

Unprecedented Times. **Unprecedented Response.**



2020

*Department of Medicine
Annual Report*



Beth Israel Lahey Health 

Beth Israel Deaconess
Medical Center



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

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 for their expert graphic design. We thank the Department's Communications team: Sophie Afdhal, for her execution, editing, and writing, and Sarah Clark, for her editorial support. Much of the photography was conducted by BIDMC's James Derek Dwyer and Danielle Duffey. We also thank the BILH Office of Philanthropy for providing photos taken by Joel Haskell Photography. Last but not least, we wish to thank all of the individuals featured in these pages – the past two years have proven what we were already well aware of: you are intellectuals, caregivers, and heroes of the highest order.



A note on photography: the photos found within this Report were taken before and after the onset of the pandemic, depicting individuals who are both masked and unmasked. Photos taken after the onset of the pandemic were done so per the safety regulations implemented by our hospital's Infection Control group, which follow State and National guidelines.

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A Message from the Chair



Like nearly every Department of Medicine Annual Report I have seen from around the country, ours focuses on our responses to the COVID crisis. As I write this, we have 24 patients in the hospital **with** COVID,

very few of whom are here **because of** COVID. Despite historic shortages of support personnel and other disruptions to the healthcare system, we continue to provide outstanding patient care, to educate the next generation of healthcare leaders, and to perform research of the highest impact. Our last Annual Report appeared in the opening phases of the epidemic, and recorded the achievements of our Department before the pandemic and during its early phases. The report in your hands describes the achievements of one of America's premier Departments of Medicine during the COVID-19 epidemic. We report on the efforts of our entire Department, including trainees, faculty members, and leadership. We describe how our people developed innovative approaches to care, reconfigured our training programs to meet service and educational needs simultaneously, and performed research crucial to controlling the pandemic. The impact of these efforts extended from individual patients to groups of patients, to our entire hospital, our health system, the Commonwealth of Massachusetts, the country, and the world. As but one example, the studies performed here by Dan Barouch and the Center for Virology and Vaccine Research which he leads, provided critical insights into the biology of COVID, the immune response, and the mechanisms by which vaccines can protect us from the original strain and subsequent variants. Of course, we also describe how Dan and his colleagues developed the J&J vaccine, which has been administered to nearly half a billion people.

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 welcomed the Joslin Diabetes Center into BILH, and continued to expand our signature clinical programs, on our campus and in the communities we serve. Concurrently, we continued the planning for our new inpatient building and have accelerated our collaborative clinical efforts throughout the BILH 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. Our educators were honored repeatedly for their dedication, ingenuity, and effectiveness.

In addition to the outstanding COVID work, and despite the restrictions on research required during quarantines, our researchers continued to break new ground in cancer, rheumatologic, metabolic, renal, and cardiac diseases, and we continued to strengthen our mentoring of young investigators and junior faculty. Our Chief Academic Officer, Dr. Szabo, led the development of a strategic plan for growth in research, the InSPIRE plan, which we are beginning to implement.

We hope that you will find this Annual Report to be both informative and inspirational. The COVID pandemic and our response to it has made very clear to all of us the vital importance of our tripartite mission: To provide exceptional, compassionate care to all who need it, to nurture and train the next generation of thoughtful, professional physicians, and to conduct research of the highest impact and quality. Our experience over the past years renews the pride we have in our missions and our confidence that they will endure and flourish, no matter what challenges our recovery from the pandemic has in store.

Mark L. Zeidel, MD
Chair, Department of Medicine

Departmental Organization

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

Barbara Kahn, MD
Vice Chair, Research Strategy

Peter Weller, MD
Vice Chair, Research

Eileen Reynolds, MD
Vice Chair, Education

C. Christopher Smith, MD
Associate Vice Chair, Education

Anjala Tess, MD
Associate Vice Chair, Education

Julius Yang, MD, PhD
Vice Chair, Clinical Affairs

Daniel Karnes
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

Meaghan Strob
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

Thomas Larsen
Division Administrator

GERONTOLOGY

Lewis Lipsitz, MD
Division Chief

Brett Rubin
Division Administrator

HEMATOLOGY AND HEMATOLOGIC MALIGNANCIES

David Avigan, MD
Division Chief

Andrea Vatulas
Division Administrator

INFECTIOUS DISEASES

Mary LaSalvia, MD, MPH
Interim Division Chief

Amanda Yano-Litwin, MHA
Division Administrator

MEDICAL ONCOLOGY

David F. McDermott, MD
Division Chief

Kevin Casey
Division Administrator

NEPHROLOGY

Martin Pollak, MD
Division Chief

Brett Rubin
Division Administrator

PULMONARY, CRITICAL CARE AND SLEEP MEDICINE

Richard Schwartzstein, MD
Division Chief

Jeffrey Weinstock
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

A Message from the CAO



The theme of this Annual Report is Unprecedented Times, Unprecedented Response which we chose to emphasize that in the face of the uncertainty and challenges the COVID-19 pandemic posed, the readiness, resilience, and courage of our Department did not falter. The response throughout all corners of the Department, across our faculty, residents, nurses, trainees, administrators, and staff, has

truly been unprecedented. It is humbling to consider where we began in March of 2020 and how far we have come together: to understand COVID, to care for all our patients, to pivot in the face of new challenges, to innovate a vaccine within our very own walls, and to uphold and renew our missions.

The road has not been easy. Our Divisions tackled numerous challenges, working long hours and in stressful conditions. As we faced repeated surges in the virus, the same providers were called on to step up again and again, and did so with steadfast dedication. The care our teams provided remained excellent and compassionate. Within the pages of this Report, you will find featured accounts of some of the extraordinary leadership shown by members of the Department across our clinical care, research, and medical education endeavors: the first-hand perspectives from those staffing our COVID ICUs, the inpatient care provided across all BID hospital sites by our Hospitalists, the innovative and life-saving vaccine development work from Dan Barouch and his team in the Center for Virology and Vaccine Research. In addition, we profile our committed efforts across the Department to further diversity, equity, and inclusion at BIDMC and how amidst the difficulties of the pandemic, how we underscored the importance of humanism in medicine. What we have captured here is only a portion of what the Divisions have accomplished over the last two years and the determination, talent, and compassion with which our team met this moment. I feel extreme pride to be associated with such gifted people. That pride is perhaps matched only by my great enthusiasm to see what heights the Department of Medicine will reach next.

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

New Leader Profiles



Sharon Wright, MD, MPH
Chief Infection Prevention Officer for Beth Israel Lahey Health

Sharon Wright, MD, MPH, has been appointed as **Chief Infection Prevention Officer** for Beth Israel Lahey Health. Since 2001, Sharon has served as Senior Medical Director of the Division of Infection Control/Hospital Epidemiology at BIDMC, where her work focused on novel approaches to the prevention of healthcare-associated infections and outbreak management.

An Associate Professor of Medicine at HMS, Dr. Wright is an Attending Physician in the Division of Infectious Diseases. As many know, she has been instrumental to BILH's infection control efforts throughout the COVID-19 pandemic as the system's Infection Control Lead for Incident Command. She has also been instrumental in vaccine rollout as a member of the Massachusetts COVID-19 Vaccination Advisory Group, which advises Governor Charlie Baker, his administration, and the Massachusetts Department of Public Health on distribution, prioritization of higher-risk groups, and equity issues related to the COVID-19 vaccines.

In her new system role as Chief Infection Prevention Officer, Sharon will provide strategic and operational oversight of infection prevention and antimicrobial stewardship across

BILH. She will lead the development of a system-wide infection prevention program, setting consistent standards for infection control practices across all BILH facilities and settings, including acute care, primary care, behavioral care and continuing care.

She earned her medical degree from Columbia University College of Physicians and Surgeons and holds an MPH in Clinical Effectiveness from the Harvard School of Public Health. She completed her internal medicine residency at Columbia Presbyterian Medical Center and her infectious diseases fellowship in the Harvard Combined (Longwood) Training Program. She completed a second fellowship in Health Services Research at Boston Children's Hospital.

A devoted mentor, Dr. Wright has mentored 22 fellows in infection control and research over the last

20 years, and all have gone on to careers in healthcare epidemiology, antimicrobial stewardship and health care quality. She developed a funded infection control fellow track with a set curriculum for senior infectious diseases fellows planning a career in infection prevention to provide hands-on experience in surveillance, quality improvement, and administration. Dr. Wright has also been an active member of the Department of Medicine and particularly the Committee for the Advancement of Women, which she co-chaired for four years. Dr. Wright is a national leader in infection control and active in numerous professional societies, particularly the Society for Healthcare Epidemiology of America for which she is the current President Elect of the Board of Trustees.



Preeti Mehrotra, MD, MPH
Senior Medical Director of Infection Control and Hospital Epidemiology

Preeti Mehrotra, MD, MPH, has been named BIDMC's new **Senior Medical Director of Infection Control and Hospital Epidemiology**. As senior medical director, Dr. Mehrotra will continue to lead hospital-wide efforts focused on the COVID-19 pandemic response.

Throughout COVID-19, she has played a major part in the hospital's Incident Command structure, serving as Medical Technical Expert. Beyond the pandemic, she will help to lead efforts in surveillance of healthcare associated infections, and continue to create awareness for the practical importance of infection prevention and antimicrobial stewardship programming.

Dr. Mehrotra has been a part of the BIDMC community since 2013 when she started her combined adult and pediatric Infectious Diseases Fellowship training. She then joined us as an Infectious Diseases Staff Clinician and Associate Hospital Epidemiologist in the Division of Infection Control/Hospital Epidemiology in the Silverman Institute for Health Care Quality and Safety in 2017. Dr. Mehrotra completed her BA and MD at the George Washington University. She

then went on to complete an Internal Medicine/Pediatrics residency at the University of Maryland Medical Center, and pioneered a combined adult and pediatric infectious disease fellowship training program here at BIDMC and at Boston Children's Hospital. She additionally earned her master's degree in Public Health, with a focus on health policy, from the Harvard TH Chan School of Public Health.

Her clinical interests include perinatal infections and transitions of care from pediatric to adult providers. Her day to day work includes the intersection of infection prevention and control with quality improvement, implementation of antimicrobial stewardship programs, as well as public health preparedness. Her academic work has focused on the socioeconomic, ethical, and regulatory implications of infection prevention and control efforts. Dr. Mehrotra has

been a highly active member of the BIDMC community, serving on countless committees and councils including work related to healthcare associated infection prevention and antimicrobial stewardship programming, Quality Improvement Directors committee, the Environmental Sustainability committee, and the BIDMC Learning Council.

She has been a BIDMC Jane Matlaw environmental sustainability awardee and more recently won the Service and Leadership award by the BIDMC ID Division. Nationally she received the Stephanie B. Davis award for her work environmental sustainability work related to waste reduction in infection prevention and control.

New Leader Profiles



Julius Yang, MD, PhD
Vice Chair for Clinical Affairs for the Department of Medicine

Julius Yang, MD, PhD, has been appointed as the first **Vice Chair for Clinical Affairs** for the Department of Medicine. In his new Vice Chair position, Dr. Yang will support the Department leadership in overseeing the clinical affairs of the Department, including management of both hospital-based and ambulatory clinical services, physician and patient experience, practice innovation and performance improvement, and integration of teaching, research, and scholarship in the clinical practice setting.

An established leader in hospital operations, health care quality and patient safety, and medical education, Dr. Yang's areas of primary focus in the past have been to improve interdepartmental and interprofessional collaboration across all BIDMC Departments, enhance reliability of patient handoffs, and to promote inpatient care system re-design to maximize efficacy and efficiency of care for both patients and their care providers. Dr. Yang will continue to help guide the hospital's clinical efforts as he plays a more critical role than ever in our strategic and tactical decisions, assuring that we provide highest caliber clinical care.

Dr. Yang received his medical degree from University of Massachusetts Medical School in 1997, after earning his PhD in Physical Chemistry from

Massachusetts Institute of Technology in 1993. He completed both his internship and residency at BIDMC as well as serving for one year as Primary Care Chief Medical Resident. He is a graduate of the Rabkin Fellowship in Medical Education in the Shapiro Institute and completed an additional fellowship in patient safety leadership. An Assistant Professor of Medicine at HMS, Dr. Yang joined the Division of General Medicine in 2001 and works clinically as an Academic Hospitalist. He is a former Associate Director of the Internal Medicine Residency Program, within which he remains an active educator. Dr. Yang was the lead physician for BIDMC's \$4.9M Innovation Grant awarded in 2012 from the Center for Medicare and Medicaid Innovation (CMMI) to reduce avoidable patient readmissions. He has been recognized

with numerous awards including the Herrman L. Blumgart Faculty Award for his contributions to Housestaff education, the BIDMC Robert M. Melzer Leadership Award, the Katherine Swan Ginsberg Faculty Award for Humanism in Medicine, and the S. Robert Stone Award for Excellence in Teaching at BIDMC from HMS.

Dr. Yang is a leader throughout BIDMC and the BILH system. He serves as Senior Medical Director of Clinical Operations and Data Analytics for BIDMC. He serves as co-chair for BIDMC Volume Operations Committee as well as the BILH Drug Shortage Task Force. Amidst COVID-19, he has served in numerous roles in the medical center's Incident Command Leadership from assisting in the design of policies and protocols to support the rapidly changing care needs of this unique patient population and attendant risks to our frontline staff, and collaborating with the Operations and Planning Branches to develop the data analytics and surveillance systems necessary to maintain organizational situational awareness of operational capacity throughout the pandemic.



Mary LaSalvia, MD, MPH
Associate Chief Medical Officer, Ambulatory for BIDMC

Mary LaSalvia, MD, MPH, who has been an integral Department leader in our COVID-19 response, has been named **Associate Chief Medical Officer, Ambulatory for BIDMC**. In this role, Dr. LaSalvia will provide clinical leadership to coordinate efforts to improve access, efficiency, safety and quality of care in the ambulatory setting.

Each time the pandemic necessitated a shift to the Incident Command model, Dr. LaSalvia was tapped to help lead and organize the Department and Medical Center through the surge in patient care and COVID-19 related needs. She served as Operations Section Chief for our BIDMC COVID-19 Hospital Incident Command Structure, which included leading the branch responsible for managing all operations and personnel involved in our surge response and COVID-19 testing, vaccine, and therapeutics efforts.

Dr. LaSalvia attended the University of Toledo College of Medicine and earned her MPH in Clinical Effectiveness from the Harvard School of Public Health. She is a graduate of the HMS CRICO Fellowship in Patient Quality and Safety. She has been a member of the BIDMC community since the beginning of her career, as a resident, chief resident,

and infectious diseases fellow, and subsequently joined the faculty in 2013. An active department member spearheading clinical innovation and quality improvement, she has been the Clinical Director of the Division of Infectious Diseases since 2015 and Medical Director of Ambulatory Clinical Operations in the Department of Medicine as well as Medical Director of Ambulatory Quality in the Silverman Institute of Health Care Quality both since 2017.

An Assistant Professor of Medicine at HMS, Dr. LaSalvia has also been appointed Interim Chief of the Division of Infectious Diseases. She assumes the role from Peter Weller, MD, who has led the Division since 2008. He continues to lead the Division of Allergy and Inflammation and serve as Vice Chair for Research.

Her clinical focus includes the care of patients with endovascular and bone

and joint infection, with a particular interest in determining the optimal approaches to providing outpatient intravenous antibiotic therapy. A passionate educator, her teaching focus is clinical infectious disease as well as principles of patient safety and quality improvement. She has been honored with several teaching awards at BIDMC including the Department of Medicine Fellow Teaching Award in 2011 and the Infectious Diseases Division Fellow Mentorship Award in 2017.

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

We write to express our gratitude and admiration for the teachers across our Department who morphed, innovated, Zoomed, and masked their way to prioritizing our educational programs, and learners during these two unprecedented years.

And we salute the learners across our entire Department's breadth of levels and specialties, who leaned into novel structures, created their own opportunities to learn, and who stepped forward to serve our patients.

In this Annual Report, you will find a featured article about how the training program, the residents and fellows, and the many program leaders stepped up repeatedly to provide care for multiple surges of hospitalized and critically-ill COVID patients. Over the past two years, our learners and programs also provided care for outpatients in person and via phone and video visits often focused on chronic disease management; organized outreach projects on

population health teams; and quite simply, faced their fears together each day.

Also in this Report, you will read about Harvard Medicine Grand Rounds, a wonderful collaboration that came from COVID and continues to enrich our learning.

We also made many improvements and advances educationally in ways that were not directly related to COVID. Here are just a few examples:

Social Justice Curriculum and Pathway

Over the last several years the [BIDMC Internal Medicine \(IM\) Residency Program](#) has developed a robust social justice curriculum (for all residents)

and pathway (for residents with focused interests in this area) that is woven in throughout the three years of the residency training. The pathway aims to better equip trainees to be agents of change in our healthcare system and society. The social justice pathway is comprised of three components: A didactic curriculum, local community outreach and advocacy work, and a year-long research or innovation project. Residents are encouraged to develop their own identity as physician advocates in ways that fit their unique interests and personal values. The interplay between social activism and transformative research and innovation resonates with those who are looking to address inequality.

Healthcare disparities in educational practices

Dr. Kelly Graham and her team have discovered healthcare inequities between the resident and faculty practice at BIDMC. They have been funded by CRICO to study these inequities in a multi-center cohort to determine their scope, and to measure the impact of equity-based interventions. Her preliminary analyses demonstrate that these trainee-faculty disparities are present throughout the country, and show promising results in narrowing these inequities using an equity-based approach.

REIGN

Over the past several decades, fewer medicine residents across the country have pursued careers in several important medical specialties: rheumatology, endocrinology, infectious diseases, geriatrics, general internal medicine, and nephrology

(REIGN). To ensure the health and wellbeing of our population, it is essential to have exceptional clinicians, educators, researchers, and leaders represented in all fields of medicine. We have created the REIGN Scholars program to encourage and enable residents to become future leaders in these important, underrepresented fields. To help REIGN Scholars achieve their future career goals, each Scholar will have unique opportunities for longitudinal specialty-specific clinical experiences in these fields including in internship; time, mentorship and funds for scholarly projects; and the opportunity to attend national specialty-specific meetings in these fields.

skills necessary to become a leader in medical education with a special focus on novel, digital media formats of teaching and learning. Building on the success of our Clinician Educator Track (CET), residents in the CET and DET participate in a comprehensive, longitudinal curriculum that extends through the last two and a half years of residency.

Novel fellowship programming

Our fellowships continue to thrive. Leaders have focused on wellness programs over the past couple of years (for obvious reasons!). Fellows may now select tracks built upon the resident program's successes, such as the Clinician Educator Track. And several fellowships are exploring

“We are proud to lead such a distinguished, innovative, and spirited group of educators in the Department of Medicine. And we are equally proud of our amazing students, residents, and fellows.”

—Eileen Reynolds, MD

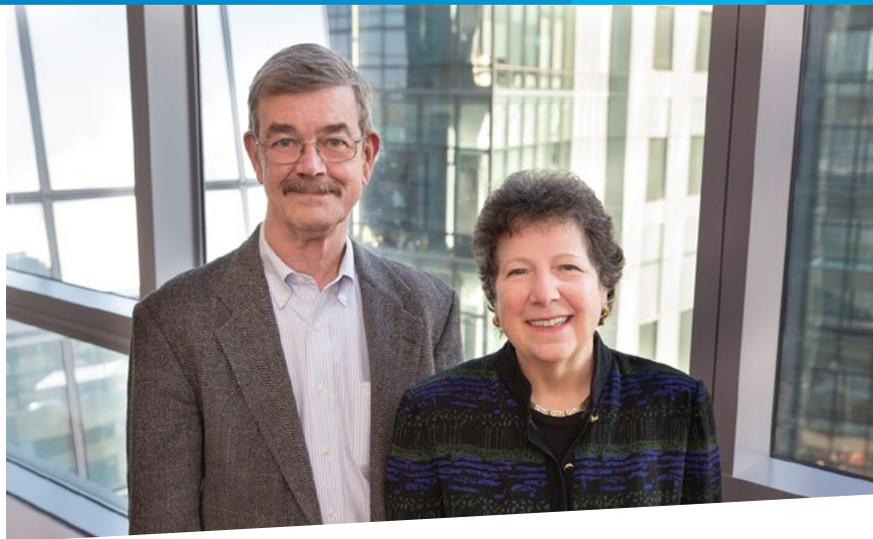
Digital Education Track (DET)

Drs. Shreya Trivedi and Adam Rodman, both noted podcasters and educators, have formed [Innovations in Medical Education Delivery](#), or iMED, program within BIDMC's Division of General Medicine and Institute for Education. Together, Drs. Trivedi and Rodman have also created a Digital Education Track (DET). The DET provides a unique opportunity to develop the

collaborative teaching models with integrated experiences between programs, such as a combined hematology-oncology and palliative care program.

We are proud to lead such a distinguished, innovative, and spirited group of educators in the Department of Medicine. And we are equally proud of our amazing students, residents, and fellows.

Vice Chair Updates



Research

Barbara Kahn, MD, MS
Vice Chair, Research Strategy

Peter Weller, MD
Vice Chair, Research

During a year that upended expectations and called on us all to respond to new challenges, research, a core mission of BIDMC and the Department of Medicine, did not falter: we rose to the occasion. After labs were shut down for months and subsequently access remained limited, we are proud to say that research was sustained throughout the Department. We continued to make it a top priority to enable our researchers in their productive pursuits of scientific discovery.

The faculty pivoted as circumstances required when both clinical and bench researchers faced initial interruptions to their work and delays in productivity during shutdowns last March. Bench research continued earnestly, once safe to do so in person, and we saw our faculty

working as a team to thoughtfully adopt all safety guidelines, such as social distancing and alternating use of spaces. Clinical research saw substantial impact but in areas where possible, such as Hematology/Oncology and COVID-19 research, studies charged ahead. Daniel Barouch, MD, PhD, Chief of the Center for Virology and Vaccine Research, partnered with Johnson & Johnson and led one of the foremost clinical trials in COVID-19 vaccine development in the country resulting in the creation of a highly effective vaccine. Kathryn Stephenson, MD, executed the vaccine trials alongside Dr. Barouch as Director of Clinical Trials Unit in the Center, putting in place strong mechanisms for international coordination (see the feature on COVID research on [page 30](#)).

A bright spot within COVID-19 is the teamwork we've seen clinically and that extends to our work in research. Members of the BIDMC faculty, including Robert Gerszten, MD, Chief of the Division of Cardiovascular Medicine, and Dr. Barouch, launched a Biobanking Initiative to collect biological samples from COVID patients

to build a resource for future research. Samples from the Biobank are currently available through the [Massachusetts Consortium on Pathogen Readiness \(MassCPR\)](#), an HMS, multi-institutional research collaboration. This will enable researchers throughout our medical center and beyond to examine the pathogenesis of disease and could facilitate development of new therapies. Additionally, the BIDMC research community received state-wide recognition this year when the Massachusetts Health Council recognized researchers with the Shining Star Research Award for the rapid and innovative development of solutions to the multiple challenges posed by the COVID pandemic.

“A bright spot within COVID-19 is the teamwork we've seen clinically and that extends to our work in research.”

—Barbara Kahn, MD, MS, and Peter Weller, MD

These accomplishments included Dr. Barouch's and Dr. Stephenson's work in vaccine development; the rapid development of a test for the clinical diagnosis of COVID-19 by Dr. James Kirby, Medical Director of Microbiology, making BIDMC one of the first medical centers in the nation to implement

a high-throughput in-house test; and the work of Dr. Ramy Arnaout, Associate Director of the Clinical Microbiology Laboratories, who led a multidisciplinary team that developed 3D printable swabs for COVID-19 testing to address the swab shortage.

Though the ways in which we connected this year changed, support for our young faculty and investigators continued undaunted, through the Franklin Epstein Society directed by Dr. Steve Freedman. Dr. Freedman and the society provide support to researchers at various stages of their careers, from initial grant applications to obtaining K-grants up to Research Project (R01) Grants to launch their independent academic careers, and that support has been instrumental in continued advancement of the careers of our young faculty and future leaders

Gyongyi Szabo, MD, PhD, Chief Academic Officer for BIDMC and Department researcher, has launched a new program InSPIRE, Institutional Strategic Plan for Innovation, Research & Education, which over the next five years will reshape and reimagine the future of research at our institution. The program is designed to expand researchers' access to leading-edge technologies that can drive rigorous, state-of-the-art science and harnessing the power of clinical data to improve patient outcomes, while emphasizing investment in and supporting of a diverse, inclusive, interdepartmental community that empowers faculty and facilitates mentorship.

Our research funding in the 2019-2020 Fiscal Year was over \$180 million, consisting of government, foundation, corporate, and donor sources (see funding details on [page 61](#)). BIDMC consistently ranks as a national leader among independent medical centers

in National Institutes of Health funding. The Department of Medicine plays a large role and accounts for 66% of BIDMC funding, and 17 of the top 20 best NIH-funded investigators at BIDMC are Department of Medicine researchers.

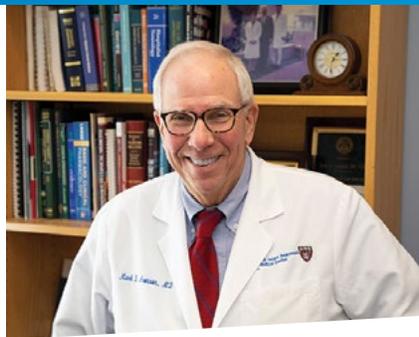
Our faculty continues to publish innovative and pioneering research in the world's leading scientific and medical journals, including *Nature*, *Science*, *Cell*, *Lancet*, and *the New England Journal of Medicine* (see a list of selected publications on [pages 52-57](#)). Our investigators also continue to be recognized for their excellence in research, both via honors and awards from national organizations, as well as through elections to major societies (see [pages 16-17](#) for a full list of awards and accolades). Daniel Barouch was elected to the prestigious

National Academy of Medicine, joining the ranks of other Department of Medicine physicians elected including Michael Rabkin, Barbara Kahn, Jerome Groopman, and Sharon Inouye.

Looking ahead, there are exciting opportunities for the advancement of research within the Department, fueled by the InSPIRE program, new research space and facilities, expansions of the faculty, and enhanced investigator collaborations. The Department continues to foster a pipeline of promising junior investigators, mentored by our faculty, many of whom will go on to prestigious and productive research careers at BIDMC and beyond. With a strong commitment to the advancement of research within the Department, the future of scientific discovery at BIDMC is promising.



Vice Chair Updates



Quality

Mark Aronson, MD
Vice Chair, Quality

Our program in Quality and Patient Safety has always fostered collaborative work to provide the best and safest care, created the finest educational forums, and continued to produce important research. Due to the impact of COVID-19, all of our programs had to adapt to the reality imposed by the pandemic; yet somehow, we thrived.

Dr. Jessica Zerillo, our new Quality Improvement Director for the Department of Medicine (DOM) and the Director of Quality for the Cancer Center, reimagined our ongoing Medical Peer Review Committee work to broaden the impact of the root cause analyses our residents and faculty carry out on adverse events. Working closely with our QI nursing colleagues, particularly Dorothy Flood and Carolyn Wheaton, she has run a series of highly successful peer-reviewed and protected virtual conferences widely attended by all of the nursing and physician clinical leaders in the DOM.

Dr. Anjala Tess, the Director of Quality and Safety Education for

the DOM continued her ongoing mentorship of our Chief Residents and has helped create a virtual learning lab for all of our residents and students, and for the faculty through our weekly peer-reviewed, protected Morbidity and Mortality Conference.

Our hospitalists and ICU and primary care teams stepped up and literally reimagined the way medical care needed to be delivered and did it with enormous efforts to protect all our front-line workers as well as our patients. Our large hospital-based teaching primary care practice, Health Care Associates (HCA), under the leadership of Drs. Julia Lindenberg and Marc Cohen seamlessly created a dedicated outpatient acute respiratory care unit to physically separate patients suspected to have COVID-19. They created a new system of care delivery utilizing modifiable templates and standardized practices that led to a very high rate of loop closure on all tests, referrals, and follow-up appointments. It has been so successful that the larger HCA practice is now working to adopt these innovations.

Two of our QI leaders Drs. Mary LaSalvia, now the Associate Chief Medical Officer, Ambulatory, and Julius Yang, the Vice-Chair for Clinical Affairs of the DOM and Medical Director, Health Care Quality of the Silverman Institute for Health Care Quality and Safety, were key members of the COVID-19 Pandemic Incident Command leadership group for the hospital and have been crucial to our Department's and hospital's ongoing success in caring for all of our patients. Patients and families also suffer from non-physical harm, particularly during the COVID period when so many

patients require isolation and cannot see their families and friends. Dr. Lauge Sokol-Hessner and colleagues in the Department of Medicine and the Silverman Institute at BIDMC have been studying and evaluating these issues as part of our efforts to provide optimal dignity and respect to our patients and families.

Our research efforts have also been able to flourish and are focused on understanding and creating systems to ensure loop closure on tests, referrals, and worrisome symptoms in patients seen in HCA and the Bowdoin Street Health Center. Funded by the Agency for Healthcare Research and Quality, we are working with a robust team including Dr. Russell Phillips, the Director of the Harvard Center for Primary Care, Dr. Gordon Schiff, the Associate Director of Brigham and Women's Hospital Center for Patient Safety Research and Practice, Dr. Talya Salant, the interim Medical Director of the Bowdoin Street Health Center, Dr. Tim Anderson, researcher and primary care physician in HCA, Scot Sternberg, Administrative Director of QI for the DOM, and Dr. James Benneyan, the Executive Director of the Northeastern University Healthcare Systems Engineering Institute and his associates and students, to use system engineering methodologies to apply to patient care delivery in attempts to ensure the safest, most reliable, and equitable care possible.

Despite the constraints placed on all of us by the pandemic and under the leadership of our Chair, Dr. Mark Zeidel, a passionate champion of Quality Improvement and Patient Safety, all of our programs have truly continued to thrive.



Clinical Care in the Community

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

High-performing health care networks are comprised of several key features: They are anchored by top-tier academic medical centers that offer access to world-class health care and cutting-edge clinical research and innovation. Community hospitals and physicians support the system and their local populations by providing the same high-quality health care closer to home, within the mission and capabilities of each center. The academic medical center and network of community providers share a mission of providing the right care in the right place by optimizing capabilities in the community and facilitating access to a higher level of care when it is needed.

Healthcare crises, such as we have experienced with the SARS-CoV-2

virus challenge these capabilities at all levels. Preparedness and adaptation to unimaginable consequences have enabled us to meet these challenges. Our Beth Israel Lahey Health Network rose to the difficult circumstances and as a medical center and Department, our providers have and continue to partner with network colleagues to provide our high-caliber care across many sites. Improved coverage of Intensive Care Units at each community affiliate have allowed the sickest patients to continue their care close to home, while reducing added stress at BIDMC. In cases where this care has been even more demanding, systems for sharing protocols and providing remote consultation have expanded the community capabilities even further. In the community, providers and systems have gone beyond any usual expectation to keep as many of these very ill patients close to home without any decrease in quality of care. In turn, the medical center leadership team has facilitated increased access to critical care beds when the demand was unavoidable.

As the COVID-19 crisis posed a significant risk and altered patient care, the collaborative, patient-centered approach to the care of our entire patient population continued to be critical. Features, such as telehealth for remote consultation, were paramount for continued delivery of patient care. Sharing management plans for critical care access and treatment protocols and providing critical care expertise to the community hospitals was essential for maintaining care close to home for as many patients as possible. This is not only vital to the health of the system

but also for the physical and emotional health of our patients and their families. Our healthcare network can be viewed as an ecosystem with each component dependent on the other. The SARS-CoV-2 virus introduced a substantial perturbation. Our response has been dramatic and successful and it is continued collaboration and adaptation which will allow us to establish a new and highly-successful equilibrium.

“Our Beth Israel Lahey Health Network rose to the difficult circumstances and as a medical center and Department, our providers have and continue to partner with network colleagues to provide our high-caliber care across many sites.”

—Donald Cutlip, MD

Awards & Honors

BIDMC

BIDMC was named LGBTQ Healthcare Equality Leader by the Human Rights Campaign Foundation for the tenth consecutive year in 2020 and the eleventh consecutive year in 2021

Boston Magazine named more than 60 Department of Medicine faculty members to its annual 'Top Doctors' guide.

The OpenNotes Team received the 2019 Gold MarCom Award for Health Advocacy. The MarCom Awards honor excellence in marketing and communication.

CARDIOVASCULAR MEDICINE

Robert W. Yeh, MD, MSc, MBA, received the American Heart Association's 2020 Joseph A. Vita Award at the American Heart Association Scientific Sessions 2020.

ENDOCRINOLOGY, DIABETES AND METABOLISM

Barbara B. Kahn, MD, was the 2020 Herbert E. Carter Lecturer in Nutritional Biochemistry and Preventive Medicine, University of Illinois, Urbana, IL

Bradford Lowell, MD, PhD, was elected to the Association of American Physicians

Eleftheria Maratos-Flier, MD, received the Roy O. Greep Award for Outstanding Research from the Endocrine Society

Johanna A. Pallotta, MD, was the recipient of the 2019 New England Chapter American Association of Clinical Endocrinologists Distinguished Member Award.

GASTROENTEROLOGY, HEPATOLOGY AND NUTRITION

Jackie Wolf, MD, received the 2020 Shirley Driscoll Dean's Leadership Award for the Enhancement of Women's Careers from the Joint Committee on the Status of Women at HMS.

Gyongyi Szabo, MD, PhD, received the 2020 Mitchel T. Rabkin, MD Chair at Beth Israel Deaconess Medical Center (BIDMC).

Daryl Lau, MD, was awarded the 2019 Excellence in Ambulatory Student Teaching in Subspecialty Medicine from HMS.



Gordon Jiang, MD, was the recipient of the 2019 Award for Excellence in GI Research from the Irving W. and Charlotte F. Rabb Foundation and 2019

Gilead Research Scholar Award to directly fund his ongoing research.

GENERAL MEDICINE

J. Jacques Carter, MD, MPH, received the 2020 Founders Alumni Award from the Georgetown University School of Medicine. This award is conferred upon those alumni leaders whose efforts and dedication to the School of Medicine have been truly remarkable.

Tom Delbanco, MD, was selected for the 2019-2020 John Phillips Memorial Award for Outstanding Work in Clinical Medicine by the American College of Physicians. This award is bestowed for outstanding lifetime work in clinical medicine that has been innovative and/or had a regional or national impact.



Shoshana "Shani" Herzig, MD, MPH, received the 2020 Society of Hospital Medicine Excellence in Research Award. This award honors Society of Hospital Medicine

members who have made exceptional contributions to hospital medicine in a wide variety of categories.



Ateev Mehrotra, MD, MPH, was the recipient of the 2020 Harvard Medical School A. Clifford Barger Excellence in Mentoring Award. Dr. Barger, Emeritus

Chair of the Department of Physiology at Harvard Medical School, believed that mentoring brought out the best in those who were mentored as well as those who were mentors.

Jennifer Potter, MD, was selected for the 2020 Harvard Medical School Class Day Outstanding Faculty Mentor Award. This award, presented by graduating Harvard Medical School students, recognizes faculty who have carefully and skillfully guided medical students not only in their scholarly projects but also as they train in their professions.

Anita Vanka, MD, received the 2019 Harvard Medical School Charles McCabe Faculty Prize for Excellence in Teaching. This award was created in memory of Charles McCabe, MD, a beloved teacher of Harvard medical students who also served as director of the Core Clerkship in Surgery at Massachusetts General Hospital for over 20 years.

Stephen Juraschek, MD, PhD, received the 2019 American Foundation for Hypertension Research and Education Award for Patient-Oriented or Clinical Research in Hypertension, supported by the American Heart Association Council on Hypertension and the American Foundation for Hypertension Research and Education. The Council supports the research efforts of its early career investigators engaged in patient-oriented or clinical research, and presents this award based on the ranking of the candidates' submitted abstracts.

NEPHROLOGY

Robert S. Brown, MD, was the recipient of the 2020 Dean's Community Service Faculty Award from Harvard Medical School.

Melanie Hoenig, MD, received the 2019 Kidney Self-Assessment Program (KSAP) Recognition award from the American Society of Nephrology.

Stewart Lecker, MD, PhD, was the recipient of the 2019 S. Robert Stone Award for Excellence in Teaching from Harvard Medical School.



Jeffrey William, MD, received the Excellence in Classroom Instruction Award from Harvard Medical School.

PULMONARY, CRITICAL CARE AND SLEEP MEDICINE

Elisabeth Riviello, MD, was awarded the 2020 Burke Global Health Fellowship from the Harvard Global Health Institute at Harvard University.

Jeremy B. Richards, MD, MA, received the Excellence in Clinical Instruction at Harvard Medical School Award



Mary Rice, MD, was the recipient of the 2020 Jo Rae Wright Award for Outstanding Science from the American Thoracic Society.

Richard M. Schwartzstein, MD, was selected for the Excellence in Classroom Instruction Award by the Class of 2020 at Harvard Medical School.

RHEUMATOLOGY AND CLINICAL IMMUNOLOGY

Robert H. Shmerling, MD was the recipient of the 2019 Marian Ropes Award from the Arthritis Foundation of New England.

SIGNAL TRANSDUCTION

Alex Toker, PhD received the Outstanding Investigator Award from the National Cancer Institute of the National Institutes of Health.

CENTER FOR VIROLOGY AND VACCINE RESEARCH

Dan Barouch, MD, PhD, was elected to the National Academy of Medicine in 2020.

TRANSLATIONAL RESEARCH AND TECHNOLOGY INNOVATION

Anna Johansson, PhD, serves as a local Co-Lead, along with Daniele Ölveczky, MD, MS, of Hospital Medicine, for the BRIM (Bias Reduction in Internal Medicine) initiative, which is a multi-center study, NIH funded study 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.

Camilia Martin, MD, MS, received the Mass Lifescience Center Capital Grant in a collaboration with BWH to develop a first of its kind "Lactation Lab" to investigate lactation outcomes and breast milk biology and composition.

HEMOSTASIS AND THROMBOSIS



Robert Flaumenhaft, MD, PhD, was elected to the American Association of Physicians in 2020.

Sol Schulman, MD, PhD, was a finalist for the Kenneth M. Brinkhous Early Career Investigator Prize in Thrombosis.

Oluwatoyosi Muse, PhD, received the 2019 Mary Rodes Gibson Memorial Award in Hemostasis and Thrombosis.

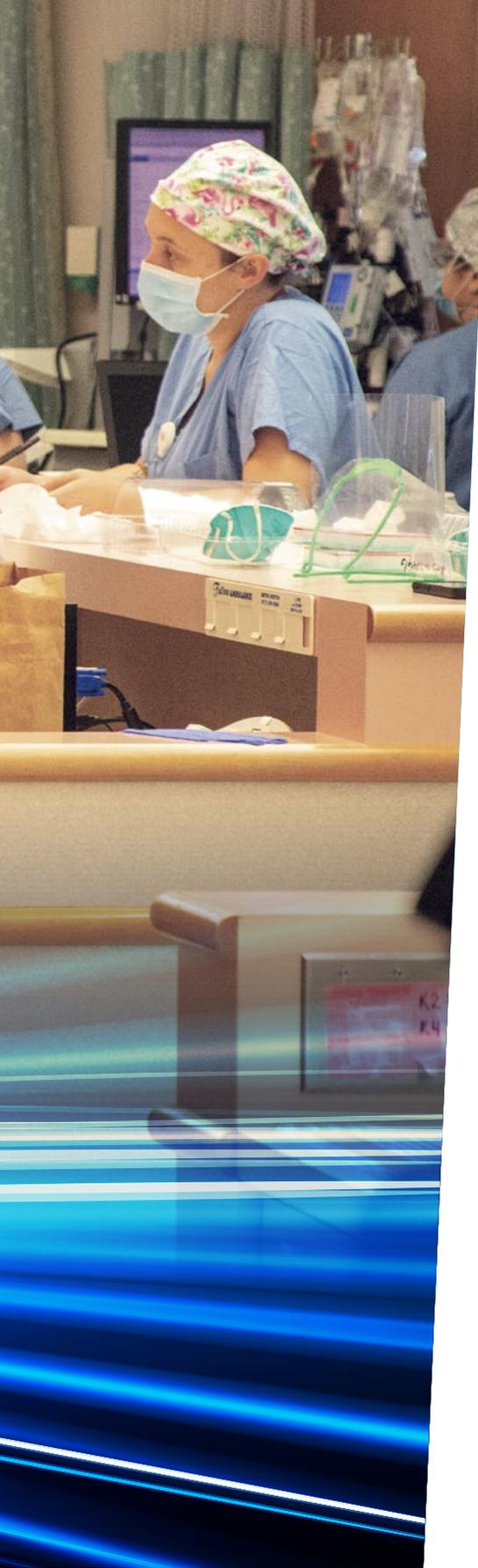
Activating Incident Command: A System-Wide Response

In early March of 2020, as the pandemic began in the US and before any COVID-19 patients were hospitalized in our region, BILH leaders established a system-level Incident Command Team for COVID-19. An Incident Command structure permits hospitals and other organizations to anticipate and respond to catastrophic events, by adopting consistent protocols and ensuring efficient resource allocation and management based on current and potential events.

The initial structure created six workgroups from across BILH in the areas expected to be critical for pandemic response including Clinical Care, Communications, Employee Health/Human Resources, Policies, Emergency Management, and Logistics/Supplies. These groups developed and constantly adapted guidelines and policies for patient and visitor screening, masking and PPE, respirator use, employee health management, infection control, social distancing, ambulatory response, elective procedures, and so on through virtually every area of patient care and physician safety. These policies have consistently adapted throughout two years of the pandemic, as our knowledge of COVID-19 grew and the surges ebbed and flowed, but the work to build and enact the first policies was an immense system-wide undertaking.

From the onset of the pandemic, communication within our Department and beyond was paramount. Mark Zeidel, MD, Chair of the Department of Medicine, launched daily morning briefing calls for the Department leadership including the Vice Chairs and Division Chiefs to ensure everyone was kept updated on the current state





of the pandemic, in which the Incident Command team regularly presented. Incident Command leadership shared clinical and operational insights in regular messages and presentations. HMFP also held weekly town halls for all HMFP faculty as well as the regular town halls Dr. Zeidel led for the Department faculty with updates on our response.

The first deployment of Incident Command lasted for 17 weeks from early March 2020 to the end of June 2020. During that time, there was unprecedented disruption to all aspects of patient care delivery and the Incident Command model developed plans for expansion of ICU capacity, growth in COVID patients, maintaining PPE supplies, managing the health of our staff, and the continuation of vital care for non-COVID patients. Their major accomplishments were numerous and included transforming medicine/surgery ICU beds in our Rosenberg Building into critical care expansion space to manage unprecedented number of patients requiring ventilator support, as well as creating inpatient “COVID units” to cohort the patients at highest risk of transmission. Amidst severe supply chain shortages, Incident Command developed protocols for the deployment of novel PPE throughout the medical center and across various patient settings. Alongside our ambulatory and clinical teams, plans were made for rapid development and deployment of telehealth care delivery models to continue support for the needs of our ambulatory patients. With multiple teams including Infectious Diseases and Pathology, the group developed novel testing platforms allowing us to accurately identify patients with COVID-19, integral to patient care, staff safety, and when the time came, safely resuming ambulatory and procedural care. Incident command was also integral in launching COVID-19 testing sites across the BILH network,

including dedicated sites at Bowdoin Street and Chelsea to support vulnerable communities. At the peak of the first surge, BIDMC had 200 patients with COVID-19 and in the four-month period, had discharged more than 730 COVID patients.

“The Department faced challenges in all areas of care and we had to create novel models of care for the medical ICU’s, the medicine floors, and our ambulatory practices,” said Dr. Zeidel. “Our Division Chiefs and administrators, our education leaders, our Chief Residents, and many others combined to develop these adaptations on the fly and to make them work.”

In mid-October 2020, Incident Command structure redeployed for the second time to combat the case count that rose as winter began. This time, they had the operational knowledge from the first surge and they implemented the contingency plans that they had formulated just such a surge.

“The second surge plans incorporated the growing knowledge about the care of patients with COVID-19 pneumonia and our efforts to manage patients across the hospital in ways that minimized the number of patients requiring intubation and ICU care,” said Richard Schwartzstein, MD, Chief of the Division of Pulmonary, Critical Care and Sleep Medicine.

The redeployment process was further streamlined to minimize strain on the Divisions and testing was expanded. By mid-December, elective surgeries and procedures had to be paused. In the second surge, the peak of cases was significantly lower, around 100 as opposed to 200, and by early March 2021, the Incident Command model had again come to a close.

A particularly bright spot during the second surge was that given the unprecedented rate of innovative vaccine development, three leading vaccine manufacturers had filed for Emergency Use Authorization (EUA)

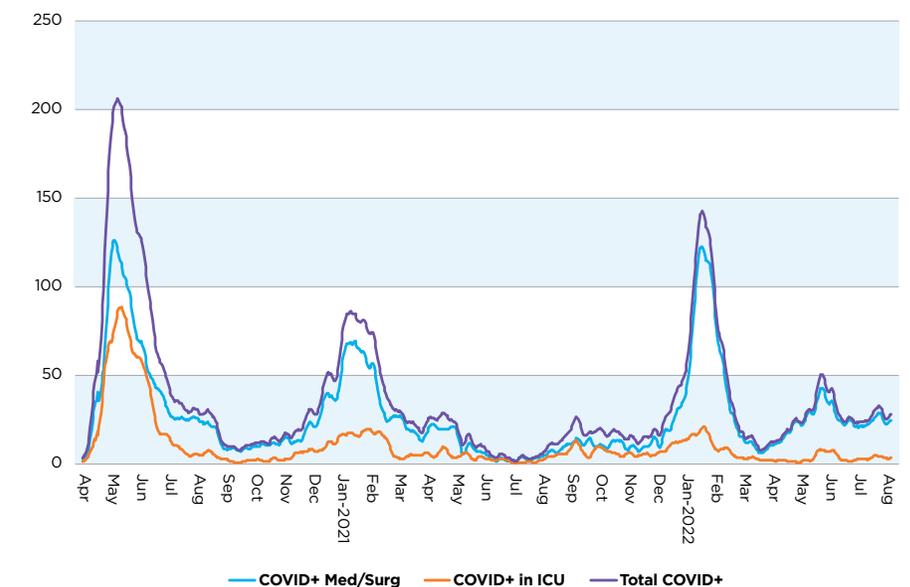
from the FDA and in preparation BILH established a multi-disciplinary Vaccine Command Team to determine how we would efficiently, equitably, and effectively vaccinate our employees and our patient population. Q&A sessions were presented on the plans for vaccine delivery and BIDMC held a virtual Vaccine Town Hall. By mid-December, the first of our frontline staff had been vaccinated and availability expanded rapidly to all our providers. A goal was set, and achieved, to vaccinate up to 500 providers across BILH each day and 25,000 BILH employees were vaccinated over a six-week period. The system then turned its resources to vaccinating the public and Incident Command was invaluable in the planning and execution of those efforts.

Despite the significant vaccination rate in Massachusetts, by August 2021 the Delta Variant, had arrived in the US and Incident Command was deployed to navigate the potential challenges breakthrough cases of Delta would create. When booster shots

“The Department faced challenges in all areas of care and we had to create novel models of care for the medical ICU’s, the medicine floors, and our ambulatory practices. Our Division Chiefs and administrators, our education leaders, our Chief Residents, and many others combined to develop these adaptations on the fly and to make them work.”

—Mark Zeidel, MD

BIDMC COVID-19 Census Over Time



were approved by the FDA, Incident Command again coordinated our staff and patient vaccine efforts.

When the Omicron variant arrived in the US in early December 2021, Incident Command was deployed again with the same management strategies and expertise gained since March of 2020 in mind. Our case count did surge as Omicron, more transmissible than past iterations of the virus, spread through the US and we reached a peak of around 175 patients. (View the graph to see our COVID-19 inpatient case count grouped by those in the Med/Surg unit and those in the ICU shown longitudinally across all surges).

In the first wave of COVID, Incident Command faced down the initial uncertainty and challenges to build operational firsts to combat COVID-19 and care for our patients. But in subsequent waves, they contended with continued operational support while balancing concerns over diminished staff as our caregivers were relied upon to continue stepping

up and did so repeatedly to meet the challenges. By November 2021, BIDMC was facing a staffing shortage and while hospital leaders worked to recruit personnel, Incident Command worked with our teams to ensure they had the best staffing and resources possible.

What our Incident Command model, and entire Department, has accomplished over the past two years is a feat of true teamwork and leadership, leveraging existing expertise to combat initially unknown pandemic challenges, to create policies and guidelines to keep our patients and staff safe, and to make sure, in a cascading fashion, that each member of the Department of Medicine had the resources and knowledge they needed to uphold our missions in the face of COVID-19.

As Dr. Zeidel emphasized, “The devotion of our faculty and trainees to expert, compassionate care for all patients throughout the waves of the pandemic was exemplary and inspirational.”

Perspectives from the ICU: A COVID Conversation

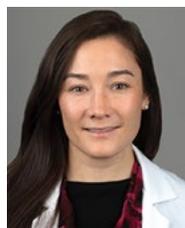


“There is an African Proverb, “Smooth seas do not make skillful sailors”. We are heading into very rocky seas. I don’t know how bad it will be or how long it will last, but what I do know is that **we will come out better doctors.**”

—Molly Hayes, MD



Molly Hayes, MD



Lauren Yang, MD



Vicki McKenna, RN, BSN

Early in COVID, **Molly Hayes, MD**, then a newly appointed Director of the Medical Intensive Care Unit (MICU), shared this message with her team in what would become weekly emails, filled with inspirational quotes and messages of camaraderie, as they weathered those rocky seas together. In March 2020, we certainly did not know what we would face but over a year later we sat down with Dr. Hayes, **Lauren Yang, MD**, then the Gastroenterology Fellowship’s Chief Fellow and now faculty in the Liver Center, who worked as a supervised physician in the surge ICU, and **Vicki McKenna, RN, BSN**, an ICU Float Nurse. They shared with us their perspectives on COVID from the ICU.

Q When cases of COVID began to emerge in the state, what were your initial thoughts on what our hospital would face?

Molly Hayes (MH): I felt like we didn’t know what to expect. We tried to prepare for the worst, and plan for every single possible thing that could happen. We learned very early on though that, as much as we planned, we couldn’t follow the plan. There were curve balls left and right. There’s always been a surge plan to care for critically ill patients on Rosenberg 7 during bad influenza seasons, but this exceeded all of that. It felt like every single day, there was something new that we had to figure out and work around. A good example is that when we ready to open Rosenberg 7 we had to quickly figure out how we would maintain sight lines for critically ill patients, because the doors on RB7 had no windows. We couldn’t close the doors, so we debated, do we keep them open with HEPA filters, or do we take them down and cut holes in them.

Lauren Yang (LY): With the physical space changes, I have so much appreciation for a service that in my mind is largely invisible: maintenance crew. I was there on the second night, and I remember we didn’t yet understand how transmissible and infectious COVID was. And all

the doors were propped open so basically the entirety of Rosenberg was considered infectious and you had to wear PPE so you felt so contaminated the whole time. Then I remember when I came back, magically, there were all these doors that had windows that could close. There were all these PVC pipes or drawers that popped up to be supply holders outside the doors. I remember thinking, this is a lot of work, and I can’t believe they did this in 24-48 hours. Each door would go off the hook and disappear and then 90 minutes later, it would reappear with the correct paneling and another door would disappear. That was kind of a magical aspect to the beginning of it.

Vicki McKenna (VM): I had no idea what to expect. I’ve been working in critical care for over 20 years. When we started talking about surging and the possibility of one ICU nurse taking care of three to four patients within a pod, I was terrified. Because when you have a sick patient in the ICU, most of the time you’re one to one, and you can be working steadily for hours at a time and not really able to come out of a room. So the thought of taking care of 2, 3, or 4 of these patients, that I have to say are probably the sickest I’ve ever taken care of in my career, was really daunting.

Q What was it like to staff an ICU care team with non-critical care physicians and nurses during initial redeployment?

MH: We had a lot of help from leadership, including Drs. Zeidel, Reynolds, Tess, Yang, and Smith. Dr. Tess was amazing in helping with scheduling, ensuring that no one was too overburdened as people really stepped up, despite initial fear. Ari Moskowitz, the then Assistant MICU Director, and I created a workflow of what people would be doing including roles and expectations. We met every physician on their first day to show them physical space and give them a brief orientation. We pulled in extra ICU attendings during the day and at night to ensure that all non-ICU physicians would always work with Attendings. We also tried to create a collegial atmosphere and to keep things light as much as we can – lots of candy and food helped with that.

VM: We were trying our best to figure out the most ideal model to use for taking care of all these critically ill patients because we didn’t have enough ICU nurses to go around. We pulled in the staff primarily of Rosenberg 7, who were more than eager to learn to work with us, and basically gave them about a four-hour Crash Course in ICU nursing. From there, we were supervising them in

a two or three patient assignment. It was a little hairy at first, but within the early weeks, the nurses worked really well together. I was primarily a resource nurse on that floor, with two other nurses, and we decided early on that to provide the best continuity of care, there would always be one of us there day and night. We really tried to make it as smooth as possible because we were pulling ICU nurses from every unit in the hospital, who wouldn’t know each other. It was incredibly challenging. And yet I loved it.



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—Vicki McKenna, RN, BSN

MH: I remember that first night very vividly with Lauren when we did a huddle where everyone introduced themselves. A lot of the nurses said, I’m not an ICU nurse. And I said, well, this is Lauren. She’s not an ICU doctor. But we’re all in this together. ICU Doctors, ICU nurses, non ICU Doctors, non ICU nurses, we will all get through this together. In the ICU, we always work in a team so we are used to that, and we worked hard to make sure everyone on Rosenberg 7 felt like they were a part of the team.

Q What were the concerns about resources and PPE like?

MH: I think we were all worried early on, but we were never in a position where we ran out. Our hospital incident command did an amazing job of making sure everyone had what they needed.

VM: We knew there was a shortage so I think people were very conscientious about that and not being wasteful.

LY: And speaking of limited supplies, a positive thing that stuck out in my mind was the use of human resources that overcame some of our physical resources sometimes. Whether it was the nurse hanging back in the room, and asking their colleague to pass them the



In a way for us in Critical Care, I regularly felt, this is the job. This is what we do. We are used to making plans in the ICU and then adjusting them based on how patients respond, so being flexible and pivoting as needed was not new. It felt kind of normal to me even though everything was different.”

—Molly Hayes, MD

things they needed so they only use one gown for that hour to the pharmacy team letting us know how we could sedate or intubated patients without IV sedatives because we needed those for the induction and the intubation process.

MH: This is a good example of as much as we planned, we couldn't plan for everything. We didn't know there would be national shortages. I think we innovated a lot because we had to. Our critical care pharmacists helped us create guidance for sedation and helped us improvise when we had other shortages. If someone says, there's a better way to do this then the response is let's figure it out. I don't think anyone took anything for granted. Every single suggestion from anyone on the team – any nurse, advanced practice provider, doctor, respiratory therapist, physical therapist, dietician, pharmacist, environmental services worker – was listened to.

VM: Remember when we ran out of trees to put the IV pumps on? The next morning, somebody from engineering had come up with this just incredible PVC rig. And he said, if you like this, we can make however many you need. So literally the next day, we had all the IV trees we needed.



Though pivoting has been critical throughout the pandemic, did you reach a point where there was a sense of normalcy or structure in COVID care?

MH: In a way for us in Critical Care, I regularly felt, this is the job. This is what we do. We are used to making plans in the ICU and then adjusting them based on how patients respond, so being flexible and pivoting as needed was not new. It felt kind of normal to me

even though everything was different. I did feel nervous because I was a brand new MICU director. I had just taken the job. But from very early on, we knew there was no playbook for this and every day, we're just going to figure it out together. I was lucky to have so much help from our surgical and anesthesia critical care colleagues and was honored to be able to work with and learn from Drs. Michael Cocchi and Todd Sarge. And to answer your question about the structure, I never felt like there was a structure in place until three quarters through the Spring of 2020, when one of our ICU attendings Dr. Cyrus Kholdani was coming on service and I had offered to walk him around the unit and explain the geography and how it worked. As he walked through, he said wow, this is amazing what you all did. You all created four ICUs overnight. It was one of those moments when you think, yeah, we really did. We really did it. It was a powerful moment for me that I will never forget, but it was fleeting. We were just so “in it”, with no time to reflect. It was running from fire to fire to fire all through that spring.



As you're caring for the patient and you're caring for your team, there is a third level of caring for families who could not physically be there with their loved ones. How did family communication work?

LY: We instituted some really beneficial policies which included the doctors calling every family member at least once a day. And it's time consuming but it keeps them in the loop. In the past, the nurses have done a lot of family communication.

VM: And we really did not give a whole lot of updates to families throughout that time, which was a saving grace when the nurses just couldn't get pulled out of the room to talk. The doctors were very, very good about handling that.

MH: The iPad program was something that was created to help with the lack of family visits. Tyler Trahan, one of the internal medicine residents, started the iPad donation project and really spearheaded it. Our social work colleagues were so instrumental in this as well and really helped us communicate with families. The iPad program was one of those things we did because we had to, but on reflection, it is one of those that things that we should've been doing all along. We have always had families from across New England who couldn't see their loved ones every day, but now they can. We can bring people closer together with these virtual visits.

LY: The iPads were also really helpful to fill gaps in health literacy when normally the family would have come in and seen how critical their family member was. For some, particularly early on, there was the impression that Coronavirus only lasts 14 days, so then they'll be home on day 15. So we could show them what this looks like and it helped to bridge that divide.

VM: It can be very difficult to appreciate what you can't see for yourself.

MH: I think we also realize that we can be compassionate humans no matter the situation. If you just go back to the basics of compassion and kindness and empathy, it doesn't matter where you are or what the setup is. I think that's who we are at BIDMC. People just did what they normally do, just in different and unique ways.



What might you remember years from now about this time and experience with COVID care?

LY: I will definitely remember this forever. It really opened my eyes to the impact of COVID, when you actually see how difficult things were on a system level and personal basis for our patients. It really changed my appreciation for being an advocate for masks and vaccines and separation. And you know, when my friends told me things like, “I don't know anyone who got COVID” or “everyone I know who got COVID had a mild illness

and got better” but bearing witness to what we experienced and relaying it to them as someone they trust, I think was helpful on a societal level.

VM: I experienced a lot of the same. And that was really hard to hear people minimizing how sick people were. It made me want to walk into work with a video camera to show the realities.

MH: My memory will be the camaraderie and the compassion of our teams. I have so much pride for everyone that we work with and how we truly came together as a team. We felt like we were in a battle together and we were all going to take care of each other as we took care of the patients and families. The camaraderie and compassion I'll remember forever.



We instituted some really beneficial policies which included the doctors calling every family member at least once a day. And it's time consuming but it keeps them in the loop. In the past, the nurses have done a lot of family communication.”

—Lauren Yang, MD

Welcoming Joslin Diabetes Center to the BILH System

On November 1, 2021, Joslin Diabetes Center joined Beth Israel Lahey Health (BILH) System. Joslin’s world-renowned expertise in diabetes research, prevention, clinical care and diabetes management education strengthens BILH’s ability to meet the needs of its patients and communities, including more than 100,000 people with diabetes across eastern Massachusetts and southern New Hampshire. By combining forces, Joslin and BILH can bring world-class diabetes care and leading edge science and clinical trials to the many diverse and often underserved populations our system serves.

Department of Medicine physicians, particularly those in the [Division of Endocrinology, Diabetes and Metabolism](#), have worked closely with Joslin faculty members in patient care, teaching and research for decades. The new relationship with BILH will deepen those collaborations within the Department and beyond, as Joslin researchers, physicians and clinical and professional education staff share their expertise across all our BILH organizations.

“Joslin and BIDMC have deep and longstanding ties in all of our missions,” said Evan Rosen, MD, Chief of the Division of Endocrinology, Diabetes and Metabolism. “Clinically, we share many faculty who move between both institutions, and Joslin has provided outstanding care to our inpatients for many years. Educationally, we co-administer a joint fellowship program in Endocrinology. And in the research arena, there are frequent and long-running collaborations and co-discoveries. We anticipate the affiliation with BILH will only strengthen these ties.”

| GETTING TO KNOW JOSLIN DIABETES CENTER | | | |
|---|--------------------------------|--|---|
| 36,000 Patient Visits Annually | 150 MDs, PhDs, & Fellows | 120 Research Papers Generated Annually | 288 IRB Approved Research Studies |
| 36 Consecutive years as an NIH/NIDDK Diabetes Research Center (DRC) Grant Awardee | | | |

A Singular Focus

Joslin provides expertise across the full spectrum of specialized needs for people living with diabetes, including culturally-appropriate education and care, eye care, pregnancy, nephrology, mental health, geriatrics, weight loss, hypoglycemia clinic, and diabetes management technology usage.

“Joslin’s strength lies in the researchers, clinicians, educators and support staff who are dedicated to making the lives of people living with diabetes better. Our mission to prevent, treat and cure diabetes and our vision of a world free of diabetes

and its complications is at the heart of our daily work and we look forward to bringing that strength to the BILH system,” said Roberta Herman, MD, President of Joslin Diabetes Center. “Our experts are researching advanced, cell-based therapies to prevent and treat type 1 diabetes and making discoveries about preventing and treating type 2 diabetes that will help curb this chronic disease pandemic. Our clinicians work hand-in-hand with our researchers to offer the most up-to-date, evidence-based treatments and technologies for diabetes management and complication

prevention. In short, diabetes and how it affects those living with it are all we think about.”

“We have two goals, which reflect the original goals of Dr. Elliott Joslin, as we enhance our Joslin relationship. First, we want to help Joslin be the best place it can be for diabetes care, education and research. Second, we want to work closely with Joslin to improve the care of patients with diabetes in our own Department and across the region,” said Mark Zeidel, MD, Chair of the Department of Medicine.

A Storied History

Dr. Elliot P. Joslin established his diabetes-focused medical practice in 1898 on Beacon Street in Boston after both his mother and aunt were diagnosed with diabetes. At that time diabetes was not a large focus of medical research or practice, and it was often a death sentence. Dr. Joslin brought together researchers, clinicians and educators to find ways to better manage and prevent diabetes. Drs. Frederick Banting and Charles Best, who discovered insulin at the University of Toronto in 1921, respected Dr. Joslin so much that they sent the first U.S. doses to him. The building that today houses Joslin Diabetes Center at 1 Joslin Place in the Longwood Medical Area of Boston was built in 1952.

In 1948 Dr. Joslin created a Medalist Program which recognizes people who have been living with diabetes for 25 years or more, and awards medals to those who live with diabetes for 50 years or more. The program has presented more than 5,000, 50-year Medals, and more than 90, 75-year Medals. This past year, several 80-year medals were given and the first-ever 85-year medal was awarded. Many of the medalists also participate in Joslin’s Medalist Study through which their success in managing their diabetes and their lack of complications is studied. Several advances in diabetes

management and cure research have come from this effort.

Joslin is also home to the Beetham Eye Institute (BEI), established through a partnership between Dr. Joslin and Dr. William P. Beetham. Through ongoing screening and timely therapeutic interventions, the Institute prevents and slows the pace of diabetic retinopathy. Treatment approaches developed at Beetham have been adopted around the world, and have markedly reduced the rates of blindness caused by diabetes.

A Bright Future

Today, as in all parts of our Department, the model of research, treatment, and education originated by Dr. Joslin is used to push the boundaries of diabetes bench and clinical research, prevention and treatment protocols. Patients cared for at Joslin have access to the latest evidence-based education and management information, diabetes management technologies and opportunities to participate in clinical trials. Joslin patients consistently exceed the American Diabetes Association’s benchmarks for A1C (blood glucose) control and prevention of diabetes-related complications. Joslin protocols and clinical guidelines are used by clinicians across the world.

Joslin is one of only 18 Diabetes Research Centers (DRC) in the United States funded by the National Institutes of Health (NIH) and has grown to be an internationally-renowned Center, educating fellow clinicians across the globe on how to improve the care of people living with diabetes.

The combined forces of Joslin and the BILH system means greater collaborations in research and clinical care and greater access for people living with diabetes to the best diabetes management education and technologies, treatment protocols and clinical trials. The future of discovery in the field of diabetes research towards a cure is brighter than ever.

123 Years of Innovation... and Counting

1898

Joslin Diabetes Center is founded by Dr. Elliott Joslin, a physician dedicated to understanding and treating type 1 and type 2 diabetes

1921/22

Dr. Joslin appointed to the “Insulin Committee” of America, assisting in the first clinical trials of insulin

1948

The Joslin Medalist Program is launched in recognition of those who have been living with Diabetes for 25 years or more

1952

Joslin moves into its current Longwood facility

1985

Joslin is awarded an NIH Diabetes Research Center grant, which they have held consecutively for 35 years

2021

Joslin joins Beth Israel Lahey Health system

Put to the Test: Executing BIDMC's In-House Testing Response

In late February of 2020, members of the Infection Control and Hospital Epidemiology Units met with other [Infectious Diseases Division](#) colleagues to plan the hospital-wide response to the growing threat of COVID-19. From the frequency and complexity of questions fielded by the Infectious Diseases physicians, it became clear that pandemic was spreading quickly and they faced two key questions: How were we going to evaluate patients with suspected COVID and where would that evaluation take place?

There was no clear process in place on a governmental level for COVID-19 testing, as the initial testing with the state required permission to send them a test and there were only 100 tests available state-wide, which would in no way keep up with the demands of our medical center and system. We were facing a critical shortage of beds due to patient occupancy as patients with suspected COVID required private rooms.

In light of these factors, Christopher Rowley, MD, MPH, Clinical Director of the Division of Infectious Diseases, an Assistant Professor at

HMS, and a Research Associate at the Harvard TH Chan School of Public Health, made a call. He reached out to his colleague Iain MacLeod, PhD, to discuss COVID-19 testing options. Drs. Rowley and MacLeod have been collaborators for many years, working on projects related to HIV in Botswana.

While in Botswana, Dr. Rowley was really interested in developing a simplified test to look for drug resistance. When examining drug resistance, researchers were looking at 20% of the entirety of the HIV genome, and yet, the majority of the time only

six different individual base pairs are critical in assessment. In Botswana, the tests were price prohibitive, costing \$300 or so for a single test.

In that context, he partnered with Dr. MacLeod, a postdoc in the Essex Laboratory School of Public Health, as they pushed the limits of what could be done with PCR technology, and restructured how we think about PCR by developing a test for the highly variable HIV genome. They successfully developed the PANDAA genotyping platform (Pan Degenerate Amplification and Adaptation), to provide rapid, low-cost HIV genotyping. Knowing they had this testing technology in place for a highly variable genotype and that identifying SARS COV2 would be a much easier region to amplify, Dr. Rowley reached out to Dr. MacLeod to make a plan for leveraging their existing technology.

Following the PANDAA technology's origins in the Botswana program, Dr. MacLeod founded [Aldatu Biosciences](#) in 2011 and Aldatu quickly adapted the PANDAA test to create COVID-19 test kits. While BIDMC had

the physical infrastructure for testing, with four high volume machines that could be used to run thousands of samples a day, they had a shortage, as did everyone in March 2020, of customized reagents to detect COVID-19. By mid-March, Aldatu had the customized reagents and test kits and our teams partnered in applying their tests in our machines.

Jeffrey Saffitz, MD, Chair of the Department of Pathology, James Kirby, MD, Microbiology Laboratory Director, and Annie Cheng, MD, Clinical Molecular Supervisor, were integral in establishing in-house testing and welcomed Aldatu into the BIDMC pathology laboratory. They, with Drs. Rowley and MacLeod, began on a Saturday what was 72 hours of fast-paced innovation and close collaboration. It took several long days and nights, with trial and error, to get the technology working. A major issue faced was how to prevent the RNA from degrading when tests were run at scale. Consultation among the team and with experts led them to use an enzyme called RNasin to prevent degradation, opening the way for COVID PCR testing on high-throughput machines.

Outside of the laboratory, efforts to support in-house testing were happening system-wide. Sharon Wright, MD, was integral in the communication between Infectious Diseases and the system as well as planning with Incident Command. Gyongyi Szabo, MD, PhD, Chief Academic Officer, put out a call to the scientific community for reagents, like RNasin, that could be utilized in testing and Dr. Rowley ran around Longwood picking them up to deliver them to the laboratory. As we began to encounter a swab shortage, Joe Preivitera, a respiratory therapist, went through every swab in the hospital to identify what could be used for COVID testing. He found a cleaning swab used in Aptima STI testing kits which would be ideal and Incident Command put out a call for all Aptima kits system-

wide and mobilized a team to sort the cleaning swabs out of their existing test kits to be repurposed. It was a system-wide initiative to ensure that once the testing technology was ready, the team had what they needed.

As a result of this system-wide team effort, BIDMC and BILH were the first in the northeast to have the high throughput in-house testing available. With that came many opportunities for care and community support. Dr. Tabb reached out to the prison systems to see how BILH could help the local jails. We reached out to Chelsea and the community health centers to support those areas that were being severely hit.

"We truly went from nothing to being able to run thousands of samples a day relatively quickly," said Dr. Rowley. The testing systems could support up to 1,500 tests per day, the number of tests that were usually run for the flu during an entire flu season, and by end of March 2020, BIDMC had run well over 3,000 tests daily and were leaders in the region in implementing the PCR technology.

pharyngeal versus nasal? Should there be antigen testing, or all PCR testing? How often do you need to be tested to have a clear negative? Our testing guidelines were not solely a BIDMC enterprise, but a network-wide consideration.

"It was great to be a part of the working group across the network with other ID providers and leadership that met probably for about six or seven months after the initial onset of the crisis, to see how we best organize testing across the network," said Dr. Rowley.

As Infectious Diseases knew at the onset and the public has learned since, there is no way to return to normal, societally and within the hospital, without reliable and accurate testing. Robust in-house testing has allowed our hospital to manage the COVID census, to welcome patients back for procedures and office visits, and to provide COVID and non-COVID care throughout our system. With the relief of creating a testing process that supported our care, also comes a pride

“This was a group of people who came together in ways I'd never seen before to help solve a crisis, and it was really empowering and really encouraging to be a part of an organization that could come together like this.”

— Christopher Rowley, MD, MPH

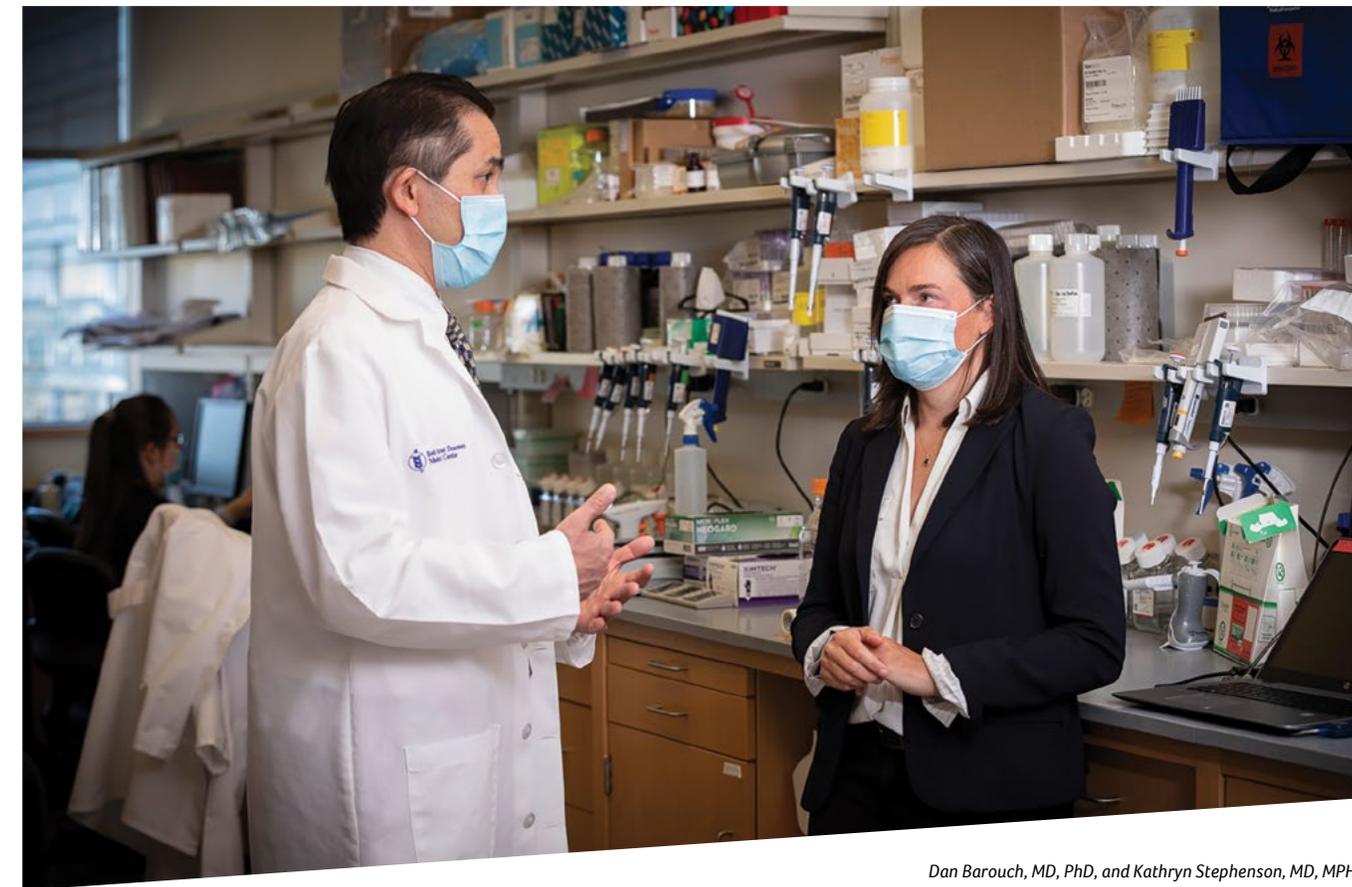
In-house testing has remained active and effective ever since, continuing to think creatively and with a great deal of resources and personnel to support the demand. Infectious Diseases remained involved in the BIDMC testing process for many months after the establishment, thinking about the prioritization of testing. They considered the type of testing in detail. Should it be nasal

in what the group accomplished.

"People here were really nimble and willing to think outside the box, and I'm sure that doesn't happen everywhere," said Dr. Rowley. "This was a group of people who came together in ways I'd never seen before to help solve a crisis, and it was really empowering and really encouraging to be a part of an organization that could come together like this."

From Sequence to Shot: The Journey to Create the Johnson & Johnson Vaccine

It began, naturally, in the Museum of Science. On January 10, 2020, after the Barouch Lab's annual team-building retreat at the Boston Museum of Science, Chinese scientists uploaded the genetic sequence of the novel coronavirus to Twitter. That same evening, the team sprang into action and throughout the weekend, they designed candidate antigens to target with candidate vaccines, beginning the process of making the vaccine on Monday morning.



Dan Barouch, MD, PhD, and Kathryn Stephenson, MD, MPH, in discussion in their research center.

“ We knew from the Zika pandemic that time was of the essence with vaccine development, as soon as we learned the SARS-CoV-2 sequence back in January 2020, we started planning for an eventual phase 1 trial. It had to be lightning fast.”
—Kathryn Stephenson, MD, MPH

“On that day, there were reports of 41 cases and 1 death from this new coronavirus. We found those numbers to be alarming, because this was a novel respiratory virus for which there was no immunity in the human population,” said Dan Barouch, MD, PhD, Director of the [Center for Virology and Vaccine Research](#) and the William Bosworth Castle Professor of Medicine at HMS.

In reality, the journey to create a COVID-19 vaccine goes back decades, to the early 2000s with the founding of the Barouch Lab, then part of the Center for Virology and Vaccine Research, which is now directed by Dr. Barouch. He and his team have spent almost two decades focused on studying the immunology and virology of HIV-1 infection and developing novel vaccine and eradication strategies. They have applied their vaccine expertise across other infectious diseases of global significance such as Zika virus, tuberculosis, influenza, and now SARS-CoV-2. What some may perceive as a rapid one year development process is actually built on 20 years of research innovation, and is a true testament to what physician-scientists do.

“We have been interested in

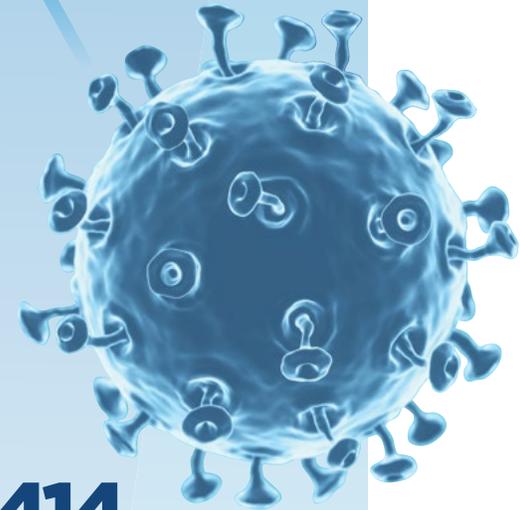
developing novel vaccine technologies for global infectious diseases for many years. These platform technologies can be adapted rapidly to new pathogens as they arise,” said Dr. Barouch.

Within two weeks of beginning their work on the vaccine, Dr. Barouch reached out to Janssen, the pharmaceutical arm of Johnson & Johnson, and within four days, they finalized a partnership for development of the vaccine. Since then, the research team worked continuously and tirelessly to create their groundbreaking COVID-19 vaccine.

The vaccine is based on the virus's genetic instructions for building the spike protein, which is the most prominent surface protein on the virus. But unlike the mRNA technology vaccines, which store the instructions in single-stranded RNA, the Johnson & Johnson vaccine uses double-stranded DNA, which is more stable and hardy than mRNA and does not require subzero freezing for storage and distribution. The J&J vaccine uses a different approach to instruct human cells to make the SARS-2 spike protein, which then triggers an immune response. It is what's known as a viral vectored vaccine. A harmless adenovirus — from a large family of viruses, some of which cause common colds — has been engineered to carry the genetic code for the SARS-2 spike protein. Once the adenovirus enters cells, they use that code to make spike proteins. The immune-triggered response then teaches the body how to fight COVID-19. The same approach has been used to make the J&J Ebola vaccine that has been authorized for use by the European Medicines Agency.

In their development process, the team created not one but seven possible vaccine candidates, which they tested in rhesus monkeys to determine which produced the strongest immune response. It was

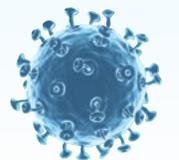
70 members of the Barouch Lab team



414 days from release of the virus sequence to FDA Emergency Use Authorization

120+ published papers since the beginning of 2020

500 Million Johnson & Johnson doses produced in 2021



through this course of study, they determined the optimal vaccine that produced a significant immune response in monkeys, with findings published in *Nature*.

Clinical trials for humans began in July of 2020 with the single-dose vaccine and were run by Kathryn Stephenson, MD, MPH, Director of the Center for Virology and Vaccine Research Clinical Trials Unit.

“We knew from the Zika pandemic that time was of the essence with vaccine development,” said Dr. Stephenson. “As soon as we learned the SARS-CoV-2 sequence back in January 2020, we started planning for an eventual phase 1 trial. It had to be lightning fast.”

It was a team effort at BIDMC to get it done. “The ethics board met on weekends and nights to review the phase 1 study. The Clinical Research Center cleared all the rooms for us and made staff available so we could enroll the entire study in 2 weeks. We’d never done anything like that before,” said Dr. Stephenson.

The subsequent pivotal phase 3 trial was a multi-center randomized, double-blinded, placebo-controlled

clinical study that was conducted not only domestically but in South Africa and Brazil over a range of racial and ethnic groups. It was also the only vaccine to have undergone field testing following the emergence of new variants of COVID-19 that present a new threat. The one-shot vaccine was shown to be 66% protective throughout the world and 72% effective in the United States, but 85% protective against severe disease. When two shots of the vaccine were delivered, it was 94% effective in the United States and 100% protective against severe disease. And there were no hospitalizations or deaths among people in the vaccine arm of the large clinical trial.

On February 27, 2021, 414 days after the development process began, the FDA unanimously voted to approve the Johnson & Johnson Vaccine for an Emergency Use Authorization. With its approval, there were considerable implications in the fight against COVID-19. The single-dose vaccine did not necessitate a return visit for a second dose, as was the case for the Pfizer and Moderna vaccines. The J&J Vaccine also built on existing vaccine technology in a way that may be more

“The worldwide effort that created multiple COVID-19 vaccines in just a year shows the true power of science to solve global health crises.”
—Dan Barouch, MD, PhD

appealing to individuals who had been hesitant to receive one of the novel mRNA vaccines. And perhaps most significantly, as DNA vaccines do not require the same degree of refrigeration as the Moderna and Pfizer’s RNA vaccines, the Johnson & Johnson vaccine is able to be transported more easily and delivered over larger distances. This means the vaccine can be given easily anywhere — in doctors’ offices, pharmacies, mass vaccination sites, public health clinics, and perhaps most importantly to remote areas of developing countries. Doses can also be stored for at least nine months at the temperature of a regular refrigerator. This made it a

global tool in virus eradication, as it could travel over larger distances and last longer.

Dr. Barouch and his team have received a spectrum of awards following the vaccine’s approval. Dr. Barouch was selected by Harvard as the recipient of the prestigious Ledlie Prize. Last bestowed in 2017, the prize is given no more frequently than every two years to a member of the Harvard community who has, “since the last awarding of said prize, by research, discovery, or otherwise, made the most valuable contribution to science, or in any way for the benefit of mankind.” Dr. Barouch was also elected as a member of the National Academy of Medicine in 2020. He was also named a Bloomberg 50 in 2021 by *Businessweek Magazine* and a Bostonian of the Year in 2021 by the *Boston Globe Magazine*, and he was honored by the Boston Celtics in 2021 with a Hero Among Us Award. Each year, the publication STAT runs a competition entitled STAT Madness and the Center and Dr. Barouch’s paper on the protective efficacy of the J&J vaccine in monkeys was selected for the Editor’s Pick Award. Dr. Stephenson has been tapped by the Massachusetts

Consortium on Pathogen Readiness (MassCPR) to lead the BioBanking Research Initiative, which will build a centralized system for collecting and sharing critical blood and tissue samples from participants affected by COVID-19. The goal of the program is to leverage collaborative science to advance breakthroughs in COVID-19 diagnosis, treatment, and prevention.

“Dan and his group have made crucial contributions to the fight against COVID,” said Mark Zeidel, MD, Chair of the Department of Medicine. “They developed models of COVID in rodents and macaques, and showed that initial infection results in robust immunity. These studies form the basis for all of the COVID vaccines. They developed the highly effective Ad vaccines and shown their effectiveness. They have also shown how all of the vaccines and boosters enhance humoral and cellular immunity, the latter may be most critical in protecting people long term from serious illness from COVID and its variants.”

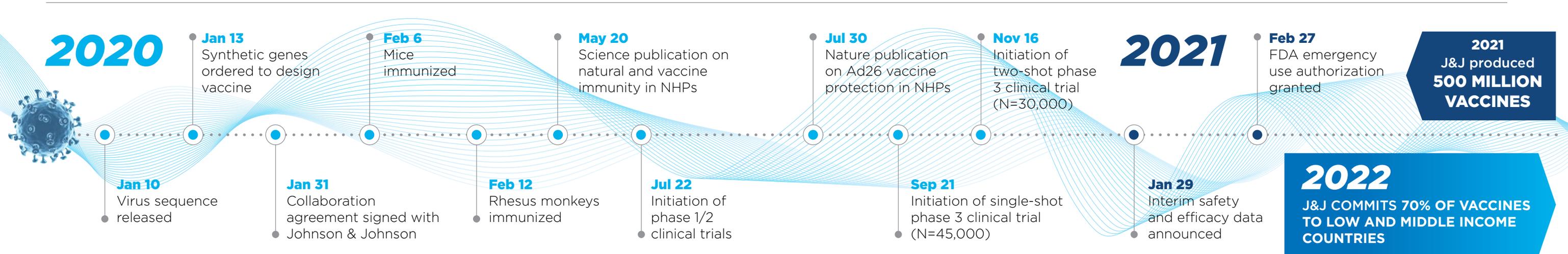
In a process involving highly technical science and global implications, there are also deeply personal connections. Many members of the Department of Medicine were

among the first of the vaccine’s clinical trial participants. In March of 2021, Dr. Barouch’s own daughter was finally able to meet her 8th grade teacher in person for the first time after nearly a year of remote learning—two weeks after her teacher received the J&J vaccine.

Since the vaccine’s approval, Dr. Barouch, Dr. Stephenson, and their team have continued to work tirelessly, testing the vaccine’s effectiveness against emerging variants and analyzing booster efficacy, as well as being vigilant to monitor the safety of the vaccine. Throughout 2021, 500 million vaccine doses were produced and distributed worldwide. In 2022, the vaccine has and will continue to be essential in the global fight against COVID-19, with 70% of doses committed to low or middle income countries on a nonprofit basis. The vaccine has and will continue to be essential in the global fight against COVID-19.

As Dr. Barouch emphasizes, “The worldwide effort that created multiple COVID-19 vaccines in just a year shows the true power of science to solve global health crises.”

Ad26-Based COVID-19 Vaccine Timeline



Unprecedented Learning: The Residency Response to COVID-19

While there is no ‘average’ year in medical education, there is the consistency of structure as our Internal Medicine Residents rotate regularly between inpatient and outpatient rotations, general medicine wards, the ICU, and electives. Across all fields, our educators and mentors create an educational experience that covers the depth and breadth that is internal medicine.

Though there is a consistency, the educational process is a dynamic, bi-directional process—as our residents change, each class and each individual plays a major part in shaping their own learning. In addition to their clinical training, residents conduct research and pursue scholar interests in a variety of fields such as medical education, quality improvement, global health, and social justice, which helps to establish them as the future leaders on the forefront of medicine.

But like so many things in March of 2020, our residency and fellowship education changed dramatically.

“Overnight, we had to completely redesign the structure of the residency,” said Christopher Smith, MD, Program Director of the Internal Medicine

Residency and Associate Vice Chair for Education. “Change was the one constant throughout the first half of the pandemic.”

As an Incident Command model was deployed and plans were made across the medical center for the safety of our patients and staff, the Residency was also making plans to reconfigure the educational program and above all else, provide exceptional care while

keeping the residents safe and healthy. As COVID-19 dramatically spread across Massachusetts, nearly all inpatient and outpatient care swiftly pivoted to caring for patients struggling with COVID, including a marked increase ICU care. As our teams reinvented our ambulatory rotations to utilize telehealth patient visits, the Residency program also swiftly redesigned all inpatient rotations, diverted the vast array and diversity of inpatient teams to almost entirely care for patients with COVID. While uncertain how long the demands of the first wave would stretch, they recognized the need to employ waves of staff to avoid overburdening our providers.

“The extraordinary sense of purpose and commitment to the mission was extraordinary,” said Dr. Smith. “We’ve always said that here at BIDMC we want to treat every single patient as though they were our loved ones and give them the care that we want our loved ones to receive. It was remarkable to see every single person here—every single resident, nurse, attending physician, patient care technician—rise to the challenge, even in the most difficult of circumstances.”

Our Chief Residents, having recently been residents themselves, play an invaluable leadership role, serving as the bridge between our faculty leadership and the current residents. They are uniquely conscious of the needs of the residents as both their leaders and peers. As COVID-19 began, they were integral in strategizing how to deploy the residents while carefully considering

the wellness of the group. Alongside Department and hospital leadership, Eileen Reynolds, MD, Vice Chair for Education, Anjala Tess, MD, Associate Vice Chair for Education, and Molly Hayes, MD, Director of the Medical Intensive Care Unit, the Chief Residents designed schedules and created additional teams to rotate through new wards and ICUs built to accommodate the burgeoning COVID census. The Chief Residents at the time, James Doolin, MD, Bess Flashner, MD, Shana Rakowsky, MD, Zachary Reese, MD, Jason Shpilsky, MD, and Shu Yang, MD, restructured their own workflow so each Chief was in charge of an aspect of the response such as scheduling, resident support, and education. With such a rapidly changing landscape it was important to have a point person with targeted knowledge and skill in each area. The Chiefs and the program leadership also placed a great emphasis on transparency and open lines of communication.

“One of the biggest things we could do is be clear and transparent about what was happening, what we knew, and what we didn’t know,” said Bess Flashner, MD, one of the 2019-2020 Chief Medical Residents who is now training in our Pulmonary and Critical Care fellowship. “We, along with Chris, would hold at least twice weekly, if not more often, check-ins with all the residents on service. We would have open forums where we would go over the most recent updates. Chris also sent out weekly email updates. We would look up every single person who is physically in the hospital and set up a time for them to chat with us. While we didn’t always have the answers, we wanted to be present for them and do anything we can to make it easier.”

For the residents themselves, the intensity of the COVID response created an environment of teamwork that created particularly meaningful bonds.

“It was remarkable to see every single person here—every single resident, nurse, attending physician, patient care technician—rise to the challenge, even in the most difficult of circumstances.”

—Christopher Smith, MD





“There was a sense of resourcefulness in coming together to meet a challenge—it was bonding to work so intensely with our co-residents,” said Audrey Li, MD, who at the onset of the pandemic was a second-year resident and is now training in our Infectious Diseases Fellowship. “At the beginning, a major point of concern for housestaff was the availability of PPE. Many of my co-residents were actively organizing the acquisition of PPE, whether sourcing from the community here in Boston or overseas. One of my co-residents was talking to 3D printing labs in the area, helping to create face shields. This speaks to the spirit of the people within our residency. There was a sense of trying to protect each other, to uplift each other.”

A core portion of residency education are daily teaching conferences, from resident report to Grand Rounds to Firm Conferences. As in-person gatherings were suspended, the residency leadership and Chief Residents faced the challenge of maintaining our rich learning experiences while transitioning into a digital world. The Chief Residents were again invaluable in this transition.

“Our conferences are one of the best parts of our whole program, something that we’re very proud of, and did not want to suffer in COVID,” said Dr. Flashner. “We asked ourselves, how can we adapt each conference? What formats can we use, which ones can still be done in person within the restrictions that were set for social distancing, and which ones could not? It took trial and error.”

“It’s not surprising to me, given the truly wonderful educators we have at BIDMC, that we were able to efficiently adapt to remote teaching, while maintaining the core principles of adult and cognitive learning theory, engaging our audience, and making it as interactive, lively and relevant as possible, despite the necessary

physical distancing. That we were able to modify the vast majority of our conferences so quickly is remarkable,” said Dr. Smith.

The Residency has completed two full Match cycles during the pandemic, requiring the leadership to completely redesign the recruitment and interview process. In the past, applicants would come to BIDMC for interviews and tours. As recruitment went virtual, the program immediately recognized that recruitment would be unlike anything ever before.

“We needed to find a way to provide our applicants with the materials needed to understand what’s truly important about our program,” said Dr. Smith. “We can provide facts and figures, but how do you express to our applicants the culture of our program and the importance of the people here—this was the greatest challenge of this new virtual interview process.”

Working closely with the residents, two Associate Program Directors, Drs. Neal Biddick and Ginny Brady, the Medical Education Coordinator, Nikki DeMelo, and many more stakeholders, Dr. Smith emphasized the importance of strong collaboration and teamwork in designing these new recruitment strategies. The program spent countless hours creating new videos to demonstrate the culture of BIDMC. Utilizing social media, including Twitter and [Instagram](#), which Drs. Li, Rachel Bocchino, and Lauren Gilbert were integral in operating, the program provided applicants new method of understanding who we are and what we do. They connected with applicants through email, small group conferences, and evening social events, all designed to make connections one on one, so that applicants had a chance to get to know our learners and understand what life as a BIDMC resident is like.

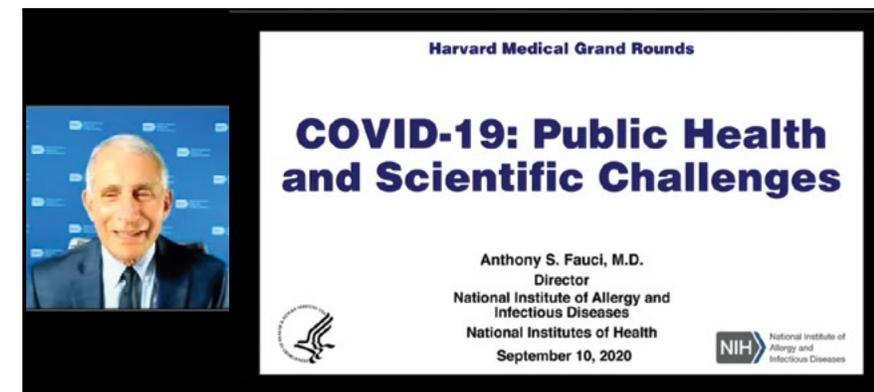
The timeline of COVID also prompted an interesting challenge for our new interns. In March of 2020,

the new intern class had just matched at BIDMC, but would be unable to safely travel to Boston ahead of starting in June. Once again, the current residents stepped forward, this time helping the incoming class figure out where to live, sending videos and pictures of their apartments and other available apartments. They hosted evening Zoom sessions to introduce themselves and to help the new residents, before they even stepped foot in BIDMC, understand the culture of our program

In certain ways, the clinical response of the crisis was a bonding experience, but COVID precautions can be isolating, as many residents are far away from family and in a new city. Once again, the residency program adapted to COVID precautions to maintain a sense of connectivity and social interaction. The program found new ways to build connections across Zoom, in small distanced groups outdoors, and through program initiatives. In one such initiative, Dr. Li was involved in matching the incoming interns with second and third year residents as program mentors and saw such great enthusiasm from both sides that there were not enough interns to give each senior resident a mentee. Maintaining the social elements of the programs was pivotal and a form of wellness support that was top of mind.

“A lot of our initiatives highlighted to me how lucky we were to be around people who are thinking deeply and powerfully about how to best serve each other and help each other through the entire crisis,” said Dr. Li.

Above all else, the residency did not struggle to accomplish the core goal: to foster smart, compassionate doctors who care for the whole patient. Each day brought new accounts from our faculty, patients, and staff of ways in which the residents were excelling in our missions and growing as physicians. To encounter as intense and altering an event as COVID-19



Harvard Combined Grand Rounds

Early in COVID-19, two friends (one from BIDMC, one from MGH) met for mutual support on a video call one Saturday night, and had an idea. What if in the midst of pandemic uncertainty the Harvard medical community could come together to share knowledge and resources? From there, the Harvard Combined Medicine Grand Rounds series was born. A collaboration between the Departments of Medicine at BIDMC, Massachusetts General Hospital, and Brigham and Women’s Hospital, the lecture series features panel discussions with experts who explored timely COVID-19 related topics from transmission to vaccine development and even a visit from Dr. Anthony Fauci, livestreamed each week to thousands of viewers in Boston and around the globe. Now held monthly, the series has expanded to other pressing topics; for example, Secretary John Kerry joined a session about Climate Change and Health. The series has become an invaluable opportunity to connect to a wider medical community and learn from one another, and has spawned a number of cross-institutional collaborations.

The full library of our past Harvard Combined Rounds events can be found in our video library at [BIDMC.org/MGR](#).



Eileen Reynolds, MD
Vice Chair for Education,
Course Director

during a formative portion of their medical education, will have a lasting impact. One our leadership believes will be for the better.

“You can learn a lot about human spirit and the importance of connectivity at the bedside through our patients and their families,” said

Dr. Smith. “We can’t always cure the disease, but we can always demonstrate kindness and compassion. We can always assuage the grief that comes with the illness. While our residents demonstrate this every day, the pandemic further magnified their kindness and compassion.”

More Than A Science: The Art of Healing in a Pandemic

In March of 2020, [Hospital Medicine](#) leaders sat together around a large, blank whiteboard with dry-erase markers in hand and many questions about how to care for the first surge of COVID-19 patients. As a team, they created strategies and faced the challenges of the subsequent surges together. Hospital Medicine has strived to support the needs of inpatients across our BILH sites throughout the pandemic. While doing so, Hospitalists have maintained a strong sense of community while finding art in all of the data, research, and diagnoses.



Lish Clark, MD, and Caleb Hale, MD, of Hospital Medicine

Lish Clark, MD, is the Assistant Chief of Operations of Hospital Medicine, Medical Director of the [BIDMC Transfer Center](#), and Director of Quality Improvement for Hospital Medicine. Dr. Clark has played a vital role in organizing continuous changes required to sustain the operations of Hospital Medicine and the Transfer Center through the challenges of the COVID-19 pandemic spanning nearly two years.

"If I had the retrospective scope, I would have said, from the very beginning, this is going to be a marathon, not a sprint," said Dr. Clark. "I feel like we went into this pandemic with so much energy at the beginning. And then each subsequent surge has been so exhausting for folks, I would have said let's pace ourselves."

Dr. Clark found her professional home at BIDMC while completing residency training here from 2007 to 2010, before serving as a Hospitalist and a Chief Medical Resident. She traveled to Duke University Medical Center with her husband and continued her career as an academic hospitalist

focused on quality and safety education at Duke before returning to BIDMC in 2017.

In her role overseeing the Transfer Center, Dr. Clark works to support patients' needs throughout the network. Her team helps coordinate transfers across BILH working to put the right patient in the right level of care. Especially during the pandemic, it was vital to efficiently use every bed to take care of as many patients as possible while also trying to preserve the frontline clinical teams.

The COVID-19 marathon began when Caleb Hale, MD, Associate Chief of Hospital Medicine, and Dr. Clark sat in their office to map out their COVID-19 strategy on the large whiteboard that would be filled with ideas to meet the needs of the patients and staff the hospital for incoming waves. Hospitalists have stepped up repeatedly and many returned from international sites to expand the footprint of the service over the last two years. Hospital Medicine has been overseeing care for nearly 50% of the med-surg population at BIDMC.

Although uncertainty surged in the planning process, Dr. Hale felt immense confidence in their team of leaders and providers.

"I think the credit really belongs with the nurses, doctors and all the support staff who are providing the majority of the bedside clinical care day-to-day," said Dr. Hale. "As a leader in our group, to support them is to make sure that we're listening to their concerns and that we're transparent about the situation, the needs and the planning going forward, and then that we're flexible."

At the beginning of the pandemic, the clinical staff did not know what the virus was, how to treat it, or how it spread, but they were ready to be among the first people to care for the patients. The Hospitalists learned and practiced their protocols before residents, and primary care doctors and specialists remained on standby to help the clinical staff as needed. Dr. Clark remembers how Hospital Medicine created videos and training algorithms to help those who would be redeploying and had not practiced

inpatient care for some time.

The first COVID-19 surge brought in many patients, but there were plenty of hospital staff, and they had the energy. In subsequent surges, not only did the hospitals have limited resources, but they also faced staffing shortages across all departments.

"One of the things we learned early on is that you needed backup layers. What you thought might be an adequate staffing plan for a weekend, then you're in the weekend to figure out that not only do we not have enough people, but someone just went out sick with COVID. You have to be pretty flexible," said Dr. Clark. Despite sick staff members, the Hospital Medicine team persists daily to treat patients. "It's never a question to take care of the individual patient and make sure that they have what they need."

Although COVID-19 compromised every layer of the healthcare system and beyond, there were notable benefits that took effect because of the pandemic. Telehealth has given patients the ability to schedule appointments without visiting the

office, healthcare professionals have been able to attend virtual meetings more easily, and most notably for the Transfer Center, the addition of their Internal Ambulance Program has prevented failed discharges since November.

"Out of crisis comes opportunity, innovation and new processes of care," said Dr. Clark. "So I don't want to say it's all dismal because I do think that great things are coming out of this."

The Hospital Medicine group and Transfer Center also saw great comradery at each phase of the pandemic. Dr. Clark notes that the "family feel" helps keep everybody calm, and that the sense of community helps retain staff members. Dr. Clark recalls that on her admitting shift in January 2022, she reached out to colleagues because of the rapid volume of incoming patients that particular shift. From all sides, Dr. Clark's colleagues stepped up to offer her support.

"I just feel like the teamwork and willingness to help out is really what inspires me to keep going

despite the constant change."

Hospital Medicine's passion for providing exceptional care for patients has not diminished—even with the overwhelming pressures of the pandemic.

"Where the art of medicine is applicable is when you can look at a person and understand their background, their values, their wants, their emotions, their fears, their needs, and think about their life, their family, their circumstance, and how it all is integrated," said Dr. Hale. "That makes the work more challenging, but also makes it all the more rewarding."

Finding capacity for patients who need the right level of care, deciding how to triage and manage requests, workflow, and safety messages daily can become tiresome, but Dr. Clark and the Hospital Medicine team have handled the pandemic with careful consideration, strategy, and passion. As Dr. Clark believes: **The practice of Medicine is more than science, it is an art.**

“Out of crisis comes opportunity, innovation and new processes of care. So I don't want to say it's all dismal because I do think that great things are coming out of this.”

—Lish Clark, MD

"In the face of constant change, it's really easy to become fatigued and overwhelmed," said Dr. Clark. "And I think that knowing what your true north is, knowing that the patient comes first and trying to remind yourself to put all the other noise aside."

The Promotion of Equity & Accessibility in Healthcare

Since BIDMC's founding, the mission of the medical center has been to serve our patients compassionately and safely, fueled by a commitment to personalized, exemplary care, mutual respect, and collaboration. Within this mission is a core emphasis on service to our patients, furthering care for underserved communities, and addressing disparities in access to care and health outcomes. Since the onset of the COVID-19 pandemic, socio-economic and racial inequities have been at the forefront of the conversation about healthcare in America, as structural racism and a multitude of factors have deeply affected COVID-19 infection, mortality, and morbidity rates. The Department and our physicians have been active in combating these factors and creating initiatives with the implicit goal of promoting equity and accessibility at BIDMC and beyond.

Meeting the Moment: The Kneel-In

In June of 2020, masked doctors, nurses, staff, and residents from BIDMC and across the HMS community gathered with signs that read "I Can't Breathe," "Racism kills," "Racism is a public health crisis." For 8 minutes and 46 seconds, the duration of time that George Floyd was pinned to the ground, demonstrators knelt in solidarity for victims of police brutality and Black communities. On June 5, 2020, the same day Breonna Taylor would have turned 27 if she were not fatally shot by police, the sidewalks outside of the Shapiro building became a place of unity and solidarity.

"Their deaths are the consequences of racism that is deeply

entrenched in our country's structure," said Audrey Li, MD, while standing in front of her colleagues at the Kneel-In she co-organized. At the time, she was an Internal Medicine Resident and is now a Fellow in Infectious Diseases. "We join together today in recognition of an irrefutable fact: Racism is a public health crisis."

The Day of Unity, part of the protest organized by our BIDMC chapter of the organization "[White Coats for Black Lives](#)," became one of many demonstrations across the world to protest systemic racism. The creation of this chapter has provided opportunities to better advocate throughout our communities, and has allowed those in leadership roles to compare our work at the medical center regarding racial equity to

others in Boston.

Slack, a communications app, was a tool that Dr. Li and other resident physicians interested in anti-racism efforts throughout Boston used to facilitate conversations regarding equality and equity in medicine. Boston Physician Trainees, the official name of their online community, totaled nearly 200 residents from multiple organizations, and Dr. Li notes that BIDMC's "White Coats for Black Lives" chapter was formed from the conversations on the platform. Marginalization is an imperative conversation for physicians and hospital staff to have, as research and the studies of communities with social disparities can initiate sound policy-making.

"I reached out to Audrey about



“ We join together today in recognition of an irrefutable fact: Racism is a public health crisis.”

—Audrey Li, MD

organizing positive actions regarding racism within the Department of Medicine and pitched the idea for a BIDMC-wide Day of Unity to coincide with what I had heard about other organizations doing,” said Julia Cooperman, MD, MEd, a Hospitalist in the Division of General Medicine. “When working with a diverse

population of patients, the more that physicians directing the care plan understand about the broader context, preferences, and social norms of their patients, the better we can tailor our interactions in a respectful way that leads to more engagement with the healthcare system and hopefully, better outcomes.”

Dr. Cooperman's proposal was soon initiated, and she served as the faculty point-person for the coordination of the event. Within a few days, she assisted the residents to mobilize other housestaff, worked with HMS leadership to excuse medical students from their clerkships to attend, enlisted colleagues within General Medicine as event volunteers, and obtained posters and supplies for people to create signs.

“The Day of Unity was so much larger than each person in attendance. So much larger than all of us gathered outside the Shapiro Building spilling into the street, all the people who joined remotely,” said Dr. Cooperman. “This was still a very scary time and we were telling everyone in the public to maintain six feet of distance, but we needed to be together to just be humans mourning together and demanding change.”

At all levels of the healthcare system, cultural humility policies are crucial. The strides BIDMC has made in equality and equitable care for staff and patients are significant, and as a leading organization in healthcare and academic medicine, addressing inequalities and inequities institutionally and in the communities the medical

center serves are vital to forge strong relationships with patients and hospital staff.

A driving force behind Dr. Li's passion for medicine is equitable care, especially because providers can bring attention to the disparities that are evident in medical settings. The progress made institutionally at BIDMC is one step towards further action, which is needed to create safer environments for marginalized communities locally and beyond.

"Definitely, there's still a lot more to do," said Dr. Li. "I think it's exciting being a partner in that and being able to speak with leadership to provide feedback. As a result of the discussions of racism and inequity, I feel like we are all a community that is invested in creating equity in some way."

Health Inequities & the Pandemic: Outreach to Marginalized Communities

In early 2021, a Dorchester church near the [Bowdoin Street Health Center](#) and a rented retail space close to the [Chelsea Health Center](#) were busy, as BILH nurses, pharmacists, doctors, and administrative staff all worked together

to vaccinate eligible patients against a disease ravaging their communities. These sites were not chosen by accident: they were thoughtfully improvised solutions, chosen specifically to increase local community access to the COVID vaccine, a key predictor of vaccine uptake.

Leonor Fernández, MD, Director of Patient Engagement at [Healthcare Associates \(HCA\)](#), a Primary Care Physician in HCA, and Senior Advisor for Health Equity at BILH, was laser-focused on how to promote vaccination equity, particularly in the context of the vastly higher rates of COVID mortality among patients of color, immigrants, and low-income communities. BILH's Vaccine Command operation, led by Peter Shorett who is now part of the BILH Chief Strategy Office, required multidisciplinary collaboration and creativity. Fernández and Shorett worked with many colleagues to ensure that BILH's vaccine distribution plan would effectively reach patients from the most marginalized communities. At the peak of the campaign, across nine vaccination sites, BILH ultimately delivered more than 300,000

vaccinations to the 1.4 million patients it serves.

"Zip code is a strong predictor of life expectancy, because geography is also associated with income, structural racism, language, and education," said Dr. Fernández. "In fact, certain zip codes experienced the highest rates of COVID-19 mortality. We knew we needed to reach those patients, so we had to prioritize early information and access for the most vulnerable patients living in the most marginalized communities in order to end up with a reasonably equitable result."

The use of deliberate equity strategies was likely one of the reasons that BIDCO MassHealth ACO (Medicaid) population had the highest rates of COVID vaccination among ACO and Managed Care organization programs in the 20 towns and cities identified as being disproportionately impacted by the pandemic.

A digital strategy for vaccination information and invitation is prone to reducing health care disparities because only some patients are on email or on the internet, and many patients may have difficulty using technology to sign up for vaccine appointments. Information Technology teams at BIDMC and BILH created a simple digital interface for making vaccine appointments that did not require the patient to have portal access.

Patients also received text invitations for vaccines with a sign-up link, and the BILH call center sent out computerized recorded phone calls in eight languages. BIDMC Bowdoin Health Center, BIDMC Chelsea, and the BILH Call Center also made live outreach calls in Spanish, Chinese and Cape Verdean/Kriolu and recorded outgoing messages in the top 10 languages.

"It was critical to think through the content and imagery of the communication. The Communications team worked to create accessible multilingual messages that also address

concerns about the vaccine," said Dr. Fernández. "Longstanding primary care and local community health center relationships with "earned" trust made a big difference."

The vaccine outreach campaign to marginalized communities resonates with BIDMC's historical mission to provide equitable healthcare access. Dr. Fernández centered her career on the promotion of health equity and the development of institutional and professional cultural competence, which is now described as cultural humility and adaptation. Because of this, she was able to assist in the implementation of a successful campaign, helping thousands of patients in marginalized communities.

"The messenger matters, and effective public health campaigns need messages that are culturally meaningful, respectful, and informative, and these work best when disseminated by trusted messengers in order to promote trust and understanding," said Dr. Fernández. "One of the things that facilitated our team's work on COVID vaccine equity was clear leadership commitment to equity at the highest levels within BILH and at BIDMC."

Addressing Racial Disparities: The Reformation of Healthcare and Beyond

BIDMC is committed to creating equal, equitable, and inclusive environments for both our patients and staff. Racial disparities in the field of medicine need to be addressed, as racism and discrimination are embedded in America's identity despite the efforts to dismantle the systemic inequalities. Black doctors were prohibited from practicing with the American Medical Association (AMA) until 2008, which prevented generations of black doctors from accessing benefits that white doctors received. This is only one disadvantage of many that Black people were forced to address.



Integral in promoting diversity, equity, and inclusion at BIDMC is Daniele Ölveczky, MD, MS, the Faculty Director for the [Center for Diversity, Equity and Inclusion](#) and Supervising Director of Geriatrics Inpatient Trauma Services. Dr. Ölveczky, who relocated from Trinidad, notes how the colorism she experienced there was different from the structural racism present in America. Her firsthand experiences have shaped her tireless advocacy for the BIDMC community, from patients to providers.

"Because of our long history of outreach in our communities, about 50% of our patient population is from racially and culturally diverse backgrounds," said Dr. Ölveczky. "We know that having a workforce that represents them is a strong way of addressing health inequity and health disparities, so a lot of my work is focused on how we recruit and retain more faculty of color to really serve our diverse patient population."

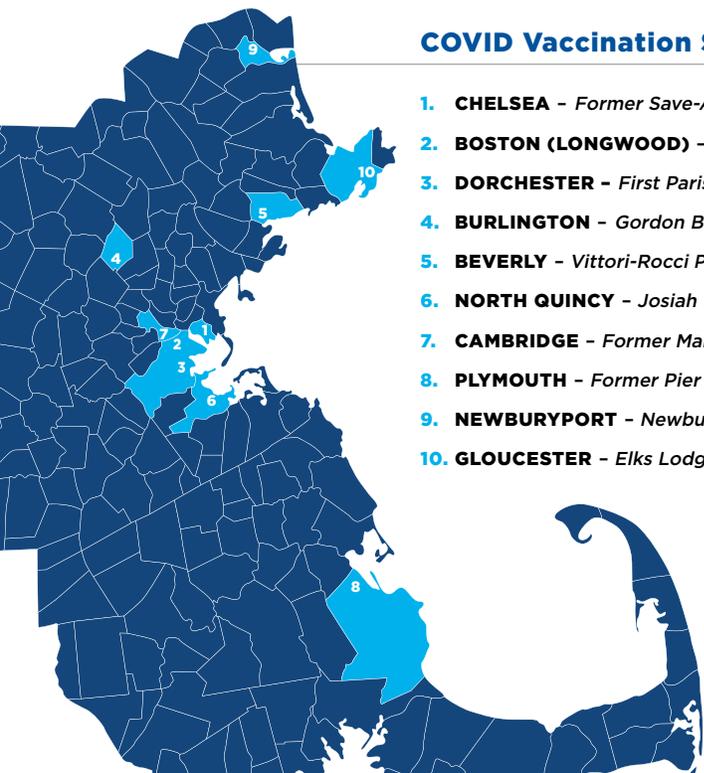
In 1972, BIDMC became the first hospital to create and implement a Patient Bill of Rights which was later used as a model for the Massachusetts Bill of Rights in 1979. However, the powerful initiative also allowed patients to discriminate against doctors. When a positive working environment that fosters safety and acceptance is created, hospital staff can provide the best patient centered care. Along with key professionals in law and social work, Dr. Ölveczky and collaborators developed an updated policy for addressing discrimination in patient settings. Once an event of discrimination occurs, there is a time out. Questions infused with humble

curiosity were created to be asked by managers and supervisors to understand the patient perspective. If after questioning, the requests are racist, sexist, or xenophobic without a history of trauma, then patients can be assisted to find care at other institutions since this behavior is not consistent with our values at BIDMC.

BIDMC's legacy of providing equitable care and emphasizing inclusivity ensures that patients do not fall through the gaps. Since Dr. Ölveczky took office in October 2020, the medical center has increased the recruitment of trainees who are under-represented in medicine by 227% over the past year and a half, a great testament to BIDMC's commitment to the legacy on which we were founded.

"We have always been an institution that was committed to equity, and the reason I love being here is that we really practice care that's consistent with my values," said Dr. Ölveczky. "We are focused on how we can become a refuge for people who are marginalized and how we operationalize equity. We're doing it for every single patient, every single day."

Supporting marginalized populations requires self-work, active listening, reading, and action. Drs. Ölveczky, Fernandez, Li, Cooperman, and their colleagues have taken initiative to promote safe and healthy environments, and by implementing upstander education to close disparity gaps, recognize racism and inequities, and maintain effective allyship, BIDMC and BILH affiliates have exemplified the medical center's mission to provide equal and equitable patient-centered care.



COVID Vaccination Sites

1. **CHELSEA** – Former Save-A-Lot Grocery Store
2. **BOSTON (LONGWOOD)** – Temple Israel of Boston
3. **DORCHESTER** – First Parish Church
4. **BURLINGTON** – Gordon Building; Lahey Medical Records
5. **BEVERLY** – Vittori-Rocci Post
6. **NORTH QUINCY** – Josiah Quincy Building
7. **CAMBRIDGE** – Former Marino Center
8. **PLYMOUTH** – Former Pier 1
9. **NEWBURYPORT** – Newburyport Senior Community Center
10. **GLOUCESTER** – Elks Lodge

Connected Caregiving: The Development of Telehealth



“There was a really thoughtful plan around how to make sure we were maintaining our patient’s health as much as we possibly could while finding the right balance between telehealth and in-person care.”

—Marc Cohen, MD
Clinical Chief for Primary Care, HCA

In the early weeks of 2020 amidst preparations for COVID-19, leaders in the Division of General Medicine’s [Healthcare Associates \(HCA\)](#) gathered to plan for an important question: how would HCA leverage telehealth to continue to support our primary care cohort? Digital healthcare was not a new conversation across our Department, as we had long considered the role of telehealth and its impact on our patients and providers.

Marc Cohen, MD, Clinical Chief for Primary Care in the Division of General Medicine, was one of the operational leaders instrumental in planning for and implementing telehealth for HCA, BIDMC’s hospital-based primary care practice alongside a team of medical directors, managers, and administrators. Within days, Dr. Cohen and the team identified a small urgent care cohort that required in-person care, and they rapidly redesigned the roles of physicians for remote care through telehealth.

“Over two years ago, when the pandemic was happening, there was a lot of concern about the ways that COVID was transmitted and about the risks of being in a healthcare setting,” said Dr. Cohen. “It was really important for us to have patients feel that they could continue to safely interact with their primary care team.”

Primary care practices throughout Boston utilized telehealth in small ways prior to the pandemic. For HCA, offering telehealth for specific concerns and urgent care needs had been discussed for nearly two years as part of their strategic plan for population health. HCA researched available applications and how physicians and staff could employ focused telehealth. However, Massachusetts compliance laws and insurer regulations had halted the initiative until March 2020, when telehealth became the only safe solution for patient-care. Once COVID-19 became a public health emergency, the scope and volume drastically increased, requiring rapid expansion of the medical center’s hardware and knowledge of staff.

“We took what our initial blueprint was for telehealth, and then in a period of a day or two basically figured out how we could scale that to everyone doing telehealth and apply what we had learned from our research and implement it,” said Dr. Cohen. “There was a lot of adjusting and thinking about patient-centered care throughout. For safety and practicality, we quickly formed a definition of what needed to be seen on-site and how we were going to deploy staff so that we had a core group of people that could continue to provide in person care.”

“I was amazed at the creativity of the administrative staff as they quickly developed ways to implement a new model for patient care that had not previously existed,” said Kevin Maguire, Chief Administrative Officer of the Department of Medicine. “It was even more challenging because they had to develop this modality while also implementing the new reality of staff working remotely.”

There were challenges related to communication in the initial days of the outbreak. The hospital and its affiliates primarily utilized in-person interpretation and language services prior to the pandemic, but new ideas to provide virtual interpreter services for patients with limited English proficiency were necessary. In order to provide outstanding patient care, the technology and systems were upgraded in order to integrate interpreters into telemedicine.

“Through lots of advocacy and work, it is in a better place,” said Dr. Cohen. “We have systems now that can incorporate interpreters into the scheduling of visits and into the interactions with patients, and that certainly helps us to provide telehealth in ways that are appropriate for our patients with limited English proficiency.”

With support from HCA staff, the foundation laid by his predecessor, Diane Brockmeyer, MD, and aid from Catherine Turnus, the project manager during HCA’s transition to telemedicine, telemedicine in our Primary Care setting successfully thrived under Dr. Cohen’s leadership.

There was a really thoughtful plan around how to make sure we were maintaining our patient’s health as much as we possibly could while finding the right balance between telehealth and in-person care,” said Dr. Cohen. “We really carved out time for telemedicine and focus time for in person care for our faculty, so we thought really hard about what care was best served by telemedicine and maintaining that in the virtual space.”

High Risk, Higher Resilience: The Creation of HO-REEES



“There are countless stories of patients enduring things solo; cancer surgery, solo. Chemotherapy, solo. It was hard to witness them having to do all those things alone. Many of my patients have chemo, radiation, and surgery, and they would have just been dropped off at the door to walk in by themselves. To see their strength was pretty admirable.”

—Meghan Shea, MD
Medical Director for Ambulatory Medical Oncology
Director for Quality Improvement for Medical Oncology

Members of The [Division of Medical Oncology](#) and the [Cancer Center](#) passed masks to each other weeks before the mandates went into effect. For our patients who are immunocompromised and the providers who care for them each day, the pandemic was at the forefront of their minds as they determined what would be like to navigate a world facing COVID-19. For the past two years, our doctors, nurses, and hospital personnel have been vital in treating patients safely and effectively in light of increased risks to their health. As the pandemic continues, many of the swift, thoughtful protocols we executed remain crucial to deliver safe care for all patients, especially those who receive cancer treatments.

“COVID raised a lot of challenges with cancer care,” said Meghan Shea, MD, the Medical Director for Ambulatory Medical Oncology and the Director for Quality Improvement for Medical Oncology. “You can’t stop cancer treatment for anything, including a pandemic. The cancer will keep on going, so it became imperative for us to figure out how

to treat our patients who happened to be COVID positive.”

To treat patients with symptoms of COVID-19 safely, the Hematology/Oncology Respiratory Emergency Evaluation Extension Site (HO-REEES) was developed to decrease the number of patients in the emergency room and to reduce the likelihood of COVID-19 exposure. Shortly after its commencement, HO-REEES turned into a testing site for patients with COVID-19 symptoms to receive results quickly, as early on it was difficult to receive an external test result in a timely manner.

The creation and coordination of HO-REEES was led by Mary Linton B. Peters, MD, Matthew J. Weinstock, MD, Jo Underhill, RN, and Christine Flanagan, RN.

“It was probably in April [of 2020] before we resumed giving chemotherapy as we created a tumor board for providers to present their COVID positive patients that they’re considering treating to a group of other oncologists to advise on when or if they should resume therapy. The group helped them weigh the risks and benefits,” said Dr. Shea.

“I set up that tumor board, and picked a handful of providers to routinely attend. Everyone had to bring their cases there before getting a spot in the outpatient COVID unit.”

By April, private rooms, or units, were developed to accommodate treatments for COVID positive patients. Redeployed hospital staff, most of whom were nurses, from multiple departments assisted with HO-REEES patient care, and effectively transitioned into their temporary roles. As research progressed, data proved that the virus lasted longer for patients in the hematology malignancy group. Due to the medications utilized in the treatment of hematology malignancy patients, they are at a significantly higher risk for contracting illnesses as their immune systems are directly impacted.

“We had some pretty resilient staff who learned how to operate in different physical settings,” said Dr. Shea. “We often equate our patient care to an outpatient ICU, so you really have to be very skilled as far as educational background and understanding of how the human body works, but also the emotional burden of taking care of such sick patients who are going through tough times.”

Dr. Shea and her teams epitomize our mission of patient-centered care with their dedication and passion for creating safe and supportive environments during the pandemic. Since the moment masks were passed around in Medical Oncology and the Cancer Center, health and safety amidst COVID-19 continues to be at the forefront of all decisions and policies our leadership and providers implement for BIDMC patients and staff.

“There are countless stories of patients enduring things solo; cancer surgery, solo. Chemotherapy, solo. It was hard to witness them having to do all those things alone,” said Dr. Shea. “Many of my patients have chemo, radiation, and surgery, and they would have just been dropped off at the door to walk in by themselves. To see their strength was pretty admirable.”

Advancing Connection and Humanism in Medicine

Hippocrates once wrote, “Wherever the art of Medicine is loved, there is also a love of Humanity.” During over two years of COVID-19, this maxim rang true time and again as our Department combated the pandemic through its waves. None of us had lived through a global pandemic of this scale before, nor had we faced the extent of isolation, safety concerns, and disruption that came with it. But the challenges COVID brought offered opportunities for creativity, growth, and connectedness throughout the Department.

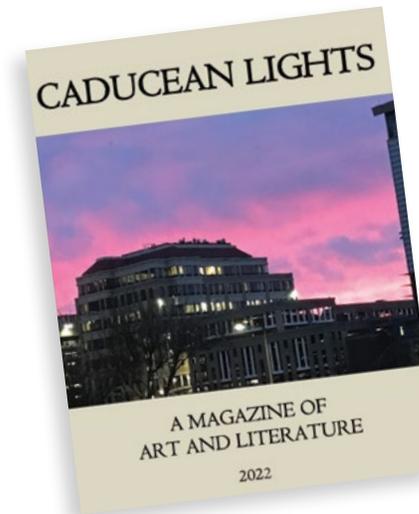
Caducean Lights and The Katherine Swan Ginsburg (KSG) Humanism in Medicine Program

The Department’s deep and ongoing commitment to Humanism, is strongly expressed in the [KSG Program](#). Dr. Swan Ginsburg was a house officer at Beth Israel who died of cancer at age 34 in 1992, shortly after completing her training in our program. The KSG Program was founded in her honor

and lives in the Internal Medicine Residency, facilitating interaction with the residents early in their careers.

The program has been led for the past five years by Director Jonathan Crocker, MD, FHM, a Hospitalist in the Division of General Medicine and Assistant Professor of Medicine HMS, who is also an Associate Program Director in the IM Residency and Director of the Global Health Fellowship and Botswana Global Health Program for Medicine.

Humanism is a phrase associated most closely with the expressive arts, but the term encompasses so much more, and relates to any activity that focuses on the human condition, human values, the lived human experience, and human dignity.



“When I think of a humanism-driven healthcare worker, I think of those qualities which enable any of us to make an intentional connection with patients or those around us,” said Dr. Crocker. “It involves thinking deeply about the individual, and not just responding with an algorithm or an automated response. It certainly manifests in expressions of comfort and compassion, but it also manifests in expressions of joy and celebration. For clinicians, it’s about finding or creating those figurative ‘stethoscope-off’ moments of connection with our patients.”

The KSG program sponsors several lectures during the academic year and catalyzes humanism in medicine projects by junior or senior resident fellows. It additionally supports a wide number of wellness-related activities. These include ice cream socials, symphony tickets for IM housestaff, and Music and Musings artistic celebrations – all of which recognize the importance of giving time as well as physical and cognitive space to engage in activities which foster humanism.

In June of 2020, KSG launched a new publication, *Caducean Lights*, the brainchild of 2020 KSG Fellow,

and then IM PGY3, Samantha Pop, MD. Dr. Pop wanted to create a literary journal at BIDMC, like the one she had founded in her medical school. The journal was open to submissions from all employees across all departments at BIDMC and was composed of previously unpublished, original submissions related to a medical subject in the form of poetry, short fiction, creative nonfiction, photography, and visual arts. The submissions received were thoughtful, wide-ranging, and demonstrative of the considerable creative talent within the walls of our medical center.

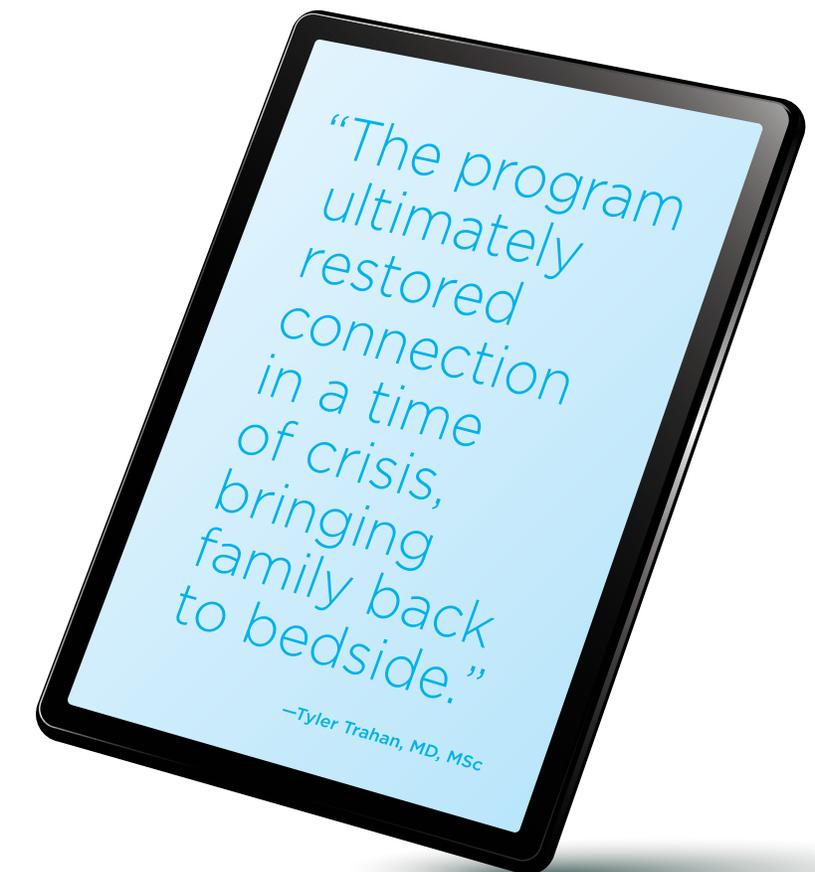
“Submissions poured in beyond our expectations, which only reinforced an instinct that this was a worthy effort,” said Dr. Crocker. “Seeing contributions from across different cadres of our employees and

workers was inspiring and provided a connection that many yearned for at the time, in the midst of our first COVID wave. What’s been amazing is how the BIDMC community has sustained the enthusiasm in the subsequent 2 years.”

Dr. Pop, Dr. Crocker, and the KSG program have produced two further editions of *Caducean Lights* in 2021 and 2022 as it continues to be an annual opportunity for connectedness and expression across the medical center.

The iPad Donation Program

When the pandemic first came through Boston, patients with COVID-19 admitted to the ICU were severely ill, often at high risk of death, and, at this critical moment in their lives, they were cut off from loved ones as visitors to inpatients had to be suspended



to avoid viral transmission. Amid the isolation, in the early months of the pandemic, one of our IM residents, Tyler Trahan, MD, MSc, had an idea.

To help our hospitalized patients connect with their families and friends, we could put to use all the old iPads sitting in drawers across our community and use them within the ICUs and throughout the medical center. Dr. Trahan and our teams launched an iPad donation program, with the goal of enhancing communication and connection between patients and their loved ones, especially those receiving end-of-life care.

In critical illness, there will always be times when loved ones, given time or distance, cannot be at the bedside. The iPad program is a way to use technology to close that gap and

values. Through interdepartmental collaboration among clinicians, social workers, spiritual caregivers, and IT personnel, we were able to make “virtual visits” with loved ones a new standard of care for our COVID-19 patients.”

“It probably shouldn’t surprise us that innovations like this come from those at the bedside the most – our residents who spend so much time at the bedside,” said Dr. Crocker. “The iPad program emerged from genuine human interactions, making it organic in its inception and then adopted structurally. It was wonderful.”

Fighting Burnout and Promoting Wellness

Burnout is not a new concept, but COVID-19 has exacerbated stress across the board and caring for our

for sustained improvements in the clinical and academic experience. At the GME level, a coaching program has been implemented for trainees across all departments and is currently being evaluated, in a study funded by CRICO. This program is aimed at improving well-being, reducing burnout, and positively impacting medical errors and adverse event processing in faculty and trainees. The GME Wellness Committee, led by residents and fellows across the institution, has brought forward initiatives such as free yoga for trainees, hot food access 24/7, and events to support community-building amongst our trainees. At the HMFP level, the newly formed Wellness Committee, which includes representatives across departments, strives to promote a culture of wellness and inclusiveness, hosting programs such as One Less Stress to help physicians navigate work and life demands.

“Unfortunately, physician burnout is a significant issue across healthcare. It is important to recognize that combating burnout is not about making the work we do easier, but rather optimizing it to be as meaningful as possible,” said Dr. Parris. “As Dr. Susan Hingle, this year’s Department of Medicine Solomon Lecturer in physician well-being, put it ‘wellness needs to be the goal, not a goal.’ If physicians and other healthcare workers are thriving, then the rest – including clinical outcomes, QI metrics, productivity measures – will follow.”

Fostering an environment where well-being and burnout factors are optimized allows individuals to reach their greatest potential and level of fulfillment, and ultimately improves



“Our peers can offer a deep well of support by checking-in on their peers, often filling their own cups along the way.”

—Ritika Parris, MD

provide pivotal comfort to our patients and families in difficult times. With enthusiastic support from our Greater Boston communities and beyond, donations of more than 250 iPads poured in. The innovative groundwork laid by staff, coupled with generous donations from community members and charitable foundations, allowed us to provide every unit in the hospital with iPads to facilitate this digital connection.

“The program ultimately restored connection in a time of crisis, bringing family back to bedside, albeit virtually,” said Dr. Trahan. “It also served as a means for loved ones to be present for critical end-of-life meetings with the patient-care-team, which helped guide us in providing care based on patients’

providers remains as important as ever. Ritika Parris, MD, a primary care physician in Healthcare Associates (HCA), who serves as the Director of Wellness for Graduate Medical Education (GME) and as HCA’s Physician Wellness Advocate, is actively involved in several layers of initiatives to promote physician wellness at BIDMC.

The Division of General Medicine has a faculty development and mentorship program, aimed at supporting early-career faculty in their personal and professional goals while fostering community at work. At HCA, the Young Rourke Wellness Committee is currently running a small grants initiative to support pilot programs to promote wellness and identify areas

patient care and experience. It is clear that we all have important roles in this process. Leadership is key to building a cultural environment that values well-being as part of a broader, organizational strategy and

As Dr. Crocker emphasized, “There are absolutely beautiful stories shared around the medical center of medical ward and ICU teams facilitating a last wish Red Sox game, or the marriage ceremony of patients receiving end of

up by a nurse or a unit coordinator, that magically appears in the room for the family accompanying a loved one who is dying on inpatient hospice care. These stories happen every day.”

Our mission in the Department of Medicine has long been to provide the kind of care we would want our own family members to receive. We continue to live and work through a public health crisis. The demands are numerous but the underlying goal remains the same.

“The one thing we all have in common working in the healthcare space,” said Dr. Crocker, “is the need to be able to reach our patients, and each other, in authentic but simply human ways.”



“The one thing we all have in common working in the healthcare space is the need to be able to reach our patients, and each other, in authentic but simply human ways.”

—Jonathan Crocker, MD, FHM

colleagues and peers play vital roles in strengthening an environment that prioritizes well-being.

“Our peers can offer a deep well of support by checking-in on their peers, often filling their own cups along the way,” said Dr. Parris. “This is certainly one of my most cherished parts of working at BIDMC: knowing that I have colleagues who will listen, support, and guide me when I need it.”

A Humanistic Mission

We are deeply proud of these formal programs and initiatives to care for our patients as a whole and for our staff. Just as we are proud of the numerous instances of humanistic care that take place, every day, across the medical center.

life care. And there are also countless other stories, many which go untold or unwitnessed that exemplify humanism in our hospital – like the intern or resident who stays beyond their shift to sit with their dying patient to ensure they don’t pass alone, or the hours of listening and support a social worker gives to a patient facing addiction and a scary decision whether or not to seek help now, or that care basket of food and other goodies, called

Medical Education Leadership

(2019-2020 and 2020-2021 Academic Years)



Drs. Zeidel and Smith with our 2019-2020 Chief Medical Residents

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
Virginia Brady, MD
Kenneth Mukamal, MD, MPH
Daniel Ricotta, MD
Elizabeth Targan, MD
Anjala Tess, MD
Aarti Asnani, MD
Leo Celi, MD
Elizabeth (Lisa) Samelson, PhD
Julius Yang, MD, PhD

EDUCATION MANAGER
Ruth Colman, C-TAGME

Chief Medical Residents (2019-2020)

James Doolin, MD
Bess Flashner, MD
Shana Rakowsky, MD
Zachary Reese, MD
Jason Shpilsky, MD
Shu Yang, MD

Chief Medical Residents (2020-2021)

Niloofar Latifi, MD
Susan McIlvaine, MD
Alison Trainor, MD
Tomas Valerio, MD
Hollis Viray, MD
Samuel Woodworth, MD

FIRM CHIEFS

Blumgart Firm
Wendy Stead, MD
William Aird, MD

Kurland Firm
Barbra Blair, MD
Emmanuel Mensah, MD, MBA

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
Anita Vanka, MD
Co-Course Director

CORE II CLERKSHIP
Vilas Patwardhan, MD
Marisa Jupiter, MD
Co-Course Directors

PRACTICE OF MEDICINE CLERKSHIP
Anita Vanka, MD
Kelly Ford, MD
Co-Course Directors

PRIMARY CARE CLERKSHIP
Katherine Wrenn, MD

Fellowship Program Directors

CARDIOVASCULAR DISEASE
Joseph Kannam, MD

CLINICAL CARDIAC ELECTROPHYSIOLOGY
Alfred Buxton, MD

INTERVENTIONAL CARDIOLOGY
Eric Osborn, MD, PhD

ADVANCED CARDIAC IMAGING
Warren Manning, MD

STRUCTURAL HEART INTERVENTION
Roger Laham, MD

CARDIO-ONCOLOGY
Aarti Asnani, MD

ADVANCED HEART FAILURE & TRANSPLANT CARDIOLOGY
E. Wilson Grandin, MD

CLINICAL INFORMATICS
Steven Horng, MD

ENDOCRINOLOGY, DIABETES AND METABOLISM
Alan Malabanan, MD

GASTROENTEROLOGY
Sarah Flier, MD
Director

Ciarán Kelley, 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 & PRIMARY CARE
Kenneth Mukamal, MD, MPH
Mara Schonberg, MD, MPH

GERONTOLOGY
Jeremy Whyman, MD

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 Kytтарыs, MD

Drs. Zeidel and Smith with our 2020-2021 Chief Medical Residents



Selected Publications

ALLERGY & INFLAMMATION

Steinfeld J, Bradford ES, Brown J, Mallett S, Yancey SW, Akuthota P, Cid MC, Gleich GJ, Jayne D, Khoury P, Langford CA, Merkel PA, Moosig F, Specks U, Weller PF, Wechsler ME. [Evaluation of clinical benefit from treatment with mepolizumab for eosinophilic granulomatosis with polyangiitis](#). *J Allergy Clin Immunol* 2019; 143(6):2170-77.

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Selected Publications

IMMUNOLOGY

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In Memoriam



Dr. Burton 'Bud' Rose

Burton 'Bud' Rose, MD, retired Professor of Medicine at HMS and BIDMC, passed away on April 24, 2020. Everyone reading this is undoubtedly familiar with his creation, UpToDate, but may not be aware that he developed this on his own, using a personal computer, well before computer-based education was commonplace and also well before the modern internet era. Before developing UpToDate, he was already widely recognized in the Nephrology community for several textbooks (including Clinical Physiology of Acid-Base and Electrolyte Disorders and Pathophysiology of Renal Disease) that became popular, largely because they were so well-organized and clearly written. A superb bedside teacher, Dr. Rose taught generations of outstanding nephrologists and residents in our training programs, many of whom are leaders nationally.

Dr. Rose graduated from Princeton University and the New York University School of Medicine. Before joining us at BIDMC, he was a member of the faculty at University of Massachusetts Worcester and at Brigham and Women's Hospital. Even after his work at UpToDate pulled him away from the bedside, Dr. Rose continued to attend on the Nephrology services at BIDMC and continued to teach residents and fellows. His many accolades included the Robert G. Narins Award of the American Society of Nephrology, the highest award given for education in nephrology. A few years ago, Bud visited us when the Department of Medicine honored him with a noontime session of short talks about medical writing and placed his picture and biography on the wall of Deaconess 3.



Dr. Robert Rosenberg

Robert Rosenberg, MD, PhD, who conducted groundbreaking research in thrombosis and hemostasis at the Beth Israel hospital prior to his retirement in 2004, passed away on April 1, 2020 at age 82 in New York City. He was one of the premier investigators in the fields of hemostasis and thrombosis and glycobiology for more than 30 years and a major presence in the BIDMC research community throughout his career.

Dr. Rosenberg joined the faculty of HMS and had laboratories and clinical responsibilities at the then Beth Israel Hospital. He rapidly was promoted to Professor of Medicine at HMS and was bestowed an endowed chair as the William Bosworth Castle Professor of Medicine. In 1981, he was appointed Professor of Biology at MIT in addition to his HMS professorship; his MIT lab engaged in basic studies of coagulation and vascular biology while the group at BI focused on clinical-translational

research. He forged strong ties between the institutions, primarily by bringing postdocs and fellows from HMS to MIT. This was inspired by his conviction that fundamental and clinical research required bridging.

Among Bob's outstanding qualities were his embrace of new technologies to address important scientific questions including molecular genetics and the early use of genetically-engineered mice and his scientific leadership abilities. He was a mentor to MDs, PhDs, and postdocs in his own and other laboratories, and led collaborative research efforts at HMS and MIT, funded by the NIH. He later founded the Division of Molecular Medicine at the then Beth Israel Hospital where he recruited talented physician-scientists in oncology, nephrology, and cardiology starting their laboratories. Dr. Rosenberg will be remembered by those who knew him for his towering intellect, warmth, wit, charm, and intensity.



Dr. Mobeen Sheikh

Mobeen Sheikh, MD, FACC, passed away on March 18, 2021. Dr. Sheikh was a renowned practicing Interventional Cardiologist, consistently listed in Boston Magazine's Top Doctors list, whose practice sites included Atrius Health, Beverly Hospital, where he was Chair of Cardiology, and here at BIDMC.

He graduated from Aga Khan University Medical College in 1995, and subsequently moved to the US

where he trained at University of Connecticut, the Cleveland Clinic, and then came to BIDMC where he completed his interventional training in 2007. He was a widely published researcher with over 250 publications in reputable journals such as the Journal of the American College of Cardiology, American Journal of Cardiology, and many more. His colleagues share that Dr. Sheikh was known for his air of positive energy, his dry sense of humor, and a warm heart.



Dr. Howard Bleich

Howard Leslie Bleich, MD, the co-founder of the Division of Clinical Informatics at BIDMC, passed away on September 2, 2021. Dr. Bleich arrived at the then Beth Israel Hospital and HMS in 1967 and is renowned for being a pioneer in a field he initially called "computer medicine." His groundbreaking work to develop a computer-based "Acid-Base Therapy Advisor" is now recognized as a pioneering work in expert systems in medicine. This expert system was the first not only to suggest a diagnosis but also to recommend treatment. In 1970, with the support of Dr. Howard Hyatt, Dr. Bleich recruited Warner Slack, and they co-founded the "Laboratory for Computer Medicine," the first academic division to explore the use of computers in clinical care. In 1976, they were approached by the hospital to computerize the medical record department and then the rest of the hospital except for financial systems.

In 1983, Drs. Bleich and Slack were asked to port the computer system from the Beth Israel Hospital to the Brigham and Women's Hospital. They formed

the Center for Clinical Computing and named their system the CCC system, which is still running (although modernized). The system grew to the needs of physicians, nurses, housestaff, other hospital personnel, and patients themselves. Howard invented some major technology to make this work, such as a clustered architecture system and a memory-sharing system, long before this technology was commercially available. Dr. Clement H. McDonald, one of the pioneers of medical informatics, noted that Beth Israel developed "one of the world-class best clinical systems of all times. It was one of the most reliable, most loved, most comprehensive."

He was a gifted teacher who started his classes on renal pathophysiology with the question, "who remembers the molecular weight of sodium?" He was on the editorial board of the *New England Journal of Medicine* and edited the Beth Israel Seminars in Medicine in this journal. Dr. Bleich's work has transformed clinical care at BIDMC and around the world.



Dr. Alex Goldfarb

Alex Goldfarb, MD, of the Division of Nephrology, passed away on January 16, 2021. Dr. Goldfarb was a full-time attending Nephrologist at BIDMC from 2007 until 2018 and an Assistant Professor of Medicine, Part Time at HMS. Since August, 2020, he was a Senior Medical Director at Inozyme Pharma, a rare disease biopharmaceutical company.

He attended medical school at Izhevsk State Medical Academy in Russia and also earned 2 PhDs, one in Numeric Methods in Medicine in Russia and another in Biomedical Informatics at the University of Utah. He went on to have an excellent academic career and

as a widely published medical writer published over 70 peer-reviewed publications and several books. His most recent, now in press, is the first Critical Care Medicine book to include a chapter on COVID-19. When the COVID pandemic first broke out, Dr. Goldfarb sought out the epicenter of the pandemic on the Eastern Seaboard—Elmhurst Hospital—and drove there immediately to treat patients in need at great risk to himself, intubating up to 6 COVID patients each night. A caring physician, Dr. Goldfarb was also an avid mountain climber, and runner who had completed dozens of marathons.

Clinical Volume at BIDMC's Boston Hub

Fiscal Year 2021

| | |
|---|---------------------|
| Clinical Revenue..... | \$84,721,227 |
| Patient Days in Hospital..... | 119,124 |
| Inpatient Discharges..... | 16,184 |
| Observation Discharges..... | 2,625 |
| Work RVUs..... | 1,290,816 |
| Outpatient Visits..... | 316,119 |
| Endoscopic procedures..... | 23,088 |
| Cardiac Caths..... | 4,580 |
| Electrophysiology procedure..... | 1,445 |
| Patients in BIDMC's Boston-based Healthcare Associates primary care practice..... | 40,592 |

Research Funding: Academic Year 2021

| Division | Funding Source | Direct Award | Indirect Award |
|--|--------------------------|----------------------|---------------------|
| Allergy and Inflammation | Federal | \$824,184 | \$513,595 |
| | Non-Federal | \$4,724 | \$65 |
| Cardiovascular Medicine | Federal | \$4,808,152 | \$2,222,628 |
| | Non-Federal | \$7,058,168 | \$1,572,848 |
| Clinical Informatics | Federal | \$83,485 | \$2,653 |
| | Non-Federal | \$47,574 | \$10,981 |
| Endocrinology, Diabetes and Metabolism | Federal | \$10,014,489 | \$4,127,796 |
| | Non-Federal | \$3,192,233 | \$378,904 |
| Experimental Medicine | Federal | \$166,667 | \$107,008 |
| | Non-Federal | \$460,964 | \$86,671 |
| Gastroenterology, Hepatology and Nutrition | Federal | \$5,346,214 | \$3,337,035 |
| | Non-Federal | \$3,283,182 | \$833,509 |
| General Medicine | Federal | \$4,804,973 | \$1,408,058 |
| | Non-Federal | \$3,830,560 | \$442,569 |
| Gerontology | Federal | \$734,968 | \$154,630 |
| | Non-Federal | \$334,419 | \$21,091 |
| Hematologic Malignancies | Federal | \$5,234,720 | \$3,285,041 |
| | Non-Federal | \$1,317,327 | \$1,747,825 |
| Hemostasis and Thrombosis | Federal | \$1,317,327 | \$661,138 |
| | Non-Federal | \$248,566 | \$141,556 |
| Immunology | Federal | \$287,226 | \$215,420 |
| | Non-Federal | \$52,268 | \$ |
| Infectious Diseases | Federal | \$1,198,174 | \$519,161 |
| | Non-Federal | \$161,075 | \$42,263 |
| Interdisciplinary Medicine and Biotechnology | Federal | \$701,569 | \$334,187 |
| | Non-Federal | \$969,971 | \$121,009 |
| Medical Oncology | Federal | \$8,425,174 | \$3,068,225 |
| | Non-Federal | \$9,467,465 | \$1,420,784 |
| Nephrology | Federal | \$4,565,413 | \$2,504,660 |
| | Non-Federal | \$2,611,116 | \$218,624 |
| Pulmonary, Critical Care and Sleep Medicine | Federal | \$1,646,118 | \$500,195 |
| | Non-Federal | \$995,981 | \$95,732 |
| Rheumatology and Clinical Immunology | Federal | \$1,375,175 | \$1,018,848 |
| | Non-Federal | \$873,865 | \$195,334 |
| Signal Transduction | Federal | \$103,637 | \$75,994 |
| | Non-Federal | \$ | \$ |
| Translational Research and Technology Innovation | Federal | \$ | \$ |
| | Non-Federal | \$1,739 | \$261 |
| Virology and Vaccine Research | Federal | \$29,797,607 | \$6,267,089 |
| | Non-Federal | \$17,174,459 | \$3,416,726 |
| | Total Federal | \$81,435,272 | \$30,323,361 |
| | Total Non-Federal | \$58,298,109 | \$10,746,752 |
| | GRAND TOTAL | \$139,733,381 | \$41,070,113 |





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 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. 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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