology's Proctor Harvey, MD Young Teacher Award.

ENDOCRINOLOGY, DIABETES AND METABOLISM

Barbara B. Kahn, MD, received the Federation of American Societies for Experimental Biology (FASEB) 2019 Excellence in Science Award.

Barbara B. Kahn, MD, was elected to the American Academy of Arts and Sciences in April 2019.

GASTROENTEROLOGY, HEPATOLOGY AND NUTRITION

Joe Feuerstein, MD, was named a 2019 Rising Healthcare Leader in Inflammatory Bowel Disease, awarded by the Crohn's and Colitis Foundation to rising leaders in the field of Inflammatory Bowel Disease.

Sarah Flier, MD, received the 2019 Irving M. London Teaching Award from Harvard Medical School.

Yury Popov, MD, PhD, received the July 2018 Award for Excellence in GI Research from the Irving W. and Charlotte F. Rabb Foundation.

GENERAL MEDICINE

Mark Aronson, MD, received the 2019 William Silen Lifetime Achievement Award, part of the Excellence in Mentoring Awards given by Harvard Medical School.

Emmanuel Mensah, MD, MBA, was recognized as a 2019 40 Under 40 Leader in Minority Health by the National Minority Quality Forum.

GERONTOLOGY

Douglas P. Kiel, MD, received the 2019 Frederick C. Bartter Award from the American Society for Bone and Mineral Research, which is given annually to a Society member in recognition of outstanding clinical investigation in disorders of bone and mineral metabolism.

Lewis A. Lipsitz, MD, received the 2018 Donald P. Kent Award from the Gerontological Society of America (GSA), which is given annually to a GSA member who best exemplifies the highest standards for professional leadership in gerontology through teaching, service, and interpretation of gerontology to the larger society.

Susan L. Mitchell, MD, received the 2019 A. Clifford Barger Excellence in Mentoring Award, part of the Excellence in Mentoring Awards given by Harvard Medical School.

MEDICAL ONCOLOGY

Deepa Rangachari, MD, was named to the American Society of Clinical Oncology (ASCO) Education Scholars Program.

NEPHROLOGY

Samir Parikh, MD, received the 2019 Donald W. Seldin Young Investigator Award, from the American Society of Nephrology and American Heart Association.

Samir Parikh, MD, received the 2018 Sir William Osler Young Investigator Award from the Interurban Clinical Club.

Martha Pavlakis, MD, was named a 2019 Honoree by the National Kidney Foundation.

PULMONARY, CRITICAL CARE & SLEEP MEDICINE

Margaret M. Hayes, MD, received the 2019 Young Mentor Award at Harvard Medical School.

Richard M. Schwartzstein, MD, received the 2019 Outstanding Educator Award from the American Thoracic Society.

Richard M. Schwartzstein, MD, Jeremy B. Richards MD, Asha Anandaiah MD, Amy Sullivan EdD, and Margaret M. Hayes MD, received the 2019 Innovation in Fellowship Education Award for Teaching from the American Thoracic Society.

RHEUMATOLOGY

George Tsokos, MD, was named a 2019 Top-Ranked Expert in Systemic Lupus Erythematosus Worldwide by Expertscape.com.

CLINICAL INFORMATICS

Alexa T. McCray, PhD, was named the Chair of the Board on Research Data and Information by The National Academies of Sciences, Engineering, and Medicine.

Yuri Quintana, PhD, was elected to the position of Fellow of the American College of Medical Informatics (ACMI) by the American Medical Informatics Society (AMIA).

GENETICS

Kevin Haigis, PhD, received the Grand Challenge Award from Cancer Research UK.

SIGNAL TRANSDUCTION

Alex Toker, PhD, received the 2018 Mentoring Award from the Biological and Biomedical Sciences PhD Progra at Harvard Medical School.

TRANSLATION RESEARCH AND TECHNOLOGY INNOVATION

Anna Johansson, PhD, serves as the local co-PI for the BRIM (Bias Reduction in Internal medicine) initiative, a multi-center study, NIH funded study led by investigators at the University of Wisconsin-Madison that seeks to evaluate the impact of a pro-diversity intervention designed to address implicit bias and involves teaching faculty workshops to recognize and mitigate the effects of stereotypes and unconscious bias.

Cami Martin, MD, was selected to a 3-year term to serve on the faculty group for the American Academy of Pediatrics/ Section on Neonatal-Perinatal Medicine fellows symposium in Perinatal and Developmental Medicine.

CENTER FOR VIROLOGY AND VACCINE RESEARCH

Dan Barouch, MD, PhD, received the 2019 award for Best Academic Research Team and The Vaccine Industry Excellence Award at the World Vaccine Congress.

Clinical Volume at the Cutting Edge

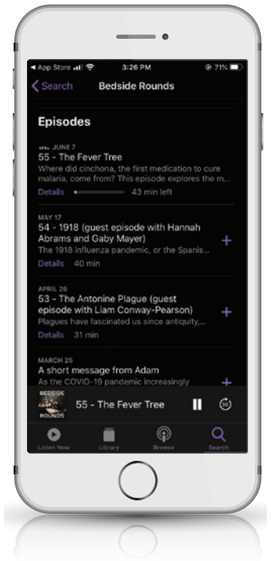
Department of Medicine
Clinical Volume at BIDMC's Boston Hub

Clinical revenue	$75,445,483
Patient days in hospital	117,793
Inpatient discharges	17,204
Observation discharges	3,212
Work RVUs	1,099,937
Outpatient visits	318,456
Endoscopic procedures	26,629
Cardiac catheterizations	4,837
Electrophysiology procedures	1,285
Patients in BIDMC's Boston-based Healthcare Associates primary care practice	40,774

Adam Rodman, MD

Taking *Bedside Rounds* Anywhere and Everywhere

On his internationally streamed and critically acclaimed *Bedside Rounds* podcast, hospitalist Adam Rodman, MD, guides listeners through the weird, wonderful, and human stories that shape modern medicine.



As a medical resident in Oregon in 2014, Dr. Adam Rodman listened to science podcasts like Radiolab and 99% Invisible on his bike ride to the hospital and wished there was also a compelling, medical podcast—something that mirrored his own intense curiosity about the world of medicine. Eventually, in what he now jokingly describes as a delusion of grandeur, he decided to create his own.

What began as a side project amidst the bedlam of resident schedules has grown into an integral part of Rodman's career; he now records live episodes at the American College of Physicians (ACP) annual meetings, nearly 20 colleagues serve on editorial and review boards, and the ACP provides Continuing Medical Education (CME) credit for listening to the podcast.

The early Bedside Rounds episodes function as extensions of Rodman's personal reading, capturing snippets of his rare free time and covering topics from the death of the Roman Emperor Hadrian to the creation of the smallpox vaccine.

After his residency, Rodman joined BIDMC, first to complete a Global Health Fellowship in the Division of General Medicine, then to stay on as a hospitalist. As he began this new endeavor, he faced the decision of either abandoning the project or incorporating it into his practice and career. Luckily for his listeners, he chose to continue.

One of the show's pivotal episodes recounts the story of Phineas Gage, the famous 19th century American railroad construction worker who improbably survived an accident in which a large iron rod was driven completely through his head, destroying much of his brain's left frontal lobe. The injury was reported to affect his personality and behavior over the remaining 12 years of his life to the point that he was considered a totally different person.

After visiting Gage's skull at Harvard Medical School's Warren Anatomical Museum and digging into primary and secondary literature about the case, Rodman had a startling realization: almost everything he'd learned about Gage in medical school was a lie.

"His personality didn't totally change!" Rodman explains. "A lot of things were exaggerated by doctors at the time to fit in a narrative about his case."

This revelation helped shape the course of Bedside Rounds' future.

"It was when the podcast became more than me exploring an idea or a historical case, but truly telling a story," Rodman says. "And acknowledging the larger humanistic, important points to these stories."

As the podcast began to deliberately engage with bigger ideas behind the narratives it shared, listeners also began to engage exponentially. Rodman recalls the Gage episode as the moment where his core listenership expanded—from several hundred downloads per episode to approximately 30,000.

The Gage episode represented a turning point for the podcast, not only in terms of listenership, but when it began its metamorphosis into something more than it was, just as Rodman himself was growing as a physician and medical educator. Still telling historical stories, Bedside Rounds now also considers the intellectual, social, and cultural currents that shape modern medicine.

"For me, it's all about science and humanity," Rodman says. "I was inspired to start digging deeper into the why of some of the things we're trained to do as physicians. I think a lot about humanism and its connection to the complexity of the relationship between doctors and patients."

Bedside Rounds is also no longer Rodman's hobby, but an integral part of his work as a medical educator. It's become an extension of the teaching that he conducts on the wards, in the simulation lab, and in the classroom. Though he still records episodes at home, sitting under a duvet to create a soundproof miniature studio, his voice now reaches a massive number of physicians, medical students, and curious civilians.

When asked why Bedside Rounds resonates with such a large and diverse group of listeners, Rodman turns both humble and contemplative.

"I think people see this complex, occasionally alienating system of medicine and they wonder why we do things the way we do," he says. "So the podcast is an exploration, not only of how medicine came to be this complicated system, but of the decisions that got us where we are, and how looking back to connect with our roots can help us find opportunities to connect with our patients in the present."

Rodman cites an example of a listener question that changed one of his long-held perspectives, both when evaluating patients and teaching medical students and residents. Someone inquired about a patient presenting with a temperature of 99.1 degrees Fahrenheit and claiming they "run low" and thus have a fever. The listener was curious: "Are these patients telling the truth? Are they crazy? Am I crazy?"

Initially, Rodman thought his response would be to comfort the patient, but privately think something along the lines of, well, that's not how it works. As he began to research his reply, however, he stumbled into another one of his surprising discoveries.

Amidst German manuscripts from the 1850s, Rodman found that a large dataset from that era was the basis for determining that the average human temperature is 98.6 degrees Fahrenheit and that 100 degrees Fahrenheit constitutes a fever.

"How did they analyze that? Statistics didn't exist yet, but that's where we determined those numbers," Rodman says animatedly. "Once statistics do exist and people start to do studies on soldiers, we see that the actual human body temperature could be in the 97-98 range. Then we have some really cool data from vaccine trials in the 1980s and 1990s that confirm a fever might actually be as low as 99.1 degrees, and 99.9 degrees is definitely a fever."

This one moment gets right at the heart of Bedside Rounds: how Rodman's own natural curiosity has led him to new knowledge that not just improves his own practice as a hospitalist, but also the medical education of his students and every listener who tunes in. By his own hand, his wish as a resident for a truly excellent medical podcast came to fruition.

HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Leading Minds: Education at Harvard Medical School

"There's this famous expression, 'a curriculum is the manifestation of the soul of an institution' and I believe that's true of BIDMC. There is something special here about the openness to innovation and to creating new things. There is an agility and a nimbleness to BIDMC that is unique."

— David Roberts, MD

On any given day in the Longwood Medical Area, educational leaders at BIDMC are engaged with their students and ever-considering how to best provide the highest caliber of education. HMS students are learning from leaders in numerous specialties, many of whom completed their own training at the medical center. The prevailing focus on education at BIDMC has created a strong culture, built for the students by the faculty and enriched by the work of all.

"The department is continuously evolving because we value education as an activity," said Anjala Tess, MD. "People give faculty opportunity and guidance in their work and even if they don't know the answers, they will help you learn them yourself. Some places can have a culture of 'no' around new ideas. Ours is a culture of 'sounds cool, how?'"

When applying for residency in 1997, Tess knew already that she wanted to be a medical educator and chose BIDMC intentionally, as it was the only place discussing training residents in education. Unaware of the numerous educational roles she would later hold, the commitment to education at BIDMC turned out to be more true than she could have imagined.

While holding numerous leadership roles, she teaches students of all levels from medical school up to fellowship. This spring, she and co-director Jennifer Stevens, MD, launched the Advanced Integrated Science Course on Health Systems Science. Designed with input from students, fellows, and faculty, the QI course is the first of its kind for medical students at HMS. In the 4-week course, students receive training in quality improvement with a later focus on data analysis for research and implementation science, and research opportunities at sites such as Ariadne, Dana Farber, and Atrius.

Anita Vanka, MD, also a graduate of the residency program, now leads students from the very beginning of their time at HMS, as Co-Director of the Practice of Medicine course, the longest class in the first-year curriculum. After teaching foundational clinical skills in year one, she works with students again in year two as they come onto the wards, in her capacity as Associate Site Core I Medicine Clerkship Director.

"The most rewarding thing is to see them actively care for patients and discuss cases that I know they wouldn't have been able to a year ago. It's really special and wonderful to see that growth," said Vanka.

Richard Schwartzstein, MD, leads education at BIDMC and HMS in countless ways: in his 25 years of teaching in the pre-clerkship curriculum, as the Director of the Shapiro Institute for Education and Research, by implementing innovative programs like the new medical education research lab, and working with faculty to empower them to pursue education as a career path.

In 2011, a major HMS curricular reform to improve first-year classroom learning began under the direction of Schwartzstein and Melanie Hoenig, MD, who co-chaired the steering committee working on this aspect of the new curriculum.

"This was a team effort from the educators. There were no top-down mandates about changes and we had buy-in from all the education stakeholders," said Hoenig. She is a devoted educator who serves as the course director for Homeostasis 2, a required course in the pre-clerkship curriculum that integrates the physiology and pathophysiology of the renal, endocrine and gastrointestinal systems. She also trains residents and Nephrology fellows and has established a program with Brigham and Women's Hospital for undergraduate students to give them a taste of kidney medicine and research.

In 2015, HMS implemented the new curriculum for the pre-clerkship year. The new format utilizes a technique called Case-

What Does Education Mean to You?

GENERAL MEDICINE

"Education is all about helping people find their passion and making them the best they can be at what they love to do."

—Sara Fazio, MD
Chair of the Principal Clinical Experience Committee
Advisory Dean and Director of the Cannon Society at HMS
Associate Director of Education, HMS Center for Primary Care

NEPHROLOGY

"Education is what we're going to learn together, because I have context but I want to promote the learner's interest. My job is to lay the foundation and spark interest and hopefully magic will follow."

—Melanie Hoenig, MD
Course Director, Homeostasis II

PULMONARY, CRITICAL CARE SLEEP AND MEDICINE

"Education is enhancing curiosity, building on curiosity, and supporting it wherever you can find it in your learner."

—Richard Schwartzstein, MD
Vice President for Education and Executive Director of the Carl J. Shapiro Institute for Education and Research at BIDMC
Director of Education Scholarship at HMS
Chief of Pulmonary, Critical Care and Sleep Medicine

Based Collaborative Learning (CBCL), which fuses case-based, problem-based, and team-based learning.

"We didn't just implement a new curriculum. We got a grant from the university and studied it. We found that the learning environment was significantly better," said Schwartzstein.

Ahead of implementation, Schwartzstein's physiology course piloted CBCL and showed that students who had struggled in prior courses performed better in CBCL than in the "standard" problem based learning tutorials. The new system emphasizes pre-class preparation and fosters a learning environment in which students are pushed to think critically and apply their knowledge to solve problems.

"We are trying to create life-long learners and that doesn't mean we have to cover everything, because the goal is creating learners who are curious and constantly assessing their own knowledge. Each learner has a responsibility for fueling their own fire to learn," said Hoenig.

The curriculum came to fruition in 2019 as HMS graduated the first class of the new model's learners. Following implementation at HMS, Schwartzstein advised schools in London, Miami, and Los Angeles to help adapt similar reforms.

After many years of leading education at BIDMC, Both David Roberts, MD, and Sara Fazio, MD, have moved into new roles at HMS. Following 16 years as the ambulatory clerkship director and subsequently overall Director of the Core Internal Medicine Clerkship at BIDMC, Fazio found a true passion in early medical education. She now serves as the Advisory Dean and Director of the Cannon Society, and Chair of the Principal Clinical Experience Committee, where she oversees the core clinical curriculum at HMS.

She is currently shepherding the next wave of change at HMS for the students' core clinical year, examining the clerkships which have not undergone such a reform in decades. For HMS students, BIDMC is the primary clinical site where all clinical work during the first two years of medical school occurs. Given Fazio's experience as an educator and a former BIDMC resident and chief resident, she is uniquely insightful and well-positioned to apply her extensive knowledge to change the way that students learn during this pivotal year, providing more authentic roles in patient care and a system to improve competency-based assessment.

> "I've found that as an educator, it's the students that keep you going. They push the limits of your knowledge and make you want to learn more and teach better."
>
> *—Sara Fazio, MD*

Drawing from her clinical experience, she has already developed a model for a four-year primary care curriculum, designed to ensure all students have a strong foundation in the primary care competencies. As an Advisory Dean, she mentors and engages with HMS students daily and throughout their four years.

"I've found that as an educator, it's the students that keep you going. They push the limits of your knowledge and make you want to learn more and teach better. The students benefit from this environment of collegiality, passion, and drive, but we benefit from it too. We benefit tremendously," said Fazio.

After many years as the Principal Clinical Experience Director overseeing all the clerkships, Roberts is now the Inaugural Dean for External Education at HMS. In 2014, the Office for External Education was founded to create innovative programs that reach an array of learners, using new technology and techniques. In six years, it has established a wide range of programs that run on every continent except Antarctica and are teaching online, in person, and in a hybrid fashion across the world.

"We built our online learning platform for incoming medical students and then when we opened it up to public applications, we had interest from lots and lots of people and companies like Novartis, and Google. If you had told me five years ago that we would be running programs in Malaysia, Mongolia, Egypt, London, Dubai, Shanghai, and so on, I would have been surprised," said Roberts.

The essence of his role is creating things that did not exist before. No other medical school is teaching executive education programs and at this point, no other medical school is creating extensive online learning for future physicians. Roberts' ties to BIDMC remain strong as many of the educators who teach in or contribute to External Education programs and content are often Department of Medicine physicians.

As these endeavors elevate and enrich the culture of education, there is a prevailing drive to keep BIDMC at the forefront of education and to make the necessary shifts to meet their learners' needs and prepare them for a changing professional and societal landscape. Medical education is changing. The role of physicians is changing. Teaching with that in mind involves both educating the educator and listening to the students.

"We have to get away from a mode of teaching that emphasizes, 'this is what's in my head and my job is to put it in your head," said Schwartzstein. "We are helping the students develop their thinking skills. The biggest thing is empowering learners to think through problems, to develop deeper understanding."

"We're constantly adapting the curriculum to fit the themes that are happening, not just in medicine but culturally," said Vanka. "And our students are driving it too. Any time you have your learners driving change, you are always on the cutting edge."

What Does Education Mean to You?

GENERAL MEDICINE, SECTION OF HOSPITAL MEDICINE

"Education gives the rest of my work meaning. Education forges relationships different from patient care in an equally rewarding way."

—**Anjala Tess, MD**
Associate Vice Chair for Education
Program Co-Director for the HMS CRICO Fellowship in Patient Safety and Quality
Program Director for the Masters in Healthcare Quality and Safety at HMS

PULMONARY, CRITICAL CARE AND SLEEP MEDICINE

"Education means creating a system where anyone can learn whatever they want to learn, however they want to learn it, whenever they want to learn it."

—**David Roberts, MD**
Dean for External Education at HMS

GENERAL MEDICINE, SECTION OF HOSPITAL MEDICINE

"Education is a dynamic pipeline. Our learners continually teach us and make us grow as educators, just as much as we are hopefully teaching them and helping them grow into the professionals they aspire to be."

—**Anita Vanka, MD**
Site Co-Director of Practice of Medicine Course at BIDMC
Co-Director of the Practice of Medicine Course at HMS
Associate Director of the Holmes Society at HMS
Associate Core I Site Director at BIDMC

Sol Schulman, MD, PhD

Early Investigator, Timely Advances

A physician-scientist in the Division of Hemostasis and Thrombosis, Sol Schulman, MD, PhD, received a 2019 NIH Director's Early Independence Award in support of his ongoing research into tissue factor and its contribution to the pathogenesis and inheritance of broadly defined hemorrhagic and thrombotic diseases.

Among the dreaded phrases in medicine are the words 'I don't know.' But to researchers, those words can also be a catalyst. A way of saying 'our knowledge is expanding.'

A lack of knowledge is the root of the problem for individuals with rare bleeding disorders, as many will never receive a molecular diagnosis. Similarly, about half of the heritability for thrombotic disorders, such as pulmonary embolism, remains unexplained. Despite constant progress fueled by new technologies, there remain more questions than answers.

Dr. Sol Schulman is working to change that as the recent recipient of the NIH Director's Early Independence Award. The award supports outstanding junior scientists with the intellect, scientific creativity, drive, and maturity to flourish independently, launch their own research careers, and bypass the traditional postdoctoral training period track.

"I'm a high-risk, high-reward type of scientist and that approach is designed for the grant's mechanism," Schulman says. "If an experiment is most likely to work—if I'm going to show that A goes to B and everyone thinks it's going to work—then to me that's not that interesting. I am much more interested in finding something that is really different and totally unexpected."

> "I am much more interested in finding something that is really different and totally unexpected."
>
> *—Sol Schulman, MD, PhD*

Schulman's research centers on the role of a protein called tissue factor (TF), which is the primary initiator of the blood coagulation cascade. The historic approach in clotting research has focused on the patient's plasma. Once blood is centrifuged, all the cells go to the bottom and the plasma remains on top. As a result, when the blood is analyzed, researchers only study the plasma without any of the missing cells, especially the cells that line the blood vessel. Schulman's strategy is to look at cells in their entirety, with a focus on the membrane protein TF that starts the blood coagulation cascade process. He utilizes functional genetics to create systematic genetic variation; instead of waiting for the rare patient to present with a clotting problem, his idea is to systematically eliminate the genes one by one. This genetic approach allows Schulman to identify new pathways that regulate the start of blood clotting on the surface of the cell.

"The functional genetic screens we do on the cells are part of finding what may be having an impact on the start of the blood clotting process," said Schulman. "The genome is a everywhere, but if the flashlight is telling you to look at A, B, C, and D, you can look at those instead of the full 20,000 genes."

Schulman graduated in 2012 from HMS' combined MD/PhD program, a track specifically designed for physicians who are inclined towards a career in academic research. As a physician-scientist at BIDMC, Schulman conducts his research within the Division of Hemostasis and Thrombosis while seeing patients in a weekly clinic through the Division of Hematology and Oncology. As a non-malignant hematologist with an expert focus on bleeding and clotting disorders, he looks at molecular genetic sequencing of his patients. As a researcher, he then seeks to identify possible pathways for further examination.

"Training as a physician-scientist is invaluable," said Schulman. "As a doctor, you're seeing the problems patients are facing and understanding what is important in a different way. It's energizing every time you see a patient and have to tell them, 'I don't know what you have,' to then go back to the lab and try to figure out why they have this bleeding problem."

He also works as an Instructor of Medicine at HMS and is a co-director of the HST Hematology Course for Spring Semester, a joint Harvard and MIT program he participated in during his training. He is now educating future physician-scientists and encouraging them to pursue careers in Hematology, with his own work as an example of what's possible. Schulman was recognized with Celgene's Future Leader in Hematology Award and the American Society of Hematology Scholar Award.

While the default pathway for physician-scientists is to receive a K-grant award and work under a mentor, the NIH award establishes Schulman as his own entity with his own lab. "This award is essentially aiming to tell creative, talented people to take a chance," said Schulman. "I'm excited to have this opportunity, and I couldn't do it without my mentors' support."

Schulman cites Tom Rapoport, PhD, Bruce Furie, MD, Robert Flaumenhaft, MD, PhD, and Ken Bauer, MD among his mentors and emphasized how thankful he is to be in an environment with an abundance of selfless colleagues.

"Dr. Schulman is a generational talent in the area of Hemostasis and Thrombosis," said Flaumenhaft. "His enthusiasm for science is contagious and he is attracting young investigators into our field. It is heartening to know that someone with Sol's talent and thoughtful personability is carrying on the important tradition of mentorship in the area of blood clotting and bleeding."

Schulman can quickly point to the impact the NIH award makes. "The most exciting thing about the award is the opportunity to explore more ideas, to not have to put some things away for a year," he said. "This allows me to build a bigger team and explore more of my ideas over the short term, as well as build towards more long-term projects."

Exceptional Mentorship and Career Development, Supporting Cutting-Edge Research

Through both the Franklin Epstein Society and Harvard Catalyst's Grant Review and Support Program (GRASP), the Department of Medicine helps young physicians and investigators launch illustrious careers. Steven Freedman, MD, PhD, and Grace Huang, MD, explain how they are leading the way.

Dr. Steven Freedman describes the process of moving from a mentored research award toward independent grants as akin to swimming through shark-infested waters. Luckily for young investigators and physician-scientists at BIDMC, Freedman and Dr. Grace Huang have assembled a mentorship and career development submarine to navigate rough seas.

"At some places, a career in research means that you're on your own and your lab is siloed. We want to do the opposite," Freedman explains. "We want to nurture you as much as possible." Career development and successful grant funding go hand in hand. Freedman emphasized why working with Huang has not only been impactful on his goals for grant funding, but also in making rising stars in the Department successful. "Such collaboration rarely happens anywhere else, he notes. "This really makes us unique."

> "The Franklin Epstein Society has been a tremendous venue to connect with peers, network about research and career development goals, and gain new friends."
>
> *— Vaishali Moulton, MD, PhD*

Both Freedman and Huang's impressive credentials make them uniquely qualified to guide younger colleagues through the process of advancing their academic and research careers.

Freedman is the Chief of the Division of Translational Research within the Department of Medicine, as well as a Professor of Medicine at Harvard Medical School (HMS). He also directs BIDMC's Pancreas Center and is a worldwide leading expert in pancreatic diseases and Cystic Fibrosis.

Huang is a hospitalist by training and an Associate Professor of Medicine at HMS. After completing her residency in internal medicine at BIDMC, she went on to participate in both the Rabkin Fellowship in Medical Education at BIDMC and the Academy Fellowship in Medical Education at HMS. She now serves as Vice Chair for Career Development and Mentoring in the Department of Medicine, Director of Academic Careers and Faculty Development, Director of the Rabkin Fellowship in Medical Education, and Co-Director of the Academy at BIDMC.

Their partnership between research mentorship and overall career advancement led to the development of a three-pronged approach to mentoring faculty: the Franklin Epstein Society, Harvard Catalyst's GRASP program, and career development services within the Department.

Franklin Epstein Society
Co-founded by Mark Zeidel, MD, Chair of the Department of Medicine and led by Freedman, the Epstein Society supports researchers from residency through their mid-career stages. The Society's monthly meetings are well attended, by junior faculty as well as established senior faculty who stay involved and use their own experiences to provide support and mentorship.

One of the primary goals of the Epstein Society is to assist investigators in obtaining a K-Grant from the National Institutes of Health (NIH). These Mentored Research Scientist Career Development Awards are an early step on

the road to a career in clinical or translational research. Traditionally, approximately 20% of applicants for a K-Grant receive the award. As Vaishali Moulton, MD, PhD, explains, the Epstein Society is an important resource for any young researcher.

"The Franklin Epstein Society has been a tremendous venue to connect with peers, network about research and career development goals, and gain new friends," she says.

> "I like to focus more broadly on what leads to professional vitality, whose pillars are mentorship, reputation, leadership, and skill-building."
>
> —*Steven Freedman, MD, PhD*

"It's a great way to engage with people across divisions, learn about their research, and help one another with ideas, potential research collaborations, and other opportunities. Steve and Grace are amazing mentors. They have created an incredibly energized platform."

The energy of that platform continues beyond the length of a K-Grant. Senior investigators seeking their first independent research award can transition from the Epstein Society into Harvard Catalyst's GRASP program, also led by Freedman.

GRASP

Freedman developed GRASP out of a desire to help colleagues grasp the next stage of their careers. A large divide exists between the 20% of applicants who receive a K-Grant and the approximately 8% of applicants (only .1% on their first attempt) who receive a Research Project Grant (RO1).

R01s are the NIH's original grant mechanism, meant to fund specific projects for independent investigators.

In the GRASP program, however, the K to RO1 divide is almost nonexistent. Twenty percent of GRASP applicants receive grants on their first attempt (Moulton is among those who made the successful transition.) The program has the grant application process down to a science.

GRASP relies on three distinct steps to best prepare investigators' submission materials. First, Freedman leads a three-day workshop—a bootcamp of sorts for mid-careers scientists. Then, they begin to shape their applications according to an Elements of Grant Writing guide created by Freedman and other HMS colleagues. Lastly, colleagues use month-by-month work plans over a five-year K-Grant. As he explains their purpose, Freedman once again turns to metaphor.

"If I asked you to build me a lunar command module, you probably couldn't do it," Freedman says. "But if I said, every month: 'put this screw here and next month you'll add another piece over there,' the module would come together."

With the work plans, GRASP has taken apart the mad dash of preparing a grant application and broken it down into methodical, manageable steps.

Then, Huang and Freedman collaborate to optimize investigators' curriculum vitae (CVs).

Career Development and Mentoring

Freedman explains that grant applications essentially come down to a simple question: are you a productive investigator? Publications and prior funding demonstrate that investigators have a strong track record of accomplishment. However, other factors contribute to grant success as well – the reputation of the mentor and co-investigators, invited presentations, and evidence that the investigator has built on opportunities to innovate and lead.

Recognition of one's unique contribution to science through talks, funding, awards, and scholarship is the foundation of promotion at HMS, which is important for professional growth. However, Huang prefers to conceptualize career development as more than achieving the next academic rank.

"When meeting with investigators and other faculty in the department, I like to focus more broadly on what leads to professional vitality, whose pillars are mentorship, reputation, leadership, and skill-building," she says.

Huang conducts 1:1 CV consultations with faculty in the Department of Medicine, which not only helps them prepare for promotion at HMS but also allows them to identify short- and long-term goals.

Looking down the list of active K Grants in the Department, it immediately becomes clear that Freedman's and Huang's support is a key step along the way for nearly every scientist at BIDMC.

Current Department of Medicine K Grants

Aarti H. Asnani, MD

CYP1 Inhibition as a New Therapeutic Strategy for Doxorubicin Cardiomyopathy

Zhenghui G. Jiang, MD

Adenosine Deaminase 2 Regulates Macrophage Phenotype and Liver Fibrosis in Nonalcoholic Fatty Liver Disease

Eric A. Osborn, MD, PhD

Intravascular Molecular-structural Imaging of Coronary Stent Pathobiology

Chen S. Tan, MD

Characterization of Broadly Neutralizing Antibodies Against JC Virus

Pavan K. Bendapudi, MD

The Role of Coagulation Factor XII in Hemostasis and Thrombosis

Stephen P. Juraschek, MD

Improved Characterization of Postural Blood Pressure Change in Older Adults

Jon M. Resch, PhD

Central Regulation of Sodium Appetite Via Synergistic Action of Raas-sensitive Neurons

Bon Q. Trinh, PhD

Enhancer RNA-mediated Tumor Suppressor Gene Expression in Normal and Malignant Hematopoiesis

Mark D. Benson, MD

The Role of PPM1G in Apolipoprotein E Biology and Atherosclerotic Cardiovascular Disease

Sarah N. Kunz, MD

Quantification of Neonatal Transport Networks Through Network Analysis: A New Approach to Studying Neonatal Regionalization

Mary B. Rice, MD

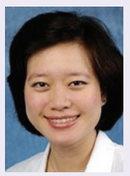
Air Pollution and the Lung in Health and COPD: Obstructive, Restrictive and Vascular Pathways

Sarinnapha Vasunilashorn, PhD

Shared Pathophysiology of Postoperative Delirium and Alzheimer's Disease and Related Dementias

Katherine M. Berg, MD

Thiamine V Placebo to Improve Oxygen Consumption After In-hospital Cardiac Arrest



Jennifer H. Lee, MD

Effects of Palmitic Acid Esters of Hydroxy Stearic Acids (Pahsas) on Intestinal Mucosal Biology for the Treatment of Type 2 Diabetes

Jennifer P. Stevens, MD

A Multistakeholder Examination of the Drivers and Value of Inpatient Consultation

Rishi K. Wadhera, MD

Explaining Rising Heart Failure Mortality in Medicare

Michael W. Donnino, MD

Neuromuscular Blockade in Post-cardiac Arrest

Ari L. Moskowitz, MD

Thiamine as a Renal Protective Agent in Septic Shock

Jordan B. Strom, MD

Identification of the Components of Frailty Using Administrative Data and Metabolite Profiling

Gloria Y. Yeh, MD, MPH

Mentoring and Patient-oriented Research in Mind-body Exercise

Di Feng, PhD

The Interaction Between Mechanical Forces and Cytoskeletal Impairments in Podocyte Mediated Kidney Disease

Ruvandhi R. Nathavitharana, MD, MPH

Optimizing Diagnostic Strategies for TB Transmission Control in Healthcare Facilities

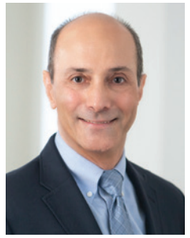
Ismail Syed, PhD

A Novel Class of Lipids as Potential Therapeutic Agents to Promote Pancreatic Beta Cell Survival and Prevent Type 1 Diabetes

Rebecca M. Zash, MD

Decreasing Adverse Birth Outcomes Among Hiv-infected Women on Antiretroviral Therapy

Cutting-Edge Conversations



David Rind, MD

Dhruv Kazi, MD

On most Thursday mornings, the Department of Medicine can be found in Sherman Auditorium gathering for Medical Grand Rounds, as speakers from BIDMC, Harvard Medical School, and other esteemed institutions share their expertise on a range of timely and clinically important topics. This year, a clear intersection of thought emerged in two lectures. David Rind, MD, the Chief Medical Officer of the Institute for Clinical and Economic Review (ICER) spoke on "Medical Value Assessment in the United States," diving into the complex model of value in healthcare. Additionally, Dhruv Kazi, MD, Director of the Cardiac Critical Care Unit at BIDMC, shared a high-level window into the world of drug costs entitled "Breakthrough Innovation without Breaking the Bank." We sat down with them to discuss the challenges of drug pricing and healthcare economics.

In 2018, you worked together when Dr. Kazi partnered with ICER on a Just in Time Analysis of PCSK9 Inhibitors. Your joint analysis seems to have led to a significant with market impact as after releasing an analysis that prices needed to come down by 80%, they were quickly reduced by 60%. What do you think made the difference in this instance?

David Rind: ICER had been heavily involved in the PSCK9 space for a while, as had Dr. Kazi, and their drugs were clearly overpriced to the point that no one was using them. As new data emerged, there was a combination of the manufacturers' recognition they had charged too much and needed to lower the price and an uncertainty about where the price should go. Value-based pricing in this rare circumstance was appealing to the manufacturer because it gave them a place to put the price. There was a win/win for manufacturer and payor. In addition, a pricing war drove down the price.

Dhruv Kazi: I like your use of 'rare circumstance.' It was a perfect storm with pressure from ICER and academic groups providing strong evidence the drug was overpriced, while patients and payors were voting with their feet. Prescriptions were either not getting approved or patients would show up to the pharmacy saying, 'Wait, how much do you want me to pay for this?' before leaving without their medication. I think the combination of market forces led to the price decrease, with ICER providing some direction for how low the price needed to go. The experience was illustrative that prices can come down in the right set of circumstances.

What areas should cost-effective analyses focus on in the future?

DK: Cost-effectiveness analyses have, for the most part, focused on the total cost of new therapies, but as drug prices skyrocket, so have the copayments patients are responsible for. Copayments are distorting the market in perverse ways, frequently putting new therapies out of reach for even insured patients. As a society, we've created a lot of incentives for developing new drugs, but once those drugs are on the market, consumers can't always afford them. Our analyses need to pay attention to both total costs and out-of-pocket payments because the two don't always travel together. Our patients should not be asking, 'can I really afford this drug for the next 10 years?' Those conversations should be happening at a societal level—What kind of innovation and access do we value and do our current frameworks reflect these priorities?

DR: This has been a problem in oncology, to the point of talking about drugs' "financial toxicity." This means instead of talking about the toxicity of chemotherapy side effects, we're talking about the toxicity of prices. We routinely hear stories of patients with cancer forgoing treatment because they don't want to bankrupt their families. It's very notable what happened with PCSK9, as a preventative drug. We know patients are hesitant to take preventive treatments already, so when you give them financial toxicity, they just won't take the drug.

DK: Now more than ever, we need to reflect on what our stark healthcare disparities say about the system we've created. We've got to push back against lazy arguments suggesting that regulating drug prices would harm innovation and explore more nuanced incentive mechanisms that support innovation but ensure access. Drug pricing isn't just an economics issue, it's a public health issue. Prohibitively high out of pocket costs make no clinical, economic, or ethical sense to me, and yet they're pervasive in our system.

DR: It's one thing to use out of pocket costs when you have seven ace inhibitors, the insurer has negotiated a great price on one of them, and a patient likes the ad for a specific one that you make them pay more for. That's very different from, 'This is the only drug you can take, yet we're going to make you pay 6,000 dollars to get it.' It's not clear why this would happen.

If almost 100% of our increased spending on brand name drugs comes from year-on-year increases that cannot be justified, is there anything within the power of providers and patients to combat these increases?

DK: A big chunk of our annual increase in spending comes from year-on-year price increases on the exact same molecule, which is the manufacturer saying 'we know you're on this drug and it's working for you, so we're going to charge you 10% more.' Rheumatological anti-inflammatory drugs have had particularly egregious increases in recent years, amounting to more than a doubling of the cost of each drug over a decade.

DR: And ICER did a study where you look at MS drugs, and all the drugs are overpriced, but if you looked 4-5 years back, they're all fairly priced.

You both mentioned a l ack of oversight and organization on the drug pricing. In a perfect world, where would you hope to see that oversight come from? Which would be more effective: a governmental or independent body?

DR: I obviously have a conflict of interest in a way and have to say, part of what attracted me to ICER was they are a non-governmental body. I personally think that governmental bodies can end up in their own odd conflicts of interest. ICER can say what a fair price is, and we'll talk about budget impact, but there's no reason for us to say the evidence isn't very good when it is.

DK: I think ICER is doing a fantastic job. I do think they're meeting a key societal need, at a time when we don't appear to have the political will to make this happen in an organized way. ICER provides the information but relies on other stakeholders to act on this information to influence prices. Since our federal and state governments are the largest purchasers of drugs, it would seem natural for them to be involved in negotiating prices.

Dr. Rind, you remarked that drug companies have teams of smart people designed to make pricing decisions, but they're tasked with making sure their in-house analysis justifies the cost they're going to charge, not vice versa. What power can ICER and academic groups exert in creating change?

DR: This is why we conduct our own analyses. We often analyze and think 'how did they come to that decision or make that claim?' and the answer is, "because it got them just to the price they wanted." We wouldn't make those same assumptions. Governmental payors also have economic incentives. They don't want to assume a drug that breaks the budget will work.

DK: I've heard folks argue that high drug prices in the US are the result of a broken system. I disagree. I think high drug prices reflect that our system is working exactly as intended. We value innovation and want to reward it, but we've lost sight of what represents meaningful innovation. We can argue about pricing and out-of-pocket costs but we need to go back to first principles and think about what want from our health system in terms of innovation and access.

I think the PCSK9i experience has shown that patients and payors are becoming increasingly sensitive to drug prices, and we may finally have an opportunity for structural change. The onus will be on us to maintain this momentum, to have the tough conversations about how to best modify our system to reflect our societal priorities and to advocate for the political reform needed at federal and state levels to ensure equitable access to effective therapies.

Medical Education Leadership

2018–2019 Academic Year

Department of Medicine education leadership for the 2018–2019 Academic Year.

Vice Chairs

VICE CHAIR FOR EDUCATION
Eileen Reynolds, MD

ASSOCIATE VICE CHAIRS FOR EDUCATION
C. Christopher Smith, MD
Anjala Tess, MD

Residency Leadership

RESIDENCY PROGRAM DIRECTOR
C. Christopher Smith, MD

PRIMARY CARE PROGRAM DIRECTOR
Kelly Graham, MD

ASSOCIATE PROGRAM DIRECTORS
Neal Biddick, MD
Jonathan Crocker, MD
Jason Freed, MD
Molly Hayes, MD
Kenneth Mukamal, MD, MPH
Daniel Ricotta, MD
Elizabeth Targan, MD
Anjala Tess, MD
Christina Wee, MD, MPH
Julius Yang, MD, PhD

EDUCATION MANAGER
Ruth Colman

CHIEF MEDICAL RESIDENTS
Molly Brett, MD
Josh Davis, MD
Jonathan Li, MD
Jim Parris, MD
Ritika Parris, MD
Sarah Shannahan, MD

FIRM CHIEFS

Blumgart Firm
Wendy Stead, MD
William Aird, MD

Kurland Firm
James Heffernan, MD, MPH
Barbra Blair, MD

Robinson Firm
Shani Herzig, MD, MPH
Zahir Kanjee-Khoja, MD, MPH

Tullis Firm
Deepa Rangachari, MD
Jeffrey William, MD

Undergraduate Education Leadership

CORE I CLERKSHIP
Amy Weinstein, MD, MPH
Course Director
Anita Vanka, MD
Course Co-Director

CORE II CLERKSHIP
Pamela Hartzband, MD
Course Director
Alexander Carbo, MD
Course Director

PRACTICE OF MEDICINE CLERKSHIP
Anita Vanka, MD
Site Director

PRIMARY CARE CLERKSHIP
Susan Frankl, MD
Site Director

Fellowship Program Directors

CARDIOVASCULAR MEDICINE
Joseph Kannam, MD

ELECTROPHYSIOLOGY
Alfred Buxton, MD

INTERVENTIONAL CARDIOLOGY
Eric Osborne, MD, PhD

NON-INVASIVE CARDIOLOGY
Warren Manning, MD

CLINICAL INFORMATICS
Charles Safran, MD

ENDOCRINOLOGY, DIABETES AND METABOLISM
Alan Malabanan, MD

GASTROENTEROLOGY
Ciarán Kelley, MD
Sarah Flier, MD
Associate Director

ADVANCED ENDOSCOPY
Tyler Berzin, MD

CELIAC DISEASE
Ciarán Kelley, MD

HEPATOLOGY
Michelle Lai, MD

INFLAMMATORY BOWEL DISEASE
Sarah Flier, MD

MOTILITY
Anthony Lembo, MD

TRANSPLANT HEPATOLOGY
Michelle Lai, MD

PANCREAS
Steven Freedman, MD, PhD

GENERAL MEDICINE AND PRIMARY CARE
Christina Wee, MD, MPH
Gloria Yeh, MD, MPH

GERONTOLOGY
Sarah Berry, MD, MPH

GLOBAL HEALTH
Jonathan Crocker, MD

HEMATOLOGY/ONCOLOGY
Reed Drews, MD

HOSPICE AND PALLIATIVE MEDICINE
Mary Buss, MD, MPH

INFECTIOUS DISEASES
Wendy Stead, MD
Christopher Rowley, MD, MPH
Associate Director

NEPHROLOGY
Stewart Lecker, MD

PULMONARY AND CRITICAL CARE
Asha Anandaiah, MD

SLEEP MEDICINE
Eric Heckman, MD

RHEUMATOLOGY
Vasileios Kyttaris, MD

Selected Publications

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Research Funding: Academic Year 2018-2019

Division	Funding Source	Direct Award	Indirect Award	Direct Award
Allergy and Inflammation	Federal	$1,072,074	$676,008	$396,065
	Non-Federal	$109,290	$107,712	$1,577
Cardiovascular Medicine	Federal	$12,419,091	$8,031,719	$4,387,372
	Non-Federal	$9,720,284	$8,198,758	$1,521,526
Clinical Informatics	Federal	$504,948	$409,592	$95,355
	Non-Federal	$69,543	$60,472	$9,070
Endocrinology, Diabetes and Metabolism	Federal	$10,471,867	$7,039,497	$3,432,369
	Non-Federal	$3,608,613	$3,150,381	$458,232
Experimental Medicine	Federal	$389,894	$219,537	$170,356
	Non-Federal	$1,146,172	$ 1,014,240	$131,932
Gastroenterology	Federal	$6,541,616	$4,303,626	$2,237,990
	Non-Federal	$3,589,143	$2,850,274	$738,869
General Medicine	Federal	$3,995,788	$2,611,876	$1,383,912
	Non-Federal	$5,909,658	$5,260,753	$648,905
Genetics	Federal	$6,865,005	$4,143,804	$2,721,201
	Non-Federal	$5,597,621	$4,975,609	$622,012
Gerontology	Federal	$700,624	$520,492	$180,132
	Non-Federal	$220,184	$204,638	$15,545
Hematology Oncology	Federal	$17,673,193	$12,076,381	$5,596,812
	Non-Federal	$17,564,681	$15,230,187	$ 2,334,493
Hemostasis and Thrombosis	Federal	$3,479,313	$2,555,266	$924,047
	Non-Federal	$741,980	$528,570	$213,409
Immunology	Federal	$1,168,372	$667,622	$500,749
	Non-Federal	$54,831	$54,831	$
Infectious Diseases	Federal	$1,958,845	$1,490,274	$468,571
	Non-Federal	$236,624	$174,765	$61,859
Interdisciplinary Medicine and Biotechnology	Federal	$2,635,551	$1,526,105	$1,109,445
	Non-Federal	$838,995	$736,034	$102,960
Nephrology	Federal	$4,833,117	$2,927,059	$1,906,058
	Non-Federal	$5,387,882	$3,739,510	$1,648,372
Pulmonary, Critical Care and Sleep Medicine	Federal	$714,588	$674,719	$39,869
	Non-Federal	$948,788	$906,473	$42,314
Rheumatology and Clinical Immunology	Federal	$1,796,356	$1,004,576	$791,779
	Non-Federal	$955,511	$781,947	$173,563
Signal Transduction	Federal	$295,361	$160,430	$134,930
	Non-Federal	$4,845	$3,656	$1,188
Translational Research and Technology Innovation	Federal	$1,042	$602	$439
	Non-Federal	$1,293,134	$1,108,566	$184,568
Transplant Immunology	Federal	$	$	$
	Non-Federal	$2,000	$1,739	$260
Virology and Vaccine Research	Federal	$40,343,678	$33,640,731	$6,702,946
	Non-Federal	$8,819,249	$7,628,904	$1,190,345
	Total Federal	$117,860,331	$84,679,925	$33,180,406
	Total Non-Federal	$66,819,036	$56,718,026	$10,101,009
	GRAND TOTAL	**$184,679,367**	**$141,397,951**	**$43,281,416**

In Memoriam

This year marked the passing of a beloved member of BIDMC and the Department of Medicine.

Joanne Casella, MS, served the medical center and New England Deaconess Hospital for 52 years. For 20 of those years, she was the administrative leader of the Department, which she ran with consummate diplomatic skill, a keen business sense, and a quiet, passionate devotion to our patient care, teaching, and research missions.

Raised in the Back Bay, Joanne attended the Boston public schools and began her career as a Northeastern University co-op student in the Deaconess clinical pathology laboratory, transitioning to part-time work as a medical technologist on the evening shift for five years when her daughter was young. A gifted technologist and manager, Joanne worked her way up from Chief Medical Technologist to Vice President of the Pathology Department before moving to the Department of Medicine in 1993. She was one of the first women to hold a departmental leadership role at the medical center.

She guided the Department steadily and effectively through the tenures of Drs. Robert Glickman, Robert Moellering, and Mark Zeidel as Chairs. She developed a superb team of division administrators, many of whom went on to major leadership roles within the institution. Her colleagues remember her sound judgement and integrity, and knew that at all times she put our mission first.

Beth Israel Lahey Health

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Beth Israel Deaconess Medical Center is a patient care, teaching, and research affiliate of Harvard Medical School and consistently ranks as a national leader among independent hospitals in National Institutes of Health funding.

BIDMC is part of Beth Israel Lahey Health, a new health care system that brings together academic medical centers and teaching hospitals, community and specialty hospitals, more than 4,000 physicians, and 35,000 employees in a shared mission to expand access to great care and advance the science and practice of medicine through groundbreaking research and education. BILH is the largest provider of healthcare in Massachusetts. BIDMC is also clinically affiliated with the Joslin Diabetes Center and Hebrew SeniorLife and is a research partner of Dana-Farber/Harvard Cancer Center and The Jackson Laboratory. BIDMC is the official hospital of the Boston Red Sox.

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