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 in the community with Beth Israel Deaconess Hospital-Milton, Beth Israel Deaconess Hospital-Needham, Beth Israel Deaconess Hospital-Plymouth, Anna Jaques Hospital, Cambridge Health Alliance, Lawrence General Hospital, Signature Healthcare, Beth Israel Deaconess Healthcare, Community Care Alliance and Atrius Health. 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. For more information, visit www.bidmc.org.
The Department of Medicine wishes to thank the many individuals 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 Jennie Greene and Meera Kanabar of the Department of Medicine. Most of the photography in this report was done by BIDMC’s James Derek Dwyer and Danielle Duffey, who also helped with photo research. Jane Hayward, of BIDMC Media Services, provided expert copy editing and design consultation. We also thank the Communications Department and Bonnie Prescott of the CardioVascular Institute. Last but not least, we wish to thank all of the individuals featured in these pages for participating in this report—and for all they do to advance BIDMC’s mission.
This report is interactive. Navigate using the Table of Contents below and the links throughout the report.

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**OUR MISSION:**

TO PROVIDE EXTRAORDINARY CARE, WHERE THE PATIENT COMES FIRST, SUPPORTED BY WORLD-CLASS EDUCATION AND RESEARCH

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Front cover:
John Tigges and Ionita Ghiran, MD (upper left)
Joseph Li, MD, and patient (lower right)
Kelly Graham, MD, with residents (lower left)

Left:
Yasileios Kyttaris, MD, and Kristie Smith, DO, with a patient

Back cover:
Dawn Lei, MD, and Gila Hoffman, MD
FROM THE CHAIR

In this year’s Annual Report—entitled “A Mission that Matters”—we reflect on BIDMC’s mission: “To provide extraordinary care, where the patient comes first, supported by world-class education and research.” Indeed, our foremost goal is to deliver superb patient care or, as I often say, to provide to every patient, at all times, the kind of care that we would want for our own family members. We support the goal of outstanding patient care with innovative and effective education, and with research that is both cutting-edge and likely to improve lives.

In the clinical arena, we continue to enhance the care we provide to our patients, improving their health outcomes and experience, and to share our best practices nationally and internationally. This year, we are pleased to celebrate the 20th anniversary of our Hospital Medicine Program and its co-founder Joseph Li, MD. One of the first hospital medicine programs in the country, ours has become a national model for hospital-based care. In the research realm, investigators like Rebecca Zash, MD, MPH, who is studying the safety of antiretrovirals in pregnant women and infants, are influencing global health policy. In medical education, we are proud to celebrate innovators like Anjala Tess, MD, who has launched a new and first-of-its-kind Quality and Safety Master’s degree program at Harvard Medical School.

In addition to highlighting people and programs that have reached milestones or contributed significantly to our mission this year, this report includes data on our clinical volume, academic publications, honors and awards, and research funding. This year, for the first time, we are also pleased to deliver updates from each of the Department’s Vice Chairs—leaders in the areas of education, mentorship, research, quality improvement, and network development. We also pause to remember the inspiring lives and the extraordinary, mission-driven contributions of two longtime BIDMC faculty members who died this year, Warner Slack, MD, and Terry Strom, MD.

Thank you for taking the time to read this report. Please be in touch should you have any questions or wish to connect on any of the work you read about in these pages. As health care professionals, we all share an overarching mission, and it’s through collaboration that we stand to make the most progress and do the most good.

Warm Regards,

Mark L. Zeidel, MD
Chair, Department of Medicine

DEPARTMENTAL ORGANIZATION

This list reflects our administration and leadership as of November 2018.

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

Jennie Greene, MS
Director, Communications

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
Nicholas Lord, MHA
Division Administrator

Cardiovascular Medicine
Robert Gerszten, MD
Division Chief
John DiGiorgio, MPS-HHSA
Division Administrator

Endocrinology, Diabetes, and Metabolism
Evan Rosen, MD, PhD
Division Chief
Nicholas Lord, MHA
Division Administrator

Gastroenterology
J. Thomas Lamont, MD
Division Chief (interim)
Sara Montanari
Division Administrator

General Medicine
Eileen Reynolds, MD
Division Chief
Blair Bisher, MHA
Division Administrator
Patrick Curley, MS
Division Administrator

Gerontology
Lewis Lipsitz, MD
Division Chief
Kerry Falvey
Division Administrator

Hematology/Oncology
Manuel Hidalgo, MD, PhD
Division Chief
Christine VanDeWege, MA
Division Administrator

Infectious Diseases
Peter Weller, MD
Division Chief
Nicholas Lord, MHA
Division Administrator

Nephrology
Martin Pollak, MD
Division Chief
Kerry Falvey
Division Administrator

Pulmonary, Critical Care, and Sleep Medicine
J. Woodrow Weiss, MD
Division Chief
Brian Duckman, MHA/MBA
Division Administrator

Rheumatology and Clinical Immunology
George Tsokos, MD
Division Chief
Patricia Harris
Division Administrator

Research Divisions

Clinical Informatics
Charles Safran, MD
Division Chief

Clinical Nutrition
Bruce Bistrian, MD, PhD, MPH
Division Chief

Experimental Medicine
Jerome Groopman, MD
Division Chief

Genetics
Pier Paolo Pandolfi, MD, PhD
Division Chief

Hemostasis and Thrombosis
Robert Flaumenhaft, MD, PhD
Division Chief

Immunology
Cox 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

Over the last year, the Department of Medicine has made great strides toward our goal of making care more readily available to our patients. Although Boston’s Longwood Medical Area is a medical mecca like no other in the world, it’s not always easy for our patients and their loved ones to come here for care. For many people, the time and resources it takes to get to our main BIDMC campus are prohibitive if they’re coming from across the city, surrounding suburbs, rural areas, or even other states. This is why I’m so pleased that our network has continued to grow this year to include even more—and even stronger—partnerships with community health centers, hospitals, and practices across our region. Increasingly, BIDMC doctors are providing care to patients in their home communities. We’re also making it easier for people to stay with their local physicians for most of their medical care, knowing they will have timely, direct access to our specialists if and when they need it. Many of this year’s network highlights are described in greater detail on page 9. I am particularly excited about our plans to be part of a combined system with Lahey Health, New England Baptist Hospital, Mount Auburn Hospital, and Anna Jaques Hospital. In the coming months, we will come together as Beth Israel Lahey Health, with the goal of providing our patients with high-quality, affordable care close to where they live and work. BIDMC will be the academic flagship of the new system, positioning us even better to live up to our mission of providing extraordinary care where the patient comes first.

Best Wishes,

Kevin Maguire, MS
Chief Administrative Officer,
Department of Medicine
During the 2017-2018 Academic Year, several talented members of the Department of Medicine assumed important leadership roles. Each of these individuals is nationally recognized and brings to his/her new position valuable experience and extraordinary commitment.

**NEW LEADERS**

Robert Flaumenhaft, MD, PhD, was named Chief of the Division of Hemostasis and Thrombosis, taking over from Bruce Furie, MD, who ran the Division since he and Barbara Furie, PhD, founded it in 2000. Flaumenhaft is an internationally recognized expert in platelet biology and thrombosis research. His laboratory has unraveled the molecular mechanisms that control platelet granule exocytosis and identified new antithrombotic therapies. He has been continuously funded by the National Institutes of Health and has been the recipient of several awards throughout his career, including an Established Investigator Award from the American Heart Association and an Outstanding Investigator Award from the National Heart, Lung, and Blood Institute. A Professor of Medicine at Harvard Medical School, he was elected to the American Society for Clinical Investigation and serves on the editorial boards of several leading journals. Flaumenhaft shares the Furies’ commitment to training the next generation and will continue to lead what has become a top-tier clinical and research program.

Ary Goldberger, MD, was appointed Chief of the Division of Interdisciplinary Medicine and Biotechnology (IMBIO), succeeding Vikas Sukhatme, MD, PhD, who recently took on the role of Dean of Medicine at Emory University. A Professor of Medicine at Harvard Medical School and a member of the Cardiovascular Institute, Goldberger is an exceptional physician-scientist. He has pioneered the quantitative analysis of complex systems science to basic and translational medicine. His laboratory is at the frontier of nonlinear dynamics, bioengineering, statistical physics, and physiology. His appointment represents a timely new phase in the leadership of the Division of IMBIO, whose members are known for their collaborative research across a broad range of fields, including genomics and proteomics; cellular metabolism in cancer and immunology; sleep-disordered breathing syndromes; and novel biomarkers of cardiovascular disease, diabetes, and neuroautonomics.
Grace Huang, MD, was selected as the Vice Chair for Career Development and Mentoring. A hospitalist in the Division of General Medicine, she will lead faculty mentorship efforts, support divisions in their annual performance review processes, and prepare faculty for the Harvard Medical School promotion process. Huang will also work with the Director of BIDMC Epstein Society to promote the careers of recipients of K awards from the National Institutes of Health. As an Associate Program Director in our Internal Medicine Program, she oversees resident evaluation and remediation. Huang serves as Co-Director of the BIDMC Academy of Medical Educators, which holds professional development seminars for faculty. She is also Director of the Rabkin Fellowship in Medical Education, a nationally recognized program that trains education leaders at Harvard Medical School. She was recently appointed the medical school’s Interim Director for Academic Careers and Faculty Development.

Daniele Ölvezky, MD, MS, a hospitalist in the Division of General Medicine, was chosen as the Diversity and Inclusion Officer for the Department of Medicine. In this newly-created leadership role, she will promote diversity and inclusion in the Department of Medicine. She will also collaborate closely with BIDMC’s Office for Diversity, Inclusion and Career Advancement, of which she has been an active member for several years. One of the aims of this position is to increase recruitment and retention of underrepresented minority faculty members, residents, and fellows in the Department. Ölvezky was selected as a Harvard Medical School Academy Medical Education Fellow in 2017 as well as an HMS Miles Shore Fellow. She also served as Co-Chair of the Cross Cultural Interest Group of the HMS Academy. An exceptional physician and mentor, Ölvezky will also work to enhance the patient-provider experience and foster skills in cultural competency.

Evan Rosen, MD, PhD, assumed the role of Chief of the Division of Endocrinology, Diabetes, and Metabolism this year, following the departure of Anthony Hollenberg, MD, who went on to become the Chair of Medicine at Weill Cornell Medicine. Rosen is a Professor of Medicine at Harvard Medical School and an Institute Member at the Broad Institute of MIT and Harvard. He leads a laboratory at BIDMC that focuses on the transcriptional pathways that underlie metabolic diseases like obesity and Type 2 diabetes. In particular, his laboratory has used genomic and epigenomic approaches to identify novel transcription factors and pathways that regulate adipogenesis, lipid handling, insulin resistance and metabolic memory. Previously Program Director for the joint BIDMC and Joslin Diabetes Center Fellowship in Endocrinology and Metabolism, Rosen has built a strong foundation in research and education over more than a decade at BIDMC.
This year, the Department continued to build on our tradition of exceptional and innovative educational programming. We welcomed 195 Harvard Medical School (HMS) students into our clerkships, 64 new interns into residency, and 56 new clinical fellows.

Our annual education retreat focused on the learning environment, developing wellness programs at all levels of learners, and a quality-improvement (QI) tracking system for episodes of professional mistreatment for all trainees. We are excited to expand and assess the use of this QI approach to wellness and professionalism.

Our student programs teach one third of all HMS students. The Medical School has now fully operationalized the new Pathways clinical training program whereby students are assigned to a single site for the first two years. Our residency continues to flourish with clinician-educator, global health, and QI tracks. Our recently redesigned research track has attracted outstanding scientists to the residency this past year. We also welcomed the first fellow into our new Hospice and Palliative Care Medicine Fellowship. In addition, building upon our successful clinician-educator track for residents, this year we launched a similar track for fellows.

The Department of Medicine and BIDMC continue to expand work on diversity and inclusion. The Department named Daniele Ölveczky, MD, MS, as our first Diversity and Inclusion Officer. (Read more on page 5.) Our Advancement of Women Committee hosted a photography exhibit honoring notable women physicians in the Department's history. And all Division Chiefs and clinical leaders in the Department attended an educational program on unconscious bias. In this report, you will see that education runs through all we do in the Department.
A central mission of the Department of Medicine is the discovery of new information that can lead to the prevention, cure, and improved treatment of human diseases. Research in the Department is also aimed at enhancing the quality of life for those living with chronic diseases. As Vice Chairs of Research and Research Strategy, we consider it a high priority to foster a vibrant, diverse, and collaborative research program with the aim of making discoveries that can eventually be translated into improved medical care. Most of the Department's divisions carry out research ranging from basic science investigation to clinical trials and outcomes research. The research is led by approximately 290 Medicine faculty members with active grants, overseeing nearly 700 trainees and laboratory staff. Research training and mentoring is a high priority, and many of our divisions with active research programs have long-standing National Institutes of Health-funded training grants.

Department of Medicine research funding in the 2017-2018 Fiscal Year was over $200 million, consisting of government, foundation, corporate, and donor sources. (See funding details on page 38.) This makes the Department one of the best-funded medical school departments of medicine in the country. BIDMC consistently ranks as a national leader among independent hospitals in National Institutes of Health funding, and the Department of Medicine is responsible for over 68% of that funding.

Research in the Department is supported by over 20 technically sophisticated BIDMC research core facilities, many of which are directed by Medicine faculty. This year the Flow Cytometry Core expanded its capabilities with the introduction of new instrumentation focused on microvesicle research. (Read more about this facility on page 28.) In addition, the Transgenic Mouse Core has mastered new technologies that facilitate the alteration of gene expression in mice to investigate their role in disease. A new Functional Genomics and Bioinformatics Core was established to assist with analysis of transcriptomics and epigenomics data bases including single cell analysis. This is in addition to an existing Bioinformatics and Systems Biology Core thereby demonstrating the ability of BIDMC to respond to the growing needs for analysis of large and complex data bases.

Our faculty's work is widely published and, again this year, we were well represented in the world’s leading scientific and medical journals, including Nature, Science, Cell, and the New England Journal of Medicine. Investigators in the Department are recognized nationally for the excellence of their research as evidenced by their election to the National Academy of Sciences and the National Academy of Medicine, the American Society for Clinical Investigation, and the Association of American Physicians.

We have started to highlight Medicine research labs at designated Medical Grand Rounds, with the goal of fostering collaboration between clinicians and researchers, and of making students, residents, and fellows more aware of research opportunities within the Department. We will continue these research-focused Medical Grand Rounds next year. In addition, we aim to facilitate the recruitment of exceptional new research faculty members in several of our divisions. We also plan to foster the involvement of more Medicine faculty and trainees with the Broad Institute of MIT and Harvard, which has cutting-edge platforms and approaches for advancing biomedical science.
CAREER DEVELOPMENT AND MENTORING
Grace Huang, MD
Vice Chair, Career Development and Mentoring
The lifeblood of the BIDMC mission resides in its faculty, and the Department of Medicine honors this through the unique position of Vice Chair for Career Development and Mentoring. Responsible for supporting the career development of over 500 faculty in the Department of Medicine, I’m proud to have succeeded Tony Hollenberg, MD, in this position this past year. I am committed to ensuring a system of mentoring for all Medicine faculty members, supporting divisions in their annual performance review mechanisms, and preparing faculty for the promotion process. I’m pleased to work in tandem with Steve Freedman, MD, PhD, the newly-appointed Director of the Epstein Society, to promote the careers of researchers in the Department. Goals for the upcoming year include: launching a communication strategy to provide faculty access to resources across BIDMC and Harvard Medical School (HMS); conducting a department-wide mentoring needs assessment; implementing division-based efforts to collect clinical feedback; expanding the Epstein Society to support grant-writing efforts across the spectrum of training from residents to junior faculty; and continuing one-on-one HMS CV and career development consultation.

QUALITY
Mark Aronson, MD
Vice Chair, Quality
As Vice Chair for Quality, I have the pleasure of working with teams across Medicine to improve the quality of care we provide in ambulatory and inpatient settings. One such team, the Medical Peer Review Committee (MPRC), is a multidisciplinary group made up of clinical leaders from the Departments of Nursing, Medicine, Emergency Medicine, and Pharmacy. Its role is to review adverse events, near misses, and patient complaints. It functions as a pivotal foundation to the Department of Medicine Quality and Patient Safety Program. The Committee, chaired by Alex Carbo, MD, analyzes root causes, identifies any lapse in standards of care, system barriers or gaps, and importantly, opportunities for improvements in care. Many of the root cause analyses and presentations are conducted by residents as part of their Stoneman Quality Improvement Rotation. The committee refers cases to hospital groups and committees for further review or action, as appropriate.

Over the past year, 103 cases were reviewed by MPRC. An important recurrent theme in many of these cases has been poor communication and coordination of patients transferring into BIDMC from outside institutions, often leading to patients being admitted to an inappropriate service. This subsequently led to the combined efforts of multiple services in the development of a Transfer Center with the aim of mitigating the risks associated with the care of these very ill patients.

Another area of focus for this year has been improving the quality of medicine consults. A central tenet of this initiative has been the development and roll out of an electronic ordering and tracking system. Building upon a model first used for Infectious Diseases, we have developed an order entry and tracking system for 16 Medicine Consult Services. This effort was led by Drs. Lauren Doctoroff, David Feinbloom, Mary LaSalvia, and Jennifer Stevens. This system facilitates timely response to requests and provides needed data on consults including volume, reason, urgency, and timeliness.
CAREER DEVELOPMENT AND MENTORING

Grace Huang, MD
Vice Chair, Career Development and Mentoring

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CLINICAL CARE IN THE COMMUNITY

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

This year, I have worked with colleagues in the Department of Medicine and across BIDMC to focus on building and strengthening relationships with our network affiliates. I have the pleasure of working with Paul Hart Miller, Administrative Director for Business and Network Development in the Department of Medicine. Our work has centered on the objectives of building a collaborative approach to care across the network, expanding appropriate levels of care to the community, and safeguarding the quality of this care.

A few key network successes within the Department this year include: developing a CME series with community partners across primary care and most medical subspecialties that drew some 500 participants; expanding cardiology care at BID-Plymouth to provide elective percutaneous coronary intervention; and partnering with our affiliates to establish and maintain community cancer care centers in Brockton, Needham, and Newburyport. We are now working with our physician group, Harvard Medical Faculty Physicians, and other BIDMC departments to develop a strategic plan for the coming year to coordinate all of our network efforts. We are pleased to support the BIDMC mission of “extraordinary care, where the patient comes first,” at BIDMC and for all of our community partners.

“We are fortunate to have mission-driven leaders in the Department of Medicine—individuals who have excelled in their own careers and are committed to innovation and excellence in all that we do.”

—Mark Zeidel, MD
A Year In Medicine

The Department of Medicine is engaged in pursuing our mission every day, but certain special events punctuated the 2017-2018 Academic Year. Here is a sampling of moments that particularly mattered this year.

**A Reason to Ride**

Mark Zeidel, MD, Chair of the Department of Medicine, participated in a A Reason to Ride, an annual bike-a-thon to raise money for cancer research at BIDMC. Started by grateful patient Tom DesFosses, the ride began in 2004. This year, Zeidel and members of the Department participated under their new team name "Medical Miracles."

**Addressing Unconscious Bias**

Over 30 Department of Medicine leaders — division chiefs, clinical chiefs, and administrative directors — participated in a three-hour unconscious bias training session. This training was a recommendation of the Department's Advancement of Women Committee, which made progress on many fronts this year.

**Honoring Women Pioneers**

The Department gathered to celebrate Women in Medicine Month with a photography exhibit entitled, “Honoring Women in the Department of Medicine,” showcasing women pioneers in the Department.

**Cancer Immunotherapy and Cell Manipulation Facility Opened**

The BIDMC Cancer Center announced the opening of the Randi and Brian Schwartz Family Center Immunotherapy and Cell Manipulation Facility. This state-of-the-art laboratory expands BIDMC’s research capacity with the ultimate goal of accelerating the delivery of new immunotherapies to patients with cancer.

**Expanding Palliative Care Training**

The Department launched a new Hospice and Palliative Care Medicine Fellowship at BIDMC and Boston VA. Led by Mary Buss, MD, Chief of the Division of Palliative Medicine in the Division of General Medicine, the new program aims to train fellows to become educational and clinical leaders in the field of palliative care.

**A Moment of Silence**

Led by internal medicine residents, members of the Department of Medicine and our colleagues across BIDMC distributed hundreds of orange ribbons and observed a moment of silence to mark the one-month anniversary of the school shooting in Parkland, Florida and to draw attention to gun violence as an important public health issue.

**Launch of Opioid Use Disorder Clinic**

Healthcare Associates, BIDMC’s primary care practice, launched an opioid use disorder clinic to help address the worsening public health crisis. BIDMC also formed the Division of Addiction Psychiatry in response to the opioid epidemic.
Addressing Unconscious Bias
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Expanding Palliative Care Training
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Looking Beyond the Guidelines
A part of the unique collaboration between the Department of Medicine and the *Annals of Internal Medicine*, six Medical Grand Rounds discussions were held this past year. They featured physicians and patients who had to go “Beyond the Guidelines” to make decisions for which there were no clear guidelines.

Mother’s Day Walk for Peace
Team BIDMC joined 225 other teams from across Boston for the Louis D. Brown Peace Institute’s annual Mother’s Day Walk for Peace, co-chaired by BIDMC CEO Kevin Tabb, MD. Members of the Department walked alongside families affected by homicide as well as neighbors, clergy, business owners, and elected officials.

The BIDMC Experience
The medical center launched the BIDMC Experience initiative to enhance the experience of those who work and receive care here. Members of the Department of Medicine have been actively involved in leading workgroups and engagement activities.

Reflecting on Health Care in America
The “Symposium on Health Care in America,” part of the George Altman Endowed Annual Lectureship at Medical Grand Rounds, addressed the challenges of achieving access to care, delivery of quality care, and cost containment. Drew Altman, PhD, President and CEO of the Kaiser Family Foundation, offered the keynote address, which was followed by a panel discussion.
HONORS AND ACCOLADES

Every year, BIDMC and members of the Department of Medicine earn many local, national, and international awards for their exceptional, mission-driven work. This is a sampling of honors received during the 2017-2018 Academic Year.

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

Recognized as National Nonprofit Organization Partner of the Year by the U.S. Environmental Protection Agency as part of its WasteWise Program.

Earned HOPE Award from the Medically Induced Trauma Support Services organization. The award went to BIDMC’s Patient Safety team in the Silverman Institute for Health Care Quality and Safety.

Recognized by Boston Magazine, which named 177 physicians and surgeons from 42 medical specialties affiliated with BIDMC in its “Top Doctors” guide.

Mark Andermann, PhD
Received the Armen H Tashjian, Jr. Award for Excellence in Endocrine Research from the Harvard T.H. Chan School of Public Health.

Dan Barouch, MD, PhD
Barouch was featured this year in Boston Magazine for his groundbreaking HIV research. He also earned the “Investigator of the Year” award from the Massachusetts Society for Medical Research, the Drexel Prize in Immunology from Drexel University College of Medicine, and the Highly Cited Researchers Award from Clarivate Analytics.

Alex Chee, MD
Chee received the Heinrich Becker Young Investigator Award for Research and Clinical Innovation from the World Association of Bronchology and Interventional Pulmonology.

Robert Cohen, MD
Named Gold Humanism Scholar at the Harvard Macy Institute Program for Educators of the Gold Foundation.

Reed Drews, MD
Drews earned the Mentor Award from the American Society of Hematology.

Sara Fazio, MD
Fazio was awarded the Ruth-Marie E. Fincher, MD, Award from the Clerkship Directors in Internal Medicine.

Lachlan Forrow, MD
One of the people who helped launch the International Campaign to Abolish Nuclear Weapons (ICAN) in 2007, Forrow joined celebrations in Oslo when the organization received the 2017 Nobel Peace Prize.

Ary Goldberger, MD, and CK Peng, PhD
Their publication “Mosaic organization of DNA nucleotides” was selected by Physical Review E as one of the 25 milestone papers of the past 25 years.
Molly Hayes, MD
Hayes was honored with the Emerging Educator Award from the Association of Pulmonary and Critical Care Medicine Program.

Grace Huang, MD
Named Editor-in-Chief of the Association of American Medical Colleges’ MedEd Portal.

Douglas Kiel, MD, MPH, and Elizabeth Samelson, PhD
Selected as Fellows of the American Society for Bone and Mineral Research for being long-term members who have made outstanding contributions to the field. Kiel also received a leadership award from the Cohorts for Heart and Aging Research in Genomic Epidemiology Consortium.

Brad Lowell, MD, PhD
Received the Naomi Berrie Award for Outstanding Achievement in Diabetes Research, Columbia University in 2017.

Christos Mantzoros, MD, DSc
Received the Outstanding Investigator Award from the Endocrine Society.

Susan Mitchell, MD, MPH
Mitchell earned the National Institutes of Health Method to Extend Research in Time (MERIT) Award from the National Advisory Council on Aging.

Pier Paolo Pandolfi, MD, PhD
Pandolfi was named 2017 Fellow of the American Association for the Advancement of Science.

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

Yuri Quintana, PhD
Named Senior Member for the Institute of Electric and Electronic Engineers of the Engineering Society.

Eileen Reynolds, MD
Reynolds was named Master of the American College of Physicians.

Adam Rodman, MD
Rodman’s podcast, Bedside Rounds, was named one of best medical podcasts by Internal Medicine News. This year the American College of Physicians also partnered with Bedside Rounds, which focuses on the history of medicine and how it affects our society and culture, to offer Continuing Medical Education credits and Maintenance of Certification points.

Sunil Sheth, MD
Sheth was honored with the Nobility in Science Award from the National Pancreas Foundation.

Ronald Silvestri, MD
Named President-Elect of the Directors of Clinical Skills Courses (DOCS).

Robert J. Thomas, MD
Honored with the Lifetime Achievement Award for Extraordinary Contribution and Academic Excellence in Sleep Medicine from the Association of American Physicians of Indian Origin Sleep.

George C. Tsokos, MD
Named Master of the American College of Rheumatology; and received the Marian Ropes Physician Achievement Award from the Arthritis Foundation.

Griffin Weber, MD, PhD
Won the Patient Matching Algorithm Challenge from the U.S. Department of Health and Human Services’ Office of the National Coordinator for Health Information Technology.

Peter F. Weller, MD
Received the Distinguished Service Award from the International Eosinophil Society.

Gloria Yeh, MD, MPH
Yeh was awarded the A. Clifford Barger Excellence in Mentoring Award from Harvard Medical School.
“When you take a history, the patient is always telling you a story. The question is whether you are hearing it or not,” explains Joseph Li, MD, Chief of BIDMC’s Hospital Medicine Program. And the story is often complex. “People come into the hospital with complicated medical issues and often other related issues,” Li notes. “I see the role of the hospitalist as part primary care doctor, part ER doctor, and part social worker.”

Li’s health care training uniquely prepared him for the demands of being a hospitalist, including his first job as a nurse’s aide at a nursing home in Tulsa, Oklahoma. He then attended pharmacy school, and eventually, medical school at the University of Oklahoma. He arrived in Boston in 1994 for residency at New England Deaconess Hospital, becoming Chief Medical Resident in 1998. It was a transitional time in the field of internal medicine, especially hospital-based care. “Back then, when a person was admitted to the hospital, their primary care doctor was contacted to come and care for them. This didn’t always work well because primary care doctors couldn’t easily leave other patients at their outpatient practice to care for a hospitalized patient,” he explains. Also, some patients—referred to as “unassigned”—did not have primary care doctors to come care for them in the hospital, Li recalls.

Mark Aronson, MD, then Associate Chief of General Medicine and Primary Care, believed that BIDMC could provide higher quality care to hospitalized patients by having internists specifically assigned to inpatient care. “It was becoming clear that office-based internists were caring for increasingly complex patients and that those demands made it often untenable for them to also care for inpatients in a timely, effective, and safe manner,” he explains.

“Because we thought that sick patients and distraught families deserved to have doctors available in the hospital at all times, we decided to embrace the hospitalist model.” Aronson approached Li and a fellow residency graduate, Preetha Basaviah, MD, about heading up the new hospitalist program. They agreed, and it became one of the first in the country. “We were incredibly fortunate to have hired two brilliant, devoted and spirited young doctors to start our program,” notes Aronson.

Since then, the field has grown exponentially with upwards of 60,000 hospitalists in the country today. As one of..."
Li has been a leader and innovator. Basaviah went on to University of California, San Francisco, and then Stanford. Li’s also been highly involved in the American College of Physicians’ Hospitalists Publications and has expanded BIDMC’s program substantially. BIDMC now boasts over 125 hospitalists, who provide care at four hospitals throughout our growing system.

Reflecting on the last two decades of hospital medicine, Li notes that a lot has changed: “We have so many new medications, electronic medical records, and the internet as a constant source of clinical information, like UptoDate.” But much has also stayed the same, he adds:

“Our program has always been innovative and physician-led.” And, in his view, BIDMC hospitalists have always been “the fiber of the institution in many ways”: they are instrumental in the residency training program; they are the some of the top quality improvement leaders at BIDMC (and arguably the country); and they are critical to the care of 400 inpatients throughout the BIDMC system at any given time. BIDMC hospitalists are also nationally recognized for their contributions to patients and to the field. Li proudly points out that more BIDMC hospitalists have been recognized as Top Hospitalists by ACP Hospitalist magazine than from any other program in the country.

This year’s celebration of the Hospital Medicine Program’s two decades is in many ways a celebration of Li, as his colleagues are quick to point out. “Joe leads by example and keeps the focus on the patients first, as the top priority in every decision,” explains Caleb P. Hale, MD, Associate Chief of Hospital Medicine. “As we celebrate the 20th year of our program, we’re celebrating the good it has done for our patients, our doctors, and BIDMC. But we’re also celebrating Li, who continues to expand and improve the program daily.”
Antibiotics, feeding tubes, ventilators, hemodialysis machines, and multiple monitors were employed to keep him alive. But what struck Berwick more than the impressive modern technology was the human interaction and teamwork he witnessed among the 20-30 people on the care team. “This was a ballet more complex than any dancer ever danced,” he recalls. “Amazingly, movingly, they included David’s family in all of that. They included me. They asked ‘Do you have any questions? Do you have any ideas?’ We, the people who loved David, were not watching the team, we were on the team.”

“He beat the odds,” Berwick says, crediting this exemplary communication, cooperation, and inclusion with helping to save his brother’s life. “I noticed that everyone had a voice. Sure, the ICU director had a voice, but so did the student nurse.” He recalls a respiratory therapist questioning one of the physicians on the team about his assessment. Rather than bristle at being challenged, the doctor thanked the respiratory therapist for the correction. “I have worked in health care for four decades now,” Berwick reflects, “and what I saw at BIDMC was care that I had only dreamed of.”

Donald Berwick, MD, the founder of the Institute for Healthcare Improvement (IHI) and a national leader in health care quality and safety, has a unique perspective on BIDMC. In addition to four decades as a health care industry trailblazer, Berwick spent a harrowing 11 days at his brother’s bedside in BIDMC’s Finard Medical Intensive Care Unit (ICU). In March 2017, his younger brother, David, developed sepsis from Legionnaires’ disease and, suffering from multiple organ failure, was brought to BIDMC and put on life support. “We were sure we were going to lose him,” Berwick recalls.

“NATIONAL HEALTH CARE LEADER
APPLAUDS BIDMC CARE”

“Antibiotics, feeding tubes, ventilators, hemodialysis machines, and multiple monitors were employed to keep him alive. But what struck Berwick more than the impressive modern technology was the human interaction and teamwork he witnessed among the 20-30 people on the care team. “This was a ballet more complex than any dancer ever danced,” he recalls. “Amazingly, movingly, they included David’s family in all of that. They included me. They asked ‘Do you have any questions? Do you have any ideas?’ We, the people who loved David, were not watching the team, we were on the team.”

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David Berwick was similarly impressed by the care he received once he was well enough to be transferred from the ICU to another medicine floor. “The team was partnering perfectly; and the nurses were angels,” he recalls. “Some people would look back on this experience with regret and fear, but I look back with gratitude because I felt so loved and well taken care of.”

Berwick has been vocal in his praise for the care his brother received at BIDMC, dedicating much of his keynote address at IHI’s annual conference this year to the subject. Upon hearing of David’s experience, Chair of the Department of Medicine Mark Zeidel, MD, invited Berwick to debrief—not simply to hear about what had gone well, but to learn about areas of potential improvement. The subsequent meeting included several Department of Medicine quality improvement leaders. “Dr. Berwick applied his keen understanding of care processes to identify a number of things that we can do better,” Zeidel explains. This includes improved communication and sign-out between the ICU and the floor teams, better and more reliable communication with rehabilitation facilities, and improved design of the waiting and patient support areas in the Finard ICU.
Members of the Department, along with partners across the medical center, are currently working on several of these areas. For instance, a new ICU Transition Guide Program aims to mitigate the fear and confusion that patients and families sometimes feel upon transferring from the ICU to a regular medical/surgical floor. To help improve the process, a multidisciplinary team developed a system whereby pre-medical school volunteers are trained to provide individualized assistance to patients and families being transferred out of the ICU. In 2018, the Institute for Patient- and Family-Centered Care recognized the program with a Partnership Award honorable mention.

Department of Medicine teams are also studying communication in the ICU with the goal of continuous improvement. A paper published this year in BMJ Quality and Safety by Department of Medicine faculty member Sigall Bell, MD, found that about 50% of ICU patients and family members surveyed nationally say they are hesitant to speak up about some concerns, such as possible mistakes in care. As Bell explains, “Our goal is to have every patient and family member at any ICU in the country feel like Dr. Berwick did: that they are an integral member of the team and always able to communicate openly and honestly with the care team.”

As Zeidel notes, “The culture of the Department and BIDMC has never been to rest on our laurels.” Referring to Berwick’s praise, he says, “This kind of recognition from someone who really understands quality of care is enormously gratifying, but I am extremely proud of the fact that we always focus on what we can do to improve, so that our patients continue to benefit from better and better care.”

50%

Effective communication in the ICU is a BIDMC priority given that about 50% of ICU patients and family members surveyed nationally say they are hesitant to speak up about concerns.
# PATIENT CARE MATTERS

Department of Medicine’s Clinical Volume at BIDMC’s Boston Hub

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<table>
<thead>
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<tbody>
<tr>
<td>Clinical revenue</td>
<td>72,290,951</td>
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<td>Patient days in bed</td>
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<tr>
<td>Cardiac catheterizations</td>
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<tr>
<td>Electrophysiology procedures</td>
<td>1,552</td>
</tr>
<tr>
<td>Patients in BIDMC’s Boston-based Healthcare Associates primary care practice</td>
<td>40,674</td>
</tr>
</tbody>
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Left: Adam Cheifetz, MD, with a trainee and patient
Top right: Suzanne Salamon, MD, with a patient
Bottom right: Resident Nathan Raines, MD, with a patient
Despite the fact that 80% of all internal medicine residency graduates go on to practice in the ambulatory environment (many in the medical specialties), most internal medicine residency programs focus on inpatient training, explains Graham, now faculty in the Department of Medicine and Director of Ambulatory Training and the Primary Care Track. “The typical inpatient training model impacts all internists, but most vulnerable are those going into primary care who rely on their residency training to prepare them for their careers without any subsequent time in fellowship,” she says. “That’s how primary care training has been for decades—kind of an afterthought.”

In order to provide residents with a rigorous and comprehensive primary care training experience, the BIDMC Residency Program’s Primary Care Track is uniquely designed: after a standard internship year, those residents who opt to join the track spend their junior and senior years participating in a training method known as the “long block,” a key feature of BIDMC’s program. During the “long block,” each academic year is cut into two six-month periods. During one of those, primary care track residents do typical rotations with the other residents; during the other half year, they are immersed in providing primary care at BIDMC’s Healthcare Associates (HCA) and a second primary care clinic. Whereas many primary care tracks offer short periods of exposure to primary care, BIDMC’s program is longer and immersive. “Immersion training is more effective. It’s more intense. Residents get a sense of what it’s like to be a primary care doctor—with large panels of about 200 patients each.”

—Kelly Graham, MD

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With its “long block” design, the Primary Care Track also emphasizes the importance...
of relationship building and time. Graham believes that establishing longer-term relationships with patients makes the residents’ diagnostics and treatment strategies more sophisticated and precise. She also believes that the time spent on long block allows residents to watch disease processes evolve over the weeks to months it often takes to develop the right diagnostic and treatment plan.

“Rather than conduct a battery of tests on a patient you’ve never seen before, you’re able to consider their illness in the broader context of their health and their lives, and evaluate it over time and space.” And she believes that these two tools—relationship building and time—are essential to being an exceptional primary care physician and can only be taught in this immersive environment.

Another important feature of the Primary Care Track is its focus on research and quality improvement training. This year, one of the projects that residents are working on is an extension of research Graham recently published in *Annals of Internal Medicine*, exploring ways to implement innovative post-discharge care for our most vulnerable patients—including home visits—and empowering residents to take the lead in delivering this care. By working on real-world quality improvement projects, residents gain a deeper understanding of primary care in various settings and they learn research skills valuable throughout their careers.

Graham has seen the effects first-hand: “Residents graduate from the track with so many great skills, and are ready to take on leadership roles throughout the country,” she notes. “And it’s really wonderful to work with them.”
This year, Tess is taking quality and safety training to a new level and a new audience, launching a Master in Healthcare Quality and Safety Program at Harvard Medical School (HMS). The program evolved out of an HMS fellowship—funded by Controlled-Risk Insurance Company, Ltd. (CRICO)—which Tess has led for five years. The fellowship, designed as a pilot program, proved to be an effective approach to teaching quality and safety. “Traditionally, quality and safety were taught on the job, but we found through the fellowship that a more foundational approach combined with an apprenticeship worked well. Fellowships are limited in number so we decided to design a master’s program to create more access for professionals who want the training,” Tess explains. The inaugural class began the first week of September 2018 with ten students from five different countries.

The new HMS master’s program is one of the first of its kind internationally. Unlike many quality and safety programs, which are primarily online, it is residential. Enrollees—all graduates from health professional programs—are based in Boston at HMS and have access to Harvard institutions and faculty. The program also draws on the resources and expertise available at BIDMC as well as the other Harvard teaching hospitals. “Many medical schools have one or two affiliated hospitals, but we have such a network across Harvard,” Tess notes. She has designed 378 hours of instruction and will be leading several of the courses within the program. Other BIDMC Medicine faculty members include Lauge Sokol-Hessner, MD, Julius Yang, MD, PhD, Patricia Folcarelli, RN, PhD, and Shani Herzig, MD.

As the field of quality and safety has evolved over the last two decades, BIDMC and Harvard have consistently been at the forefront—and students will benefit from this exposure. Recently, for instance, the medical center has received international recognition for its groundbreaking initiative to identify, track, and prevent non-physical harms that patients often experience in medical settings. (Tracking physical harms has long been required at hospitals, but addressing non-physical harms is new and unique.)

Tess explains that when she came to BIDMC for residency in 1997, she found mentors like Mark Aronson, MD, and Ken Sands, MD,
who were committed to patient safety, but there was not yet a formal training program in place. “In the late 1990s, the concept of ‘do no harm’ was refined to include what we now refer to as quality and safety work,” she reflects. She and Yang, a fellow resident, were among a new cohort of physicians at BIDMC focusing in this area, many of whom have gone on to become national leaders in the field.

“Today quality and safety underlie everything we do in the Department of Medicine,” says Tess, noting that residents, fellows, and faculty alike are expected to engage in quality improvement projects on an ongoing basis. In fact, she says, residents often graduate, leave BIDMC, and only then realize how much of a focus it is at the medical center. “It’s something that they often take for granted but that sets them apart in other institutions. They have the mindset and skills to improve patient outcomes and efficiencies in how we deliver care. BIDMC is years ahead in this journey and in engaging our trainees from their first week here,” she says.

With the new master’s program, Tess intends to further expand the number of physicians and other health professionals with high-level, foundational training and a commitment to healthcare quality and safety.
EDUCATION MATTERS
MEDICAL EDUCATION LEADERSHIP

Residency Leadership
Residency Program Director
C. Christopher Smith, MD
Primary Care Program Director
Kelly Graham, MD
Associate Program Directors
Alicia Clark, MD
Jonathan Crocker, MD
Jason Freed, MD
Molly Hayes, MD
Grace Huang, MD
Kenneth Mukamal, MD, MPH
Daniel Ricotta, MD
Anjala Tess, MD
Anita Vanka, MD
Christina Wee, MD, MPH
Julius Yang, MD, PhD
Education Manager
Ruth Colman
Chief Medical Residents
Andrew Locke, MD
Susan McGirr, MD
Robert Montgomery, MD
Lika Targan, MD
Alok Tewari, MD, PhD
Alexa Triot, 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
Ronald Silvestri, MD
Site Director
Anita Vanka, MD
Associate 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
Ciaran Kelley, MD

Advanced Endoscopy
Tyler Berzin, MD
Celiac Disease
Daniel Leffler, MD
Hepatology
Michelle Lai, MD
Inflammatory Bowel Disease
Alan Moss, MD
Motility
Anthony Lembo, MD
Transplant Hepatology
Nezam Afdhal, MD
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
Jakob McSparron, MD
Associate Director
Asha Anandaiah, MD
BIDMC Site Director
Sleep Medicine
Robert Thomas, MD
Rheumatology
Vasileios Kyttaris, MD
Top left: Residents Joshua DuBow, MD, and Alex Goldowsky, MD
Top right: Internal Medicine Residency Program Director, C. Christopher Smith, MD, with residents
Bottom left: Chief Medical Residents
Bottom right: Jeff Zwicker, MD, with resident Ali Corley, MD
“Women of reproductive age make up nearly half of the global population of people living with HIV,” explains Rebecca Zash, MD, a member of the Division of Infectious Diseases, and Associate Director of the Internal Medicine Residency Global Health Program and the Global Health Fellowship in Medicine at BIDMC. “However, there’s been a lack of effort to understand the effects of HIV medications on pregnant women and their infants, except to determine whether the medications prevent mother-to-child transmission of HIV.” While preventing pediatric HIV infections is critical, she notes, “It’s only one of the bad things that can happen to a baby. We need to find out if any antiretroviral medications (ARVs) cause other adverse birth outcomes like stillbirth, preterm delivery or birth defects, in order to determine the best HIV treatment regimen. That’s the focus of my work.”

Zash’s research in Botswana—often in partnership with her longtime mentor Roger Shapiro, MD, and BIDMC’s Botswana Global Health Program—has established her as an internationally known expert on the safety of HIV medications for pregnant women and infants. Her work has informed treatment recommendations and health policy internationally; and over the last 18 months, her landmark findings have resulted in a proverbial roller coaster ride for her and many in the global health world.

At the 2017 International AIDS conference, Zash presented results from the Tsepamo Birth Surveillance Study in Botswana on the safety of the drug Dolutegravir when started during pregnancy. At the time, Dolutegravir was becoming the HIV medication of choice in non-pregnant adults because it was more effective in controlling viral load and had fewer side effects than most other ARVs. So when Zash studied its safety during pregnancy and reported that it carried the same low risk of adverse birth outcomes as Efavirenz (a popular ARV, which had already been shown to be one of the safest during pregnancy), several countries welcomed her findings and changed their recommendations to Dolutegravir.

However, Zash had reported outcomes among women who started Dolutegravir before pregnancy. In the spring of 2018, when she analyzed the new data on women who started ARVs prior to conception, she found that Dolutegravir carried an increased risk for neural tube defects of about 1 in 100 births compared to about 1 in 1000 births on other ARVs. Although the findings were preliminary and needed more data to confirm or refute, the stark difference in risk ratio was too large to ignore, prompting Zash to present her findings to the World Health Organization (WHO) HIV Guidelines Committee and at the 2018 AIDS Conference. “Our findings were disappointing to everyone—the public health world and women taking these drugs,” she reflects. “It was hard to be the bearer of bad news, as we knew it would likely impact health recommendations and cause concern and anxiety among HIV-infected pregnant women.”

Published in the New England Journal of Medicine, her results led to official safety warnings by the FDA and WHO, and to HIV treatment guideline modifications in the US and globally. While more data is being collected in Botswana and elsewhere, Zash explains that the decision to choose one ARV regimen over another one is complicated...
with many factors to consider. Controlling the viral load is important to help prevent mother-to-child transmission after birth and to ensure the health of the mother, but using a drug that might cause a birth defect is also risky. Although “there are no easy answers,” as Zash reflects, her work is critical for the field, says Peter Weller, MD, Chief of Infectious Diseases. “Her research has drawn important attention to and helped elucidate the safety of HIV drugs for the two million HIV positive women who become pregnant each year around the world,” he explains. “Historically, there hasn’t been enough research on the safety of medications in pregnancy, in general, not just with HIV,” Zash reflects. “I’m hoping that my research highlights why this is important—and ultimately we shift the conversation from the challenges of including pregnant women in research to the ethics of excluding them.”

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The researchers were concerned that the formation of microvesicles—small membrane-bound sacs that are thought to be shed from a variety of cell types—were impacting the quality of stored blood. But their then-current instrument did not have adequate magnification to see the microvesicles. During a brainstorming session over a beer at a Dublin pub, Tigges and the engineers sketched a new instrument on a cocktail napkin. They believed it would help address the Boston-based investigators’ research dilemma. And it did; this rudimentary sketch eventually led to the development of new instruments with higher resolution than was previously available. This new technology also helped establish BIDMC’s Flow Cytometry Core as a world-leader in microvesicle research. When it was first established in 1994, the Core—started by Peter Weller, MD—consisted of just one full-time staff member and a single instrument, which was funded by a $113,000 grant from the National Institutes of Health. With the world’s latest technology to offer, the Core has since expanded into a successful enterprise with hundreds of clients. According to Core Director Peter Weller, MD, Vice Chair for Research, Department of Medicine, today the research facility’s clients are 60% internal BIDMC investigators and 40% external. Its state-of-the-art flow cytometry instrumentation includes three different models that evolved from the early sketch: the Nanoview, the Moflo Astrios EQ, and the CytoFLEX. These instruments are available to help researchers perform the important work of characterizing microvesicle size, distribution, count, surface protein composition, and RNA cargo.

During his 15 years at the Core, Tigges has worked closely with many investigators. Among them is long-time BIDMC researcher Ionita Ghiran, MD, a member of the Division of Allergy and Inflammation and Associate Professor at Harvard Medical School. Born in Romania, Ghiran’s international medical training gave him a strong theoretical background, which
proved advantageous to his later work with the Core. He explains, “In Romania, you didn’t have flow cytometers or kits. Knowing what one component does, you can make individualized solutions.” Given their technical skills and proclivities, over the years, Ghiran and Tigges have paired up to improve the Core’s instruments, often advising the instrument manufacturers on upgrades to the technology.

They’ve also teamed up to use the technology to perform groundbreaking research. As Ghiran notes, “A lot of the things you don’t consider when working with larger cells come into play when working with extracellular vesicles.” For instance, some of their recent research has looked at the best time of day and method for collecting blood samples based on biological circadian rhythms and other variables. Collecting specimens at different times and in different ways introduces noise into the sample that can lead to misdiagnosis. “If you’re looking at different times of day, you may actually be misdiagnosing what is happening, or undermining the effectiveness of treatment,” Ghiran explains. “If you take the sample differently—for instance, the process varies nurse to nurse—you might think everything looks great, but the next day the patient isn’t doing well. So we are narrowing down the ‘when’ and the ‘how.’” While they have received continued funding to explore this further, their preliminary findings suggest that it is generally best to take blood samples early in the morning.

The vision of the Core, Tigges notes, has always been “to stay at the forefront of cytometry, and be here to provide everything we can in an instrument capacity as well as in a scientific capacity. We’ve tried to be forward thinking.” While they’re both inspired by innovation and are constantly looking at new ways to improve and apply existing technology, Tigges and Ghiran agree that they’re most fulfilled by the impact the Core has on patient care and outcomes. Ghiran reflects, “We both love high-tech ‘toys’ and using technology to advance science, but the greatest fulfillment comes when our insights have practical impacts on patient care and outcomes.”
“Therapies such as chemotherapy and radiation that effectively battle cancer can be toxic to the cardiovascular system,” explains Asnani, who joined the Division of Cardiovascular Medicine in 2017. Prior to treatment, it can be difficult to identify which cancer patients are at risk of developing these dangerous and sometimes fatal complications and, in some cases, heart damage doesn’t become apparent until many years after cancer treatment has ended.

During her medical residency, Asnani cared for a woman in her early 40s who had received high doses of Adriamycin chemotherapy as a teenager. Several decades later, the patient was cancer-free but had developed symptoms of heart failure. By the time Asnani saw the patient, she was in cardiogenic shock and passed away within 48 hours of arriving at the hospital.

“She and her doctors thought she was cured of cancer and in good health. When she developed decreased energy levels and fatigue, it took a while to diagnose her with congestive heart failure and treat her with the appropriate medications.”

This particular experience, says Asnani, led her to pursue the field of cardio-oncology.

“A physician-scientist, Asnani oversees a team of basic researchers who are working to identify risk factors and markers that could signal the development of cardiac problems following cancer treatments. Using both zebrafish and mouse models, the Asnani lab is focused on understanding the molecular pathways that underlie chemotherapy-induced cardiac toxicity in patients who receive anthracyclines including Adriamycin, which is still commonly used in the

“The percentage of all cancer patients who were treated with anthracyclines demonstrated signs of heart toxicity within the first year after chemotherapy

9%
treatment of leukemia, lymphoma, breast cancer, and sarcoma.

At the same time, Asnani is working to identify cardio-protective therapies that one day could be administered in tandem with chemotherapy to prevent the development of heart damage.

A recent estimate finds that as many as 9% of all cancer patients who were treated with anthracyclines demonstrated signs of heart toxicity within the first year after chemotherapy. Asnani reflects, “With all the recent successes of cancer treatment, there is a need to minimize the impact of cardiotoxicity as much as possible. From a public health standpoint, it will be important to develop new risk stratification and treatment strategies to protect the heart during cancer therapy.”
RESEARCH MATTERS: PUBLICATIONS

The following publications from the 2017-2018 Academic Year highlight just some of the scholarly work conducted in the Department of Medicine.

Allergy and Inflammation


Xenakis JJ, Howard ED, Smith KM, Olbrich CL, Huang Y, Anketell D, Maldonado S, Cornwell EW, and Spencer LA. Resident intestinal eosinophils constitutively express antigen presentation markers and include two phenotypically distinct subsets of eosinophils. Immunology 2018; 298-308.

Cardiovascular Medicine


Clinical Informatics


Center for Virology and Vaccine Research


Clinical Nutrition


Endocrinology, Diabetes, and Metabolism


Gastroenterology


Genetics


Gerontology


Hemostasis and Thrombosis


Interdisciplinary Medicine and Biotechnology


Costa MD, Davis RB, Goldberger AL. Heart rate fragmentation: a symbolic dynamical approach. *Front Physiol* 2017; 8:827.


**Immunology**


**Infectious Diseases**


**Nephrology**


**Pulmonary, Critical Care, and Sleep Medicine**


**Rheumatology and Clinical Immunology**


**Signal Transduction**


Translational Research and Technology Innovation


Quality Improvement


Medical Education


## RESEARCH MATTERS: FUNDING

### 2018 Research Funding

<table>
<thead>
<tr>
<th>DIVISION</th>
<th>FUNDING SOURCE</th>
<th>TOTAL AWARD</th>
<th>DIRECT AWARD</th>
<th>INDIRECT AWARD</th>
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</tbody>
</table>
IN MEMORIAM

This year marked the passing of two longtime and beloved faculty members in the Department of Medicine. In their distinct and distinguished ways, each promoted the BIDMC mission immeasurably.

Terry Strom, MD, Chief of our Division of Transplant Immunology, was a Professor of Medicine and Surgery at Harvard Medical School. He was a world leader in transplantation immunology, whose discoveries in the domain of cellular immunology transformed the field. Strom trained and collaborated with all of the foremost leaders in this field and helped develop the highly successful therapies we have today in solid organ transplantation. In addition to being an outstanding investigator, he was a superb physician and a master transplant nephrologist as well as an outstanding teacher and mentor.

Warner Vincent Slack, MD, was a Professor of Medicine at Harvard Medical School, co-founder of our Division of Clinical Informatics, and a pioneer in the field of medical informatics. With longtime partner Howard Bleich, MD, Slack oversaw creation of some of the earliest and most effective clinical computing and online medical record systems. Over his remarkable 50-year career, Slack was concerned first and foremost with the wellbeing and rights of individual patients. He was a forceful advocate for patient privacy and a critic of using computer technology in such a way that reduced human beings to numbers or undermined personal relationships in medicine.
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 in the community with Beth Israel Deaconess Hospital-Milton, Beth Israel Deaconess Hospital-Needham, Beth Israel Deaconess Hospital-Plymouth, Anna Jaques Hospital, Cambridge Health Alliance, Lawrence General Hospital, Signature Healthcare, Beth Israel Deaconess HealthCare, Community Care Alliance and Atrius Health. 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. For more information, visit www.bidmc.org.