



Beth Israel Deaconess
Medical Center



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



2016–2017 BIANNUAL REPORT

Department of Anesthesia,
Critical Care, and Pain Medicine

Our Mission:

Improve the quality of our patients' lives by providing compassionate, state-of-the-art care and relief of pain.

Advance the science of anesthesia by generating new knowledge. Educate the next generation of leaders in anesthesia.

Support personal and professional fulfillment of our departmental members.

Department of





Beth Israel Deaconess
Medical Center



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Anesthesia, Critical Care, and Pain Medicine



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TABLE OF CONTENTS

Welcome	1
Harvard Faculty Roster	4
CLINICAL ANESTHESIA	6
BID–Milton	8
BID–Needham	10
BID–Plymouth.....	12
CLINICAL ANESTHESIA DIVISIONS	
Ambulatory and Pre-Admission Testing	16
Nurse Anesthesia.....	18
Cardiac Anesthesia.....	20
Neuroanesthesia.....	24
Obstetric Anesthesia	28
Orthopedic Anesthesia	34
Regional Anesthesia.....	38
Thoracic Anesthesia	42
Transplant Anesthesia.....	46
Vascular Anesthesia.....	48
CRITICAL CARE	50
PAIN MEDICINE.....	54
RESEARCH	58
Center for Anesthesia Research Excellence	62
EDUCATION	64
QUALITY, SAFETY, AND INNOVATION	70
Residents and Fellows	78
Selected Publications	80
By the Numbers.....	89
Administrative, Technical and Nurse Staff.....	90

Editor's Note

This biannual report of the Department of Anesthesia, Critical Care, and Pain Medicine highlights the work and achievements of the department, and its faculty, residents, and staff for the **academic years 2016 and 2017**. I hope you find it interesting and informative.

– Alan Lisbon, MD
Executive Vice Chair



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WELCOME

Welcome to the Department of Anesthesia, Critical Care, and Pain Medicine! This biannual report documents just some of the many impressive accomplishments of the department over the past two years. These accomplishments underscore the remarkable work of our team, working together to provide skilled and compassionate clinical care, inspiring education, innovative research, and leadership in the management and continuous improvement of high quality, effective, patient-centered care. As chair and a longtime member of the department, I offer my personal appreciation and admiration for the expertise, collegiality, and dedication of this impressive team of physicians, nurses, and support staff.

Our shared departmental vision is to:

- contribute significantly to the further development and success of Beth Israel Deaconess Medical Center and its network of hospitals.
- deliver state-of-the-art and efficient service in perioperative anesthesia, critical care, and pain management.
- lead the way to improving perioperative patient care through the collaborative application of best practices.
- develop innovative training programs that attract the finest applicants from Harvard Medical School and other top programs nationally.
- be recognized nationally and internationally as a leader in the advancement of anesthesiology through education, research, innovation, and participation in specialty societies.
- be accountable in a measurable way for the value the department brings to our patients and the medical center.

The department has significant strengths. First and foremost, our faculty is clinically excellent. They provide cutting-edge clinical care, supporting the most complex surgical services. They are among the hardest working physicians in the medical center. We take huge pride in our individual achievements, our work as a department, and in the medical center. The intense loyalty and dedication among our staff produces results. The clinical outcomes of our cases are second to none across all three areas of service: operative anesthesia, critical care medicine, and pain medicine.

Through our work over the last year, we are poised to ensure that these high standards are extended across the Beth Israel Deaconess Medical Center

(Continued on page 2)



(BIDMC) network of hospitals. We have assumed responsibility for anesthesia and pain medicine services at Beth Israel Deaconess–Milton and Beth Israel Deaconess–Plymouth hospitals. The department is leading the way for the integration of hospital-based clinical services throughout the network. As the network expands, we will expand to provide high-quality and cost-effective care at our new affiliates.

Our educational programs are nationally renowned and continue to attract excellent candidates. Our clinical research programs have benefited greatly from the formation of our Center for Anesthesia Research Excellence (CARE), which has allowed us to grow clinical research across the department. Our laboratory researchers in the field of pain medicine are nationally recognized, and in both areas we have significant and increasing external funding.

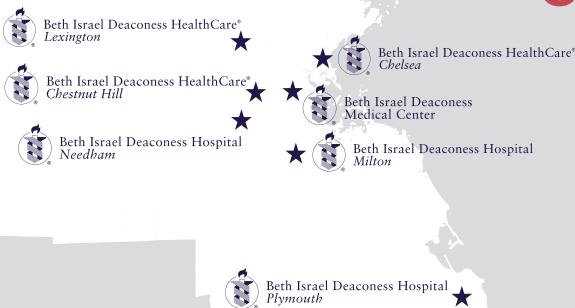
The Division of Pain Medicine is one of the oldest and most respected academic pain practices in the nation. Over the last year, we have also seen an increase in services at our affiliates. The Pain Medicine Fellowship training program is widely considered the best in the nation, and in 2015 was named one of the top two training programs in the country by the American Academy of Pain Medicine. The division has recruited several new physicians and implemented a comprehensive plan to provide all of the nonsurgical care in the Spine Center.

The Department of Anesthesia founded the first Intensive Care Unit (ICU) at BIDMC in 1969. Since then, our department has provided stable and responsible leadership for the surgical ICUs. Over the last two years we have led development on the new BIDMC Neuro ICU, increased ICU services at BID–Plymouth and begun to provide critical care coverage at BID–Milton. Our Critical Care group continues to build on its research success with multiple, ongoing clinical and translational research projects.

All academic clinical departments are challenged by a fourfold impact from accountable care, declining clinical revenue, an evolving training environment, and flat or contracting NIH budgets. Anesthesia is especially sensitive to all of these. In the past, our specialty (and departments) pioneered the patient safety

OUR COMMUNITY SITES

We provide a full range of anesthesia, critical care, and pain medicine—and oversee day-to-day operations of the ORs—at our BIDMC Boston main campus, as well as our community hospital partners, BID–Milton, and BID–Needham. We provide oversight for Anesthesia and Critical Care at BID–Plymouth. We also provide Pain Services our BID HealthCare® locations: Lexington, Chestnut Hill, and Chelsea.



movement, founded the specialties of critical care, and pain medicine, introduced simulation to medicine, and led the integration of nonphysician providers in the workforce. As a specialty and as a department, we will continue to adapt and lead in this changing environment. Within the medical center, the Anesthesia Department is recognized as a team player that provides outstanding clinical service. We have taken the lead in collaborative process improvements across the spectrum of perioperative medicine, and in developing and improving patient care processes for optimal outcomes. Outside the hospital, we are recognized as a national leader in innovation, both in clinical care as well as in the science of perioperative health care delivery.

The Beth Israel Deaconess Department of Anesthesia, Critical Care, and Pain Medicine continues to provide world-class clinical care, training and education, research, and leadership in an environment of collaboration and collegiality. Whether you are an alumnus, colleague, potential applicant, or interested friend, I hope that by perusing these pages you will learn more about our diverse programs, activities, and accomplishments.

–Danny



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CLINICAL ANESTHESIA

The Clinical Anesthesia Program provides anesthesia services for all operating rooms, labor and delivery, and non-operating room procedural areas at Beth Israel Deaconess Medical Center.

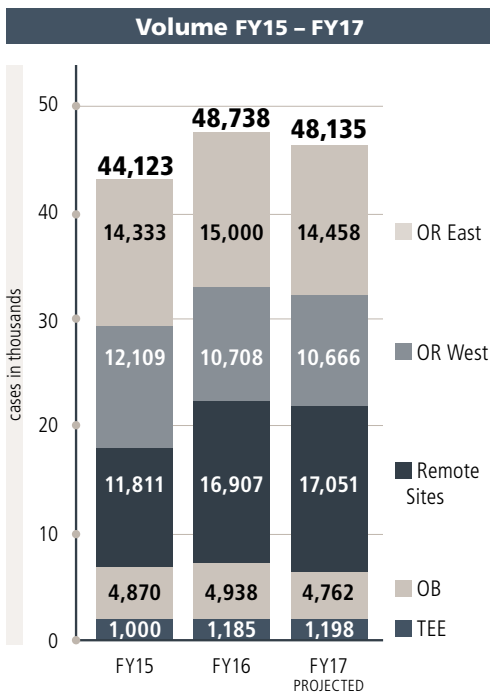
At BIDMC, we staff 40 operating rooms (ORs) between Boston’s East and West campuses, located in three main suites (19 on Main West, 11 in Feldberg-East, and 10 in the Shapiro Ambulatory Suite-East). We recently opened a new hybrid OR on the West Campus to care for the substantial increase in structural heart procedures over the past two years. Non-operating room procedural areas include three sets of gastrointestinal endoscopy (GI) suites, three electrophysiology (EP) suites, two angiography suites, an endovascular procedure suite, and CT, MRI and ECT suites.

Clinical Anesthesia Divisions include cardiac, vascular, thoracic, orthopedic, neurosurgical, transplant, ambulatory, regional, GI, office-based, pre-admission testing, and obstetrics.

Governance of perioperative services at BIDMC is by the Operating Room Executive Committee (OREC), a subcommittee of the Medical Executive Committee. OREC is responsible for strategic planning for the operating rooms and meets biweekly. This committee is chaired by the Chiefs of Anesthesia and Surgery, and the Director of Perioperative Nursing (Dr. Danny Talmor, Dr. Elliot Chaikoff, and Elena Canacari, RN respectively), with representation by members of the Anesthesia Department. A subcommittee of OREC—the Perioperative Operations Committee—is responsible for the day-to-day operations of the ORs and also meets biweekly. This committee is chaired by the Vice Chair of Clinical Anesthesia, the Chief of General Surgery, and

the Director of Perioperative Nursing (Dr. Peter Panzica, Dr. Mark Callery, and Elena Canacari, RN respectively). In 2016, we added clinical directors to the East (Dr. Eswar Sundar) and West (Dr. Adam Lerner) Campuses. The role and responsibility of the clinical directors is to manage the clinical operations of their respective campuses.

Our presence in the community continues to grow as we provide anesthesia care at BID–Needham and BID–Milton, and oversight at BID–Plymouth. OR integration happens in concert with senior hospital leadership to make the best use of our systems OR resources—namely driving lower-acuity care out to the community. We have helped create effective OR governance in the community and connected their ORs to the main campuses with a robust IT system after creating common definitions and accountability for OR metrics and efficiencies. BID–Needham has six ORs—including two





new ORs and a post-anesthesia care unit (PACU) and holding area. BID–Milton has six ORs, as well as a high-volume GI suite, with future OR expansion being planned. BID–Plymouth has eight ORs, along with a labor and delivery suite (L&D), and a GI suite. We will soon have a common electronic anesthesia record in our community sites.

Case volume at BID–Needham and BID–Milton has continued to increase over the past two years. The Anesthesia Department is expanding to support additional space and growing volume at our Boston campus and our community hospitals. With the addition of 10 new staff to our department, we have a total of 205 clinicians—91 attendings, 40 CRNAs, house staff of 55 residents, and 19 fellows (with new fellowships in neuroanesthesia and neurocritical care).

Several Faculty Hour chartered teams were centered around OR improvement and involved departmental members collaborating with our surgical and nursing colleagues. These included eliminating blood bank waste (essentially eliminated); improving PACU length of stay (with the addition of patient pathways and multimodal analgesia in many subspecialty areas); and improving cath lab efficiency.



Adam Lerner, MD
Clinical Director, West Campus



Eswar Sundar, MD
Clinical Director, East Campus

The only constant is change. It is an exciting time to be at BIDMC, with the accelerated consolidation of health care systems in the Boston area. Ours is the fastest-growing system in the region, and this brings on certain challenges and opportunities. Our Anesthesia Department is well positioned and trusted to help guide these changes and create our own successful future through clinical excellence, innovation, collaboration, and value-based care.



BIDMC Anesthesia and Hospital History

This year marks the 70th anniversary of anesthesia services at Beth Israel Hospital, founded by Sam Gilman, MD, in 1937, and evolving into the Department of Anesthesia, Critical Care, and Pain Medicine. Our 70-year history depicts a story of clinical and academic excellence, with deep roots in social responsibility and patient care. We're proud of our reputation, which has shaped who we are today, and continues to guide us in providing compassionate and state-of-the-art care for our patients.

-1896

New England Deaconess Hospital (NEDH) is established by the New England Conference of Methodists, opening 14 patient beds in a residential brownstone on Mass. Ave. From its founding, NEDH maintained a reputation as an outstanding tertiary-care hospital, developing many of the techniques used in cardiac, and vascular surgery.



-1907

NEDH builds a **50-bed hospital** and relocates to the Longwood area near Harvard Medical School.



-1916

Beth Israel Hospital (BIH) opens on **Townsend Street, Roxbury**, with 45 patient beds. A Jewish-sponsored hospital, BIH was founded to care for the medical needs of Boston's immigrant Jewish community and to provide residency training opportunities for the area's Jewish doctors. The hospital developed a strong reputation for social responsibility, for taking care of the poor, and for academic excellence. Beth Israel earned a place as one of the premier hospitals in the Harvard system.





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 Site Chief, Milton
 Associate Professor of Anaesthesia

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Sara E. Neves, MD*
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Beth Israel Deaconess Hospital Milton (BID—Milton) is an 88-bed acute care community hospital with 24-hour emergency services, an eight-bed ICU, and more than 250 physicians on staff. The hospital has been affiliated with BIDMC since 2005. In 2015, the BIDMC Anesthesia Department took over anesthesia services, including pain management and shared coverage of the ICU. We staff five to six operating rooms as well as one to three endoscopy suites daily. BID—Milton offers surgery for

adults in multiple specialties, including orthopedics, hand, spine, general surgery, ENT, urology, gynecology, and plastics. This past year, several surgical services have joined or expanded coverage at Milton, leading to exciting new opportunities. This includes the introduction of a new robotic surgery program—allowing surgeons to decant cases from downtown BIDMC to the community. This year Milton also became a bariatric center of excellence, and we observe steady growth in this service. Ortho-

pedic surgery volume, especially for knee and hip joint replacements, continues to be a major contributor to operating room volume and it is not uncommon to perform six to eight joint replacements in a single day. Volume is likely to continue to increase next year with the addition of more orthopedic surgeons. To accommodate the expanding surgical volume, a seventh operating room and a new 12-bed inpatient unit are expected to open in early 2018. The increase in services and surgeons operating at Milton is met with great enthusiasm from patients and providers since the community setting is often easier for patients and families to navigate—avoiding the stresses of downtown traffic, costly parking, and crowded clinics.

The operating rooms at Milton are now a hive of activity, and this is an exciting time for our anesthesia group. Over the last 12 months, our team has steered the way on major efforts to improved operating room



efficiencies and the perioperative care of our patients. This has led to consistent on-time starts in the operating room, efficient use of rooms during the day, less overtime for late rooms, and an increase in surgical capacity. While intraoperative anesthetic excellence is always our goal, in the last 12 months we have also turned increasing attention to the perioperative care of our patients. Our preoperative assessment system is modeled after BIDMC–Boston, and patients with complex medical histories are evaluated in person by our nurse practitioner in the preoperative assessment clinic in advance of surgery. Postoperative pain control is also a major issue for patients, and we have worked closely with our orthopedic partners in particular to create streamlined carepaths, including multimodal analgesia for joint-replacement patients. This effort has led to the ability to send patients home the morning after their surgery, sometimes even the day of surgery.

Within our own group, we continue to look for opportunities to improve patient care and the quality of our anesthetic care. For example, as a group we have increased the number of members performing regional anesthetics, and spinal anesthesia is routine for all joint-replacement patients. This year we introduced regular quality meetings to review

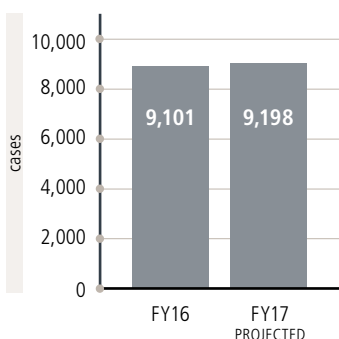
cases—both cases associated with adverse events, and also those that are interesting cases for education. Additionally, we regularly review data on case volume and anesthetic types. We have also added the ability to stream grand rounds from the main campus and host teleconferences for staff meetings. We serve on several major committees for the hospital including Medical Staff, Operating Room Executive, Surgical Steering, and ICU committee. We have been working with other community partners on shared operating room governance through PowerHealth, an operating room data collection tool, and streamlining our electronic record within Meditech.

The community setting

Working in a community setting brings different challenges compared with a major academic hospital, and we continue to learn from our community partners. The importance of teamwork in the community setting cannot be overemphasized. To run nine locations efficiently and safely, every member of the team makes invaluable contributions every day—whether by demonstrating clinical excellence, efficiently setting up for the next case, or simply entering orders on time. It all counts.

As chief of our Milton service, I feel fortunate to have an enthusiastic and talented team of anesthesiologists and nurse anesthetists who come in every day ready and prepared to give it their all. In the coming year, I look forward to continuing to work together to provide the best patient care as safely and efficiently as possible.

BID-Milton Volume FY16 – FY17



1923

Frank H. Lahey, MD, a member of the NEDH surgical staff since 1914, founds the Lahey Clinic, a pioneering multispecialty group medical practice. Lahey was NEDH surgeon-in-chief for many years.

1928

BIH dedicates its new facility at **330 Brookline Ave** (our East Campus).



1928

BIH and Harvard Medical School form a teaching and research partnership, with **Herman L. Blumgart, MD**, named Director of Medical Research and head of the Harvard Teaching Service.



1937

Samuel Gilman, MD, founds the anesthesia services and becomes head of anesthesiology at BIH. He remains chair of anesthesiology until 1967.



1952

The transthoracic pacer, a noninvasive method for jump-starting the heart, is developed by **Paul Zoll, MD**, and his team at BIH. Zoll becomes known as the father of modern cardiac therapy.





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Beth Israel Deaconess Hospital in Needham (BID–Needham) is a 58-bed community satellite hospital affiliated with BIDMC in Boston. The surgical pavilion has a state-of-the-art “open concept” pre-anesthesia holding area, a post-anesthesia care unit, six ORs with two new operating suites added recently to accommodate growing surgical volume. One OR Suite is a dedicated Cystoscopy room, and two are laparoscopic suites.

In an effort to distribute volume appropriately within the system, in 2015, a Clinical Integration Committee, with members from BIDMC and BID–Needham, worked to offload lower-acuity volume from BIDMC to BID–Needham, leading to consistently increasing volume year after year. Volume at BID–Needham has increased 15% since the committee was formed.

Anesthesia providers who manage complex and high-acuity patients at BIDMC bring their expertise to the community, but tailored to the needs of a fast-paced outpatient setting.

Pre-admission testing

BID–Needham uses a pre-admission system that enables patients to pre-enter relevant health information. This encourages active patient participation and engagement in the development of perioperative care plans.

Patient satisfaction

We have implemented a variety of subspecialty-specific multimodal analgesia pathways. These include a number of innovative peripheral nerve blocks that enhance the entire post-surgery recovery. In the area of patient satisfaction with ambulatory surgery, month after month, greater than 95% of patients coming to BID–Needham would be very likely to recommend having surgery here.

Training

The high percentage of orthopedics at BID–Needham offers an excellent opportunity to develop a rotating Regional Anesthesia Fellowship in combination with BIDMC–Boston. Currently there is a practice management rotation for residents nearing graduation at BID–Needham. They gain experience supervising CRNAs,

managing a fast-paced OR, and learning more about the intricacies of running an efficient OR similar to that found in private practice.

Quality and safety innovations

The Department of Anesthesia at BID–Needham has developed several innovative programs in recent years, including:

- multimodal analgesia for patients having laparoscopic surgery and uro-gynecological procedures.
- postoperative care pathways for major joint replacements
- innovative iPad-based electronic health records

In addition, the department has received recognition. A poster titled “Improving Pain Management by Focusing on Causes of PACU Discharge Delays and Preoperative Medications” received third place at the Foundation for Anesthesia Education and Research poster presentation contest at the 2017 American Society of Anesthesiologists Practice Management conference.

We’ve accomplished all this while experiencing significant growth: from 2014 to 2016, the Needham OR volume increased by 26 percent.



SERVICES PROVIDED

- Cancer surgery
- Plastics and reconstructive procedures
- Women’s health and gynecology procedures
- Orthopedic sports medicine
- Total and complex joint replacements
- Hand, ankle, and podiatry sports medicine
- Minimal-access laparoscopic surgery, including colorectal surgery
- Adult otolaryngology
- Limited pediatric otolaryngology
- Urological procedures for men and women



-1967

John Hedley-Whyte, MD, moves from MGH to BIH to found a new independent academic department of anesthesia. Joining Hedley-Whyte from MGH was Leonard Bushnell, MD, to head the ICU at BIH. The department’s key role in critical care at Beth Israel and now at BIDMC has continued over the decades.

-1983



NEDH performs the **first successful liver transplant** in New England.

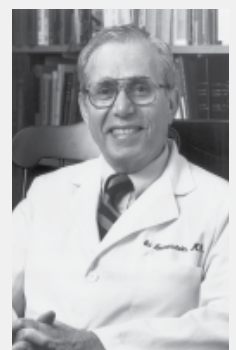
-1985



Ellison “Jeep” Pierce, MD, chair of anesthesiology at NEDH, founds the Anesthesia Patient Safety Foundation. (Pierce served as president of the American Society of

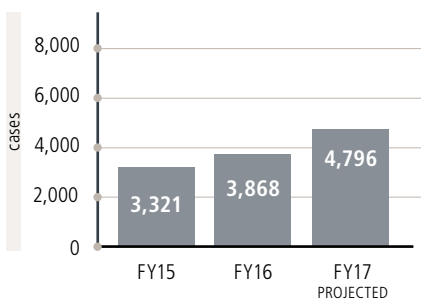
Anesthesiologists in 1982). In the 1980s, residents were taught the mortality rate from general anesthesia was 1/10,000. Now it’s closer to 1/250,000.

-1990



Ed Lowenstein, MD, is named chair and remains in this position until 1997. Considered one of the founders of the field of cardiac anesthesia, his seminal paper in *NEJM*, “Cardiovascular responses to large doses of morphine,” was the basis for the use of high-dose opioid anesthetics in cardiac surgery.

BID-Needham Volume FY15 - FY17





John M. Connolly, MD
Site Chief, Plymouth

CLINICAL ANESTHESIA—PLYMOUTH

Erin Burns, MD

Benjamin Moor, MD

Neil W. Oliwa, MD

Sohrab Sidhwa, MD

Christopher Walters, MD

Natallia Yaromenka, MD

Randy Barnhard, CRNA

John Cona, CRNA

Shirley Czaja, CRNA

Kevin Doherty, CRNA

Jos Foley, CRNA

Penne Traci Greer, CRNA

Kristen Hogan, CRNA

Barbara Quirk, CRNA

Amy Townsend, CRNA

Tara Traczyk, CRNA

Peter Tsinzo, CRNA

Maria Vaz, CRNA

The Beth Israel Deaconess Hospital in Plymouth (BID–Plymouth) is a 153-bed community hospital, located 43 miles south of Boston. BID–Plymouth was chosen as a Leapfrog Top General Hospital in 2016.

The BID–Plymouth Anesthesia Department is a division of the HMFPP Department of Anesthesia and works under the auspices of Harvard Medical Faculty Practice Affiliates. The Plymouth Division is comprised of seven anesthesiologists, 11 CRNAs, a nurse practitioner, and a pain management physician’s assistant, all of whom are dedicated to providing the safest anesthetic care possible to our patients.

Anesthesia services are provided in the operating rooms, OB suites, Pain Management Center, cardiovascular lab, endoscopy suites, Radiology, and emergency room. Anesthesiologists are available in the hospital 24 hours a day, 7 days a week to meet any emergent medical needs of the patients in our expanding community.

Our anesthesia care team is proud to serve all of the patients in Southeastern Massachusetts. We are committed to developing and implementing patient safety and quality initiatives to best

meet the needs of patients while optimizing clinical outcomes and promoting an exceptional patient experience.

Department statistics

We perform about 6,500 operative procedures annually in eight ORs, along with staffing three endoscopy rooms performing approximately 5,500 cases. The Obstetric Department manages about 770 deliveries, and our Pain Management Center has about 4,000 patient encounters annually. We provide extensive use of nerve blocks to facilitate enhanced patient recovery and patient satisfaction.

Accomplishments

Anesthesia Department members, along with surgeons, peri-op nursing representatives, OR technicians and ancillary health professionals, met off site at a “Patient Experience” deep-dive event to identify opportunities to improve the patient experience. Ideas in development include creating a “What to expect” video for patients, perioperative status updates for waiting family members, and a campaign for increased awareness of professional conduct in the perioperative area.



1996

Beth Israel Hospital and New England Deaconess Hospital merge to form **Beth Israel Deaconess Medical Center** (BIDMC). The traditions of the two hospitals melded to create a medical center with outstanding surgery, attention to patient safety, academic excellence, and a continued sense of social responsibility.

2002

BIDMC expands our network of care. **Deaconess Glover Hospital** in Needham becomes the first community hospital affiliate of Beth Israel Deaconess Medical Center, where we run the Anesthesia Department and Pain Services.



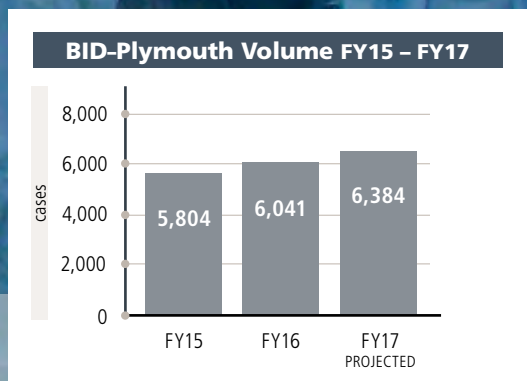
2012



Milton Hospital officially becomes **Beth Israel Deaconess Hospital-Milton**, solidifying a relationship that began nearly a decade earlier.

2015

The 114-year-old Jordan Hospital is renamed **Beth Israel Deaconess Hospital-Plymouth**, extending the BID system of integrated care into southeastern Massachusetts.



FACULTY HOUR

Faculty Hour projects are one of the primary methods we use for improving health care delivery in the perioperative environment. The Faculty Hour Chartered Team portfolio is managed by the Quality, Safety, and Innovation Division.

These projects are comprised of multidisciplinary teams with staff from the Departments of Anesthesiology, Surgery, Nursing, Orthopedics, Obstetrics and Gynecology, and others, to rigorously study and develop methods for improving our care delivery system.

Collaborating across departments on shared issues in this way facilitates a number of benefits:

1. First, it provides all the relevant stakeholders with a “seat at the table.”
2. Second, it increases the knowledge and experience base with which to consider issues and conceive of possible solutions.
3. And finally, it helps build a culture of collegiality and collaboration outside of the clinical setting, which can persist back at the bedside.

All of these factors contribute to developing a more robust shared mental model within the group, which enhances the “stickiness” of proposed solutions, and increases the probability of the success of intervention.

EXAMPLES OF FACULTY HOUR PROJECTS: 2015 – PRESENT

- Carepath for Ambulatory Orthopaedic Sports Medicine Surgery to Improve PACU Length of Stay
- Implementation of Enhanced Recovery After Surgery (ERAS) for Colorectal Surgery
- Carepath for Ambulatory Breast and Plastic Surgery to Improve PACU Length of Stay
- Carepath for Outpatient Cystoscopy Surgery to Improve PACU Length of Stay
- Revising ICU Notes Creation and Rounding Process in the Surgical ICUs
- Improving Access and Preventing Waste of Blood Bank Products
- Developing Neuraxial Anesthesia PACU Discharge Guidelines
- Reducing the Incidence of Unplanned Intubation for General, Thoracic, Vascular Surgical Services
- Development of Preoperative Anemia Guidelines for Orthopedic Surgery
- Development of Protocols for Emergency Aortic Ruptures (“Code Aortic Rupture”)
- Design and Development of Processes to Improve Catheterization Lab Efficiency
- Implementing Anesthesia Interventions for Controlling Unplanned Intubation





Beth Israel Deaconess
Medical Center

**JOYSON
RATNARAJ, MD**
ANESTHESIA
19772



Stephen D. Pratt, MD

Director, Pre-Admission Testing
and Patient Experience

Assistant Professor of Anaesthesia

“Witnessing the phenomenal teamwork and collaboration of our entire staff to prepare each patient for a successful, comfortable experience is very satisfying and rewarding.”

AMBULATORY AND PRE-ADMISSION TESTING

Completely redesigned in 2014, the BIDMC Pre-Admission Testing (PAT) unit is a state-of-the-art clinic that provides a private, patient-centered atmosphere, with resources for blood drawing, electrocardiogram testing, complete physical evaluations, and targeted physical therapy assessments. The multidisciplinary PAT team includes dedicated anesthesiologists, perioperative advanced practice nurses, nurses, case managers, physical therapists, medical assistants, and administrative staff. The primary mission of the PAT clinic is to ensure that all patients are optimally prepared for their planned anesthesia and procedure. This preparation includes management of complex medical conditions, patient education, coordination of appropriate laboratory or other testing, collection of required chart elements, and,

most importantly, an introduction to the medical center to maximize the patient-friendly experience.

Patients can be assessed in one of three ways. All patients receive a telephone call from an experienced nurse in PAT to review health issues, confirm medications, and review preoperative instructions. For many, this is the only preoperative assessment that is needed. Those with a more complex medical history will be seen in the PAT clinic by an experienced nurse practitioner or physician anesthesiologist. During this visit, we perform a complete pre-anesthesia assessment, a history and physical exam, and obtain appropriate testing (blood work, echocardiogram). If indicated, a physical therapist or case manager might also see the patient. The medical staff spends hours ensuring that these complex patients

TEAM

Sheila R. Barnett, MBBS, BSc
Associate Professor of Anaesthesia

Lisa J. Kunze, MD, PhD
Assistant Professor of Anaesthesia

Brendan P. Garry, MBBCh BAO
Assistant Professor of Anaesthesia

Randall S. Glidden, MD
Assistant Professor of Anaesthesia

Joyson P. Ratnaraj, MD, MBBS
Assistant Professor of Anaesthesia

Deborah S. Reynolds, MD
Assistant Professor of Anaesthesia

Richard A. Steinbrook, MD
Associate Professor of Anaesthesia

Nurse Practitioners

Norine M. Gentner, NP

Brian A. Hoell, NP

Joyce Larson, NP

Mary-Ellin Moore, NP

Norma Osborn, NP

Yolanda Perez-Schulman, NP

Eileen Pimentel-Smalling, NP

Virginia A. Sheppard, NP

Eileen M. Stuart-Shor, NP

Bethany W. Thomas, NP

are optimally prepared. They might contact a medical specialist to obtain records, arrange additional assessment of a significant condition, or create a plan for issues like perioperative management of anticoagulant medications or an implanted cardiac device. They might discuss the appropriateness of the planned procedure with the surgeon in light of a high anesthesia risk. The final preoperative assessment is a “waive.” These are complex patients who would generally come for a PAT visit, but this visit is waived because they have had a recent anesthesia assessment, or they live far away, or there are other extenuating circumstances. The charts of these patients are thoroughly re-

viewed by the PAT attending anesthesiologist and appropriate recommendations made when necessary.

The BIDMC PAT clinic is a new, open, bright, and patient-centered environment. It is also a very busy clinic. In 2016 we performed more than 24,000 RN telephone assessments, saw more than 8,100 patients in the clinic, performed more than 7,000 history and physical exams, and waived nearly 2,400.

Despite the busy clinical load, the PAT group is continually trying to improve the care we provide. We have worked to improve the workflow for several specific patient groups. Patients with an implanted cardiac device now



have input from the cardiology device clinic regarding management of the device. We are working on a more standard approach to perioperative management of anticoagulant medications. The nurse practitioners actively engage in a self-education program with regularly scheduled lectures on relevant topics. Multiple academic publications have arisen from the work done in PAT, and the group was awarded a grant for assessing perioperative cognitive dysfunction in the geriatric population.



Anesthesia Pre-Admission Testing October 2016 to May 2017

Total operating room cases booked

14,321

RN telephone assessments

11,981

Pre-admission testing visits

5,062

PAT histories and physicals performed

4,298



Beth A. Coolidge, CRNA
Chief Nurse Anesthetist

“I am inspired by the commitment of our nurse anesthetists to provide the best care to our patients. They are all dedicated and hard-working team members of our outstanding department.”

NURSE ANESTHESIA

The nurse anesthetists primarily practice in a clinical role within the Department of Anesthesia, Critical Care, and Pain Medicine. Certified Registered Nurse Anesthetists (CRNAs) work within a care-team model providing perioperative anesthesia care for most of the departments and subspecialties throughout the medical center, both in Boston and at BID–Needham, Milton, and Plymouth. A secondary, yet important, role of our CRNA team is to actively assist with resident, medical student, nursing, and nursing student training. CRNAs also participate in a wide variety of hospital and department committees, including the multidisciplinary Faculty Hour and Advanced Practice Nursing Committees. The division at the medical center currently includes 23 highly-trained and dedicated CRNAs, with an additional four new hires onboarding this fall. Overall, the division has an impressive depth of

experience with an average of 20 years of anesthesia practice. CRNAs provide mentoring and shadowing opportunities for BIDMC RNs hoping to gain admission to nurse anesthesia graduate programs. Such opportunities have enabled graduates of nurse anesthesia programs to return to BIDMC and practice as nurse anesthetists in our department. The CRNAs have prescriptive authority, which enables them to provide immediate pre- and postoperative order completion. This improves efficiency and quality of pain management to our patients during their entire surgical experience.

The Division of Nurse Anesthesia is committed to—and takes pride in delivering high-quality, safe anesthesia care to the BIDMC and affiliate populations. I am inspired by the commitment of our nurse anesthetists to provide the best care to our patients. They are all dedicated and hard-working team members of our outstanding department.

TEAM

Judy Akpan, CRNA
Carolyn H. Bruce, CRNA
Donnell Carter, CRNA
Timothy J. DeGuzman, CRNA
Patricia A. Demiglio, CRNA
Florence M. Egan, CRNA
Cary Endozo, CRNA
Nicole Graham, CRNA
Donna M. Greene, CRNA
H. Rita Han, CRNA
Sarah E. Hayden, CRNA

Judith B. Hurley, CRNA
Tawnya Lopez, CRNA
Eileen Lyons, CRNA
Arpana Miller, CRNA
Patricia M. O'Connor, CRNA
Rebecca J. Peyev, CRNA
Jennifer L. Phelan, CRNA
William G. Rice, CRNA
Brian Sim, CRNA
Ashley Vaughn, CRNA
Genevieve E. Wright, CRNA





Feroze Mahmood, MD

Director, Cardiac and Vascular Anesthesia
Director, Perioperative Echocardiography
Professor of Anaesthesia

“Our division is considered the national leader in 3D imaging and research.”

CARDIAC ANESTHESIA

The scope, case mix, and complexity of the cases for cardiac anesthesia has continued to evolve over the past two years. Our hospital volume for open cardiac surgical procedures remains stable. Almost a thousand cases were performed in the last fiscal year that required cardiopulmonary bypass support. Importantly, many transcatheter aortic valve replacements (TAVRs) were performed this year with an expected marginal reduction in the number of surgical aortic valve replacements. Our medical center remains one of the busiest centers in Boston for TAVRs. There was also a significant increase in the number of percutaneous interventions on mitral and tricuspid valves that included Mitraclip® procedure and valve-in-valve therapy. Additionally our interventional cardiologists have started performing percutane-

ous Amplatzer® device closures of atrial and ventricular septal defects and other complex intracardiac interventions. Our staff members provide a very high level of real-time three-dimensional (3D) imaging to assess suitability and procedural guidance, thereby establishing success and excluding complications. This unique skill set has expanded our role beyond the traditional heart rooms into the cardiac catheterization laboratories and has established our staff members as integral members of the “structural heart” team. Therefore, our role as perioperative physicians is well established. With the approval and accreditation of our medical center as a heart failure program by the Joint Commission, the ventricular assist device (VAD) volume has consistently increased over the last year. Our division

TEAM

Ruma R. Bose, MD, MBBS
Assistant Professor of Anaesthesia

Megan L. Krajewski, MD
Instructor in Anaesthesia

Robert S. Leckie, MD
Assistant Professor of Anaesthesia

Adam B. Lerner, MD
Assistant Professor of Anaesthesia

John D. Mitchell, MD
Associate Professor of Anaesthesia

Qi C. Ott, MD
Instructor in Anaesthesia

Peter J. Panzica, MD
Assistant Professor of Anaesthesia

Shahzad Shaefi, MBBS
Assistant Professor of Anaesthesia

Bala Subramaniam, MBBS, MPH
Associate Professor of Anaesthesia

Sugantha Sundar, MBBS
Assistant Professor of Anaesthesia



members are involved in clinical care of patients on various kinds of VADs for cardiac and noncardiac surgery.

Quality

According to the Society of Thoracic Surgeons data, our cardiac surgical outcomes data has enjoyed the highest star rating in the majority of outcome metrics, and, is above the national average in others. Vigilance of division members in timely administration of antibiotics and

beta-blockers, reducing allogeneic transfusions, and facilitating early extubation times have all translated into a demonstrable shorter length of stay for our patients—a benchmark of program quality. In the last fiscal year, members of the division have served on various hospital committees for process improvement. Notably, Drs. Panzica, Mahmood, and Ott spearheaded the cardiac catheterization laboratory efficiency project to ensure on-time start of

cases. Drs. Panzica and Lerner have worked on a project to reduce blood component wastage, streamlining of ordering, and availability of blood products. Dr. Lerner is also the leader of the group working to develop a protocol for management of aortic emergencies. Ongoing faculty educational projects include introduction of a new echocardiography reporting system, educational in-service of multiple VAD devices, and introduction to structural heart interventions.





Fellowship and education

Our cardiothoracic (CT) anesthesia fellowship program is one of the most competitive programs in the country. We had more than 150 applicants for only two spots last year. In this context we are excited to report that our CT fellowship program was approved for a third spot by the Accreditation Council for Graduate Medical Education (ACGME), and in July 2017, we started three fellows for our 12-month accredited CT fellowship. In the coming year, we plan to offer an additional (fourth) spot of a Structural Heart Fellowship for fellows who have completed the accredited CT fellowship. We envision this one-year fellowship dedicated to developing expertise in multimodality perioperative imaging to provide procedural guidance. Trainees' experience during cardiac rotations continues to improve, and cardiac electives during senior year are consistently oversubscribed. The division also offers a very popular one-month TEE elective to senior residents and to trainees of sister institutions. Our

division members are rated as some of the best clinical teachers in the department, with Dr. Robert Leckie selected by the residents as the 2016 Clinical Teacher of the Year.

Research and innovation

In addition to their clinical responsibilities, our division members have participated in basic science, clinical, educational, and database research. As part of his Foundation for Anesthesia Education and Research

grant, Dr. Shahzad Shaefi has been investigating the role of hyperoxia in postoperative delirium. Dr. Qi Cui Ott has initiated a research project on the changes in cerebral oximetry with initiation of cardiopulmonary bypass. As part of his National Institute of Health grant, Dr. Balachundhar Subramaniam has been investigating predictive value of pulse pressure variability during cardiac surgery. Under the auspices of the multidisciplinary Valve Research Group division members have been conducting multiple 3D imaging-based projects that range from valve modeling to 3D printing of intracardiac valves. Our division has been recognized and granted the status of hospital "core laboratory" for 3D printing. We have established a state-of-the-art 3D printing laboratory and offer these services to the entire medical center. Additionally, our division possesses multiple echocardiography simulators and a dedicated simulation laboratory. Echocardiography education curricula developed in our laboratory are shared with multiple national and international universities, and we conduct multiple





continuing medical education courses over the year.

Our basic science operation investigated the role of remote ischemic preconditioning, neuroangiogenesis and the role of nanoparticles in delivery of angiogenic therapy to the ischemic myocardium. Our division has also collaboratively developed an artificial mechanical heart capable of generating physiological pressures for hemodynamic evaluation of prosthetic valves. Our division members are working on 3D printing anatomically correct pulsatile models of hearts for task training and developing valvular repair techniques. As a result of these accomplishments and efforts, our division is considered the national leader in 3D imaging and research.

Teaching and mentorship

Members of our group have served in various capacities in multiple national and international professional orga-

nizations and as invited faculty and prestigious visiting professorships. Our members have presented case reports and scientific abstracts, and served as keynote speakers at national and international meetings. Our staff members also serve as editors, section editors, and reviewers for prestigious specialty journals. Academically our group has been consistently productive, with multiple original research articles, invited reviews, case series, editorials, and invited book chapters in peer-reviewed literature. Cardiac anesthesia fellows and residents are invited to participate

in these scholarly projects and are regularly mentored by the faculty.

The specialty of cardiac anesthesia is evolving at a fast pace. Recognizing this challenge, we have transformed our practice and the quality of our training. As a group, we believe we are at the cutting edge of our clinical practice and that we need to be competent, flexible, and efficient to turn this challenge into an opportunity. As a group we have worked hard to be where we are, and we are ready to make the transition to the next level.

FACULTY HOUR

Members from the Cardiac Anesthesia Division are involved in the following projects:

1. CathLab Efficiency Project to improve start times of the cardiac catheterization laboratories (Drs. Mahmood, Panzica, Ott)
2. Blood Conservation Project (Dr. Lerner)
3. Code Aorta Project (Dr. Lerner)



M. Dustin Boone, MD

Director, Neuroanesthesia

Program Director, Neuroanesthesia Fellowship
Program Director, Neurocritical Care Fellowship
Co-director, Neuroscience Intensive Care Unit
Assistant Professor of Anaesthesia

“BIDMC is the most collaborative and friendly hospital where I have worked.

I belong to a highly supportive department where, if you can dream it, the department will help you accomplish your goals.”

NEUROANESTHESIA

Anesthesiologists from the Division of Neuroanesthesia provide comprehensive perioperative care for patients undergoing a wide array of complex intracranial and spine procedures at Beth Israel Deaconess Medical Center (BIDMC). Approximately 2,500 intracranial and spine surgeries are performed annually. BIDMC has an international reputation for the surgical treatment of movement disorders, epilepsy, and cerebral aneurysms. Neurosurgeons who specialize in functional neurosurgery place the largest number of deep brain stimulators in Boston. A multidisciplinary team of specialists is important to the overall success of this program. To that end, Dr. Rami Burstein, a neuroscientist from our department, performs microelectrode recordings for these cases. BIDMC is a high-volume center for patients

with neurovascular disease and offers world-class treatment using open and endovascular techniques. Indications for interventional neurosurgical procedures continue to expand and now include clot-retrieval procedures for acute ischemic stroke. The volume of patients presenting for these emergency cases continues to increase as significant benefit for select patients has been demonstrated. In addition, the evolving technology for pipeline stent and coil embolization procedures has decreased the number of patients who would otherwise require invasive, open neurovascular procedures.

Members from the division serve as attending faculty in our high-acuity Neurosciences Intensive Care Unit (NICU). As a tertiary-care regional referral center, the NICU treats patients with a wide variety of neurologic disease.

Vimal K. Akhouri, MD, MBBS
Assistant Professor of Anaesthesia

Amanda K. Anastasi, MD
Assistant Professor of Anaesthesia

Ruma R. Bose, MD, MBBS
Assistant Professor of Anaesthesia

Somnath Bose, MD, MBBS
Instructor in Anaesthesia

Stephanie B. Jones, MD
Associate Professor of Anaesthesia

Rikante O. Kveraga, MD
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Akiva Leibowitz, MD
Instructor in Anaesthesia

Melanie R. Loberman, MD
Instructor in Anaesthesia

Haobo Ma, MD, MS
Instructor in Anaesthesia

Soumya Mahapatra, MD
Instructor in Anaesthesia

Achikam Oren-Grinberg, MD, MS
Assistant Professor of Anaesthesia

M. Leo Tsay, MD
Instructor in Anaesthesia

Research

Faculty within the division are involved with research that focuses on traumatic brain injury, intracranial hypertension, and lung/brain interactions. The Brain and Lung Injury Study Group (BALI), supported by the Center for Anesthesia Excellence (CARE), is focused on better understanding how mechanical ventilation practices affect brain injury. This work has resulted in the publication of a paper that explored how cerebral hemodynamics are affected by mechanical ventilation. We are currently enrolling patients for a study, Prospective Brain and Lung Injury Trial (P-BALI), that prospectively examines how titration in positive end-expired pressure influences intracranial pressure.

Grant

2013–2016 Regionalizing Safety Through System Science and Patient Engagement, Gordon and Betty Moore Foundation. M. Dustin Boone. The goal of this grant is to develop novel approaches to patient and family engagement and patient safety in the intensive care unit by using system science to develop a series of novel IT applications.

Education, teaching, and mentorship

Members of the division play an active role in resident education; residents rotate through neuroanesthesia during their first two years, with increasing exposure to difficult cases. Senior residents can elect to spend an extra month on service. In addition, the division has hosted foreign residents looking to complete an observership in neuroanesthesia. The group also organizes an annual resident lecture series that covers core topics in neuroanesthesia. A journal club is used to introduce several of the most important articles in neuroanesthesia on a weekly basis. Members of the group maintain an up-to-date list of educational resources, both online via the Anesthesia Intranet and in the Anesthesia Lending Library.

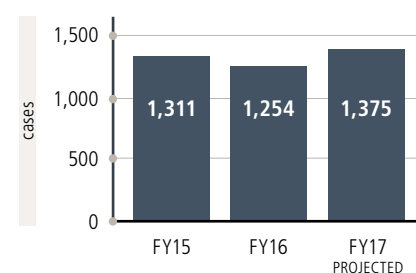
The division also organizes hospital-wide educational events meant to encourage clinicians from various specialties with similar clinical interests to engage in collaborative discussions to improve patient care. The first of these was a neurophysiologic monitoring symposium. Upcoming events include electroencephalography in the

perioperative setting and a Harvard-wide neuroanesthesia resident and fellow journal club.

First-year residents spend one month in the neurosurgical suite. This month is meant to be an introduction to neurosurgical anesthesia, and teaching is directed at reinforcing the basic principles of the subspecialty. In their second year, residents complete another, one-month rotation. During this month, the complexity of the cases increases and there is exposure to neurocritical care. The second-year rotation also includes an “airway rotation,” during which residents gain familiarity using advanced airway techniques.

Members from the division are active in national neuroanesthesia and neurocritical care societies and have been invited to present lectures for these meetings.

Neuro Case Volume FY15 – FY17



Fellowship programs

Two fellowships were established this year in neurocritical care and neuroanesthesia. The Division of Neuroanesthesia offers a one-year, non-ACGME accredited fellowship position in advanced neurosurgical anesthesiology. This is a comprehensive fellowship that provides an opportunity for fellows to gain experience in all aspects of neuroanesthesia, in addition to neurocritical care. In addition, participation in a research project is expected. These projects are facilitated through close mentorship from faculty members, who are accomplished physician-scientists.

For anesthesiologists who have completed a fellowship in critical care medicine, the department offers an

FACULTY HOUR

Members from the division of neuroanesthesia are involved in an ongoing Faculty Hour project to improve operating room efficiency for spine procedures. The goal of this multidisciplinary project—which involves representatives from the entire perioperative care team—is to decrease turnover time between cases. To accomplish this, the team has analyzed our current practice and also looked beyond BIDMC to seek out best practices. A performance scorecard tracks turnover time on a weekly basis, which allows for a closer look at how implementation of factors affects these results.

additional one-year fellowship in neurocritical care. This fellowship, which is accredited by the United Council for Neurologic Subspecialties, leads to board eligibility for the subspecialty of neurocritical care. This fellowship consists of eight months spent in our dedicated neuroscience intensive care unit and four months of elective rotations, which include a wide range of options.

Neuroanesthesia is an exciting place to be. The case mix is interesting and challenging, and much work needs to be done to better understand how to best care for patients undergoing neurosurgical procedures. BIDMC is the most collaborative and friendly hospital where I have worked. I belong to a highly supportive department where, if you can dream it, the department will help you accomplish your goals.







Philip E. Hess, MD

Director, Obstetrical Anesthesia
Associate Professor of Anaesthesia

“We help spearhead medical teamwork in the hospital and nationally. We strive to ensure that the care of the pregnant patient is seamless across every hospital service.”

OBSTETRICAL ANESTHESIA

The obstetric services at Beth Israel Deaconess Medical Center are a major tertiary referral center and the second-largest delivery unit in Massachusetts. The Division of Obstetric Anesthesia includes 13 full- and part-time staff that provide clinical, academic, and administrative services. The primary clinical service consists of providing anesthetic care to women who are pregnant beyond 20 weeks of gestation, with a principle focus on managing the anesthetic care of women in the peripartum period. This entails providing pain relief services during labor, providing anesthesia for cesarean delivery, and other clinical services such as emergent and high-risk care, consultations, and postpartum care.

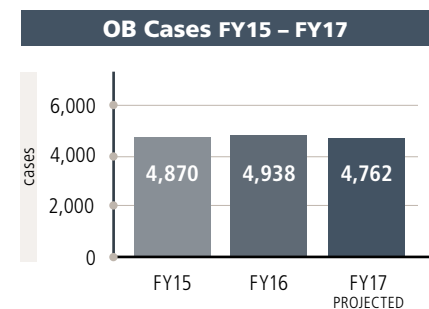
In addition to providing services for labor and delivery, the division is involved in the care of the parturient during other times. We provide a consultative service for pregnant patients who

have complex medical conditions and assist in the management of patients with postpartum complications, such as massive hemorrhage, congestive heart failure, or neurologic deficits.

A core principle of the division is interdisciplinary coordination and teamwork. We help spearhead medical teamwork in the hospital and nationally. We strive to ensure that the care of the pregnant patient is seamless across every hospital service.

Quality and volume

Over the past year, the Division of Obstetric Anesthesia was very active



TEAM

Vimal K. Akhouri, MD, MBBS
Assistant Professor of Anaesthesia

David M. Feinstein, MD, MS
Assistant Professor of Anaesthesia

Bozena R. Jachna, MD
Assistant Professor of Anaesthesia

Galina V. Korsunsky, MD
Instructor in Anaesthesia

Adrienne T. Kung, MD
Instructor in Anaesthesia

Lior Levy, MD
Instructor in Anaesthesia

Yunping Li, MD
Assistant Professor of Anaesthesia

Selina A. Long, MD
Assistant Professor of Anaesthesia

Anh L. Ngo, MD, MBA
Instructor in Anaesthesia

Nancy E. Oriol, MD
Faculty Associate Dean for Community
Engagement in Medical Education
Associate Professor of Anaesthesia

Stephen D. Pratt, MD
Assistant Professor of Anaesthesia

Laura L. Sorabella, MD
Instructor in Anaesthesia

Joan E. Spiegel, MD
Assistant Professor of Anaesthesia

Justin K. Stiles, MD
Instructor in Anaesthesia

Sugantha Sundar, MBBS
Assistant Professor of Anaesthesia

clinically. In the 2016–2017 academic year, the Division provided almost 5,000 anesthetics. This included over 4,000 patients who received analgesia for their labor pain, and almost 1,500 who had a cesarean delivery (some of whom were in labor and received labor analgesia), and dozens of additional cases of peripartum care. We provided formal consultation to over 1,000 women prior to delivery. Many of these were for high-risk conditions, including severe scoliosis, hematologic conditions, cardiac, pulmonary, and neurologic diseases, and supra-morbid obesity.

Over 90% of the women who deliver at Beth Israel Deaconess Medical Center receive labor analgesia. The Division is responsible for the vast majority of this care, including providing labor epidural analgesia, combined spinal-epidural analgesia, and intravenous narcotics in women who cannot receive neuraxial techniques. A significant component of the service is also devoted to providing anesthesia for cesarean delivery. Par-

turients can be scheduled for cesarean delivery, or proceed to cesarean after labor on an urgent or emergent basis. Cesarean delivery can be accomplished with spinal anesthesia, epidural anesthesia, or occasionally general anesthesia. Approximately 30% of women delivered by cesarean, and our general anesthesia rate remained below 1%. Furthermore, we met and exceeded all quality goals as set by MassHealth maternity and the Joint Commission perinatal care measures. We also provided the highest quality post-cesarean section pain control via multimodality approaches, including neuraxial opioids, epidural analgesia, parenteral pain medication, and transversus abdominus plane block, if indicated.

Last year we participated in the New England Center for Placental Disorders, a program at BIDMC designed to provide comprehensive care to women with abnormal placentation. Using a cooperative, multidisciplinary approach, we help to care

FACULTY HOUR

The Division of Obstetric Anesthesia maintains an active involvement in Faculty Hour quality improvement projects.

Multidisciplinary quality improvement projects. Run throughout the year, these projects have a single theme around some aspect of patient care that needs to be improved. Projects include anesthesia staff, residents, and fellows, along with obstetrician counterparts, and nursing representatives. We recently completed the Obstetric Hemorrhage project, in which we redesigned the hemorrhage response checklists and identified in situ simulation as the future goal. We also completed the Maternal Early Warning System (MEWS), creating an early warning system for calling providers to a patient's bedside. Our current project, designed to improve patient handoffs between providers, improve communication of patient care, and enhance safety and is focused on labor and delivery post-anesthesia care.

Staff education. Throughout the year, Faculty Hour slots are dedicated to improving the skills and knowledge of the staff. Previous sessions taught transversus abdominal plane blocks, neuraxial ultrasound, and transthoracic echocardiography (TTE). This year, our session will focus on gastric volume assessment and FAST exam, in addition to TTE and neuraxial ultrasound.



for over 20 women with pathologically adherent placentation and many others with placenta previa. The multidisciplinary team included specialists in maternal-fetal medicine (high-risk pregnancy), newborn medicine, nursing, urology, and, of course, obstetric anesthesia.

The division also maintains a comprehensive QA program. Virtually 100% of patients are seen on the first postpartum day and QA data is recorded for each visit. This year we developed an electronic QA dashboard which is delivered to the staff electronically each month. This dashboard will allow the division to focus improvement efforts with greater precision.

Research

The division is actively involved in research activities to enhance the knowledge of the care of the pregnant patient. These research activities include investigations to improve the educational program and better understand the physiologic changes of pregnancy, and studies to improve the safety and clinical care of the parturient.

The educational studies are currently focused on the impact and implications of bedside high-fidelity ultrasound on the training of the resident. Two currently active studies include:

- *Identification of L3-L4 interspace in parturients*

This study uses point-of-care ultrasound to improve the ability of the resident to correctly identify the bony landmarks in patients prior to a procedure.

- *Assessment of the use of ultrasound for epidural catheter placement and comparison with palpation technique*
This study examines whether identifying the entry position using ultrasound is an improvement over traditional palpation techniques.

Physiologic studies

- *Mechanoadaptation During Pregnancy—Implications for Myometrial Quiescence And Preterm Labor*
Assessment of the changes in the muscle fibers of the uterus that prevent (or cause) contractions that lead to labor
- *Determining Incidence of Clinically Evident Right Ventricular Strain During Routine Cesarean Section*
Transthoracic assessment of the heart muscle of patients undergoing cesarean delivery
- *Assessment of Thromboelastography in Patients with Factor XI Deficiency*
Determining whether patients with heterozygous Factor XI deficiency, identified on genetic panel testing, are safe to receive neuraxial anesthesia
- *Assessment of sFLT Levels in Cerebrospinal Fluid in Pregnant Patients with Preeclampsia*
Evaluation of the protein changes in the cerebral spinal fluid among women with preeclampsia

Safety studies

- *Risk factors for labor epidural failure during conversion to cesarean delivery*
Assessment of the relationship between the duration of the second stage of labor and the success or failure of epidural anesthesia for cesarean delivery

Division research was presented at the 49th Annual Meeting of Society for Obstetric Anesthesia and Perinatology, held in Bellevue, WA. Several abstracts received distinction:

- *Nominated for Best Paper:* Cellular Mechanism of Inhibitory Effect of Propofol on Uterine Smooth Muscle and its Clinical Implication
- *Third Place, Gertie Marx Research Award:* The Protein Content of Cerebrospinal Fluid is Altered in Preeclampsia
- *Top 15 Research Poster:* Assessment of Thromboelastography in Patients with Factor XI Deficiency

Education, teaching, and mentorship

A core function of the Division of Obstetric Anesthesia is the education of students, trainees, and ourselves.

The Division trains medical students from countries all around the world as part of the HMS clerkship. In addition, the division provides 100% of the residency training in obstetric anesthesia, as required by the Accreditation Council for Graduate Medical Education (ACGME). We maintain one of three ACGME obstetric anesthesia fellowship training programs in the city. Finally, the division maintains ongoing group educational programs for the staff. These programs are designed to provide ongoing education and improve the capabilities of each member.

Clinical teaching is performed through organized and impromptu lectures, supervised hands-on training, and the open provision of reading materials. Residents are first trained in the subspecialty of obstetric anesthesia during the first

six months of their residency. All first-year residents are assigned to an orientation week of OB anesthesia, where they learn the basic skills of neuraxial anesthesia and analgesia and the management of a routine OB patient. The purpose of this introductory week is to allow the resident to feel somewhat comfortable with the foundational skills so that they can learn advanced patient care during the subsequent required rotations. After orientation, all residents are assigned a basic obstetric anesthesia rotation. During this month-long rotation, the residents learn the techniques of neuraxial anesthesia and analgesia, and how to manage a healthy parturient, and are exposed to high-risk cases. All residents go through a second, month-long rotation during their second year. In addition to providing



additional training and education in the management of high-risk parturients, this month includes a one-week rotation in the Neonatal Intensive Care Unit. Residents learn about the care of the high-risk neonate in a level-3 NICU by participating in care with the neonatology attending and fellow. We also provide an elective third year advanced rotation. On this rotation, the residents are expected to participate in the care of high-risk and complex parturients, conduct consultations, and learn the management of postpartum conditions or complications.

Recent innovations in education include a new teaching calendar system for resident education. Prior to the start of each month-long rotation, residents are sent a comprehensive list of topics. They are expected to present three of these topics during the month as formal lectures. These, as well as all other talks, are then recorded in the wall calendar. This has dramatically increased the amount of lecture-driven education on the unit. A second innovation is the fellow lecture series.

ACGME accredited fellowship program

The Obstetric Anesthesiology Fellowship is accredited by the ACGME and recently underwent the first site review, with zero citations. The program is accredited for up to two fellows. In addition to dedicated obstetric anesthesiologists, faculty who provide education and consultation include intensivists, obstetricians, maternal fetal medicine specialists, neonatologists, and pathologists; these members are integral to the fellow's education program. The





didactic curriculum for the fellowship program embraces lessons from fundamental physiology and pharmacology through the advanced science of genetic polymorphisms and molecular mechanisms of diseases during pregnancy. Fellows meet for a weekly didactic session with a fac-

ulty member. As a combined venture with the Anesthesia Departments at Harvard Medical School, an educational lecture is held every few months for all OB anesthesia fellows. Internationally, the fellow has an opportunity to have a one-week rotation in a labor and delivery unit

in China, as a member of the “No Pain Labor and Delivery– Global Health Initiatives” program. Dr. Yunping Li is one of the founding members of that program, which has sent hundreds of anesthesiologists, obstetricians, and nurses on missions.

No Pain Labor and Delivery – Global Health Initiatives Program

Yunping Li, MD — Section Chief of Anesthesia for Gynecology; Phil Hess, MD, Director of Obstetric Anesthesia; Obstetric Anesthesia Fellow, Nathan Liu, MD; and many others from our BIDMC team have volunteered with this program. Six teams across the U.S. travel to 30 hospitals in China for one week each year, to share best practices for maternal safety, educate staff on the value of teamwork, and promote the use of epidural analgesia for labor. In June, 2017 Dr. Li led a BIDMC team

(Nathan Liu, MD, Anu Vasudevan, MD, Todd Shapiro, MD, Eva Luo, MD, Leslie Guglielmo, RN and Lindsey Goldman, RN) to work with doctors in southwest China in the city of Zunyi, at Maternal and Child Health Hospital, where they ran a full week of education, lecture, hands-on training and simulation. Dr. Li and her team shared ideas of why we practice the way we do, and how hospitals in China can make changes to benefit their patients.





Lisa J. Kunze, MD, PhD

Director, Orthopedic Anesthesia
Assistant Professor of Anaesthesia

“The importance that my colleagues in surgery, nursing, and anesthesia place on providing patient-centric care, to adapt evidenced-based practices, and to think outside of the box to solve unusual problems inspires me to strive to improve my own care of the patient everyday, and makes me proud to be a part of the BIDMC family.”

ORTHOPEDIC ANESTHESIA

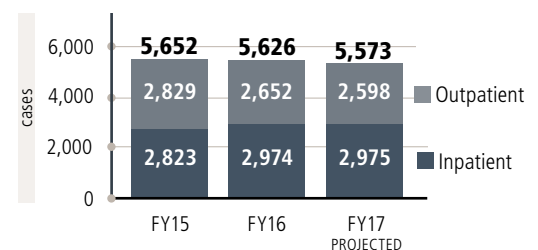
The orthopedic anesthesia division has continued to be instrumental in providing high quality, state-of-the-art care for patients undergoing orthopedic surgical procedures. The orthopedic surgeons have been very productive during the past year. During 2016, they did 4,251 orthopedic procedures and through July 2017, they have done 2,734 procedures (excepting spine surgeries).

The orthopedic anesthesia division has been active in several projects to improve patient care throughout the past year. A primary focus for the past three years has been to optimize analgesia and to reduce the hospital length of stay for patients undergoing total knee and hip arthroplasty. There have been several multidisciplinary projects that have been completed or are ongoing to achieve these goals.

Neuraxial anesthesia vs. general anesthesia

Large database studies published a few years ago demonstrated that use of neuraxial anesthesia reduced some of the major complications in patients having total joint arthroplasty. Since instituting spinal anesthesia in these patients over two years ago, we have observed that approximately 60% of patients receive spinal anesthesia for primary, elective total knee and hip arthroplasty. Analysis of over 100

Orthopedic Volume FY15 – FY17



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Instructor in Anaesthesia



consecutive patients demonstrated that over 50% of patients having spinal anesthesia are discharged within 3 days compared with 14% of patients having general anesthesia. This is consistent with data from 2015–16.

Adductor canal block

Postoperative analgesia with the femoral nerve block in patients having total knee arthroplasty is associated with quadriceps weakness and leg buckling. Our physical therapists have reported that this affects postoperative therapy and can be persistent for several days after the block. Nationally, many orthopedic centers have moved away from femoral nerve blocks. A cooperative effort between surgery, the Orthopedic Anesthesia Division, and the Regional Anesthesia Division resulted in utilizing adductor canal blocks in place of the femoral and selective tibial nerve block. This block is supplemented by local anesthesia to the knee capsule by the surgeon. This has resulted in fewer instances of leg weakness.

FACULTY HOUR

The Division of Orthopedic Anesthesia brought forth two issues for Faculty Hour quality improvement projects.

Discharge criteria after spinal anesthesia. A Faculty Hour project convened in 2016 developed guidelines for post-anesthesia care unit (PACU) discharge after spinal anesthesia. This project involved evaluation of patients for orthostatic hypotension in the PACU and utilizing IV fluid boluses for treatment. After analyzing 100 patients, measuring orthostatic hypotension in the PACU and treating with fluid boluses was not found to reduce orthostatic hypotension after discharge to the floor, so this practice was abandoned. At the time of this project, use of urinary catheters for these patients was reduced dramatically at the request of surgery. In conjunction with this project, nursing conducted an audit for the need for urinary catheter placement in the PACU. The rate of catheter placement was quite low, so most patients do not receive a urinary catheter for elective total joint arthroplasty.

Use of TXA to reduce transfusion. Tranexamic acid (TXA) has been used for the past 4 years in patients having total joint arthroplasty. This program continues to be successful. Approximately 10–15% of patients having elective hip or knee arthroplasty require transfusion. Of these patients, most did not receive TXA due to contraindication. There are plans for discussion with surgeons using intraarticular TXA in patients who have contraindications for intravenous TXA. The transfusion rate remains higher than large orthopedic centers, so a Faculty Hour was convened by Dr. Meghan Krajewski and Dr. Adam Lerner to determine if anemia screening and therapy could be optimized using iron infusions or other therapies prior to surgery. The findings of this group indicated that developing a preoperative anemia clinic would not be a cost-effective solution at BIDMC.

Anterior approach for hip arthroplasty

Dr. Ayesha Abdeen has been performing anterior hip arthroplasty procedures for the past year. These cases are currently done with general anesthesia. Educational material for anesthesia was developed and is posted. The operating time has decreased, so some of these procedures may be done with neuraxial anesthesia in the near future.

Perioperative multimodal analgesia

Multimodal analgesia utilizing both regional anesthesia and nonopioid medications is routine in all of the elective orthopedic procedures. Management of postoperative pain continues to challenge medical providers. With the assistance of the orthopedic PAs, a pathway was developed to help guide physicians who may be covering the arthroplasty patients during nights and weekends. One of the goals of this was to minimize patient-controlled analgesia and IV opioid administration during the postoperative period. Plans for the coming year include evaluating postoperative opioid and nonopioid analgesic use in orthopedic surgical patients.

Research

The orthopedic anesthesia division is currently working with patients in the Role of Inflammation after Surgery in Elders (RISE) study. This large, multidisciplinary effort is coordinated by the SAGES and BASIL groups to determine factors that contribute to postoperative delirium. Physicians in

the orthopedic anesthesia division are responsible for collection of cerebrospinal fluid, which will be analyzed for various inflammatory markers. Dr. Justin Stiles has agreed to be a project resource for this study. All of the members of this division have been very helpful in managing patients in this study.

Dr. Abdeen and Dr. Subramaniam are working on a proposal to study the effects of meditation on reducing pain. This is an exciting opportunity that could be strategic in reducing the requirement for opioids in patients with pain related to orthopedic conditions and procedures.

The orthopedic trauma service has been consistently busy and offers our resident physicians great educational opportunities in intraoperative anesthesia and perioperative analgesia.

Surgical site infections spiked in this patient population in late 2016. A multidisciplinary group met to analyze various processes and develop efforts to reduce these infections. A thorough evaluation of various aspects of OR processes did not reveal any specific causes, but some process changes were developed. Data from 2017 have shown a reduction in infection. We all need to monitor our practices with regard to preventing these infections in the orthopedic suites.

Overall, the orthopedic anesthesia division has been focusing on incorporating evidence-based practice into everyday use. One of the next major steps is developing educational curriculum for the anesthesia residents. Dr. Govindan is spearheading efforts to develop more formalized curriculum and educational activities in orthopedic anesthesia.







Marc R. Shnider, MD

Director, Regional Anesthesia
and Acute Pain Services

Assistant Professor of Anaesthesia

“We have an environment where our residents have experience that vastly exceeds the ACGME requirements for blocks, with a diverse exposure to various blocks.”

REGIONAL ANESTHESIA

To address an increasing need for anesthetic blocks that improve patient comfort and safety, the Division of Regional Anesthesia was organized in 2008 and charged with developing a service of clinical and educational excellence.

Objectives in this endeavor included:

- Expanding the use of regional anesthesia, where appropriate, on the BIDMC campus.
- Developing residents who are proficient in a wide range of regional anesthetic blocks.
- Improving the proficiency and comfort with regional anesthetics among the anesthesia faculty.
- Providing acute pain management for postoperative surgical patients.

Thirteen faculty members make up the division and perform the majority of the blocks for surgical procedures.

One staff member is assigned with a resident or fellow each day as a block team to place all needed blocks. Subsequent anesthetic care is performed by a second anesthesia team. This dedicated block service is present on both the East and West Campuses. This model has greatly increased the amount and quality of regional anesthesia performed at BIDMC. With the development of the regional anesthesia team, there has been an increase in surgeon satisfaction as well as requests for regional anesthetics. Patient satisfaction continues to improve.

Since our last report, the number of regional anesthetics has remained stable at approximately 4,000 per year. Our pool of ultrasound machines has been upgraded and now consists of seven designated machines. We are currently waiting for approval of two new advanced units. We have introduced a number of new

Procedures	FY15	FY16	projected FY17
PNB	3,825	3,905	3,720
Epidural	606	655	694
Intraoperative	27	24	18
Rescue	131	118	98
Total	8,381	9,050	4,530

TEAM

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Amanda K. Anastasi, MD
Assistant Professor of Anaesthesia

Hyun Kee Chung, MD
Instructor in Anaesthesia

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Instructor in Anaesthesia

Nurse Practitioners
Sara S. Durgerian, NP
Meghan A. Saund, NP



blocks to our unit, including the Pecs 1 and 2, and subscapularis and quadratus lumborum blocks. Additionally, we now provide training for thoracic epidural placement with the use of a simulated patient back, which we can modify for different conditions such as morbid obesity and scoliosis.

Education

The regional rotation in the second and third years continues to be one of the most popular residency rotations.

Most residents complete their training proficient in the use of ultrasound guided regional anesthesia for a wide variety of surgical procedures.

The Regional Anesthesia Division has developed several courses over the years, including an ultrasound course for the Harvard Anesthesiology Update, and overseas courses at Ben Gurion University in Beer Sheva, Israel.

The Regional/Acute Pain Service fellowship consists of six months of

advanced regional anesthesia training combined with six months of work as an attending anesthesiologist.

Research

There is currently one active research project underway. The study compares the success rates of open-end epidural catheters versus multiport catheters for thoracic epidurals. Another study comparing Pec blocks to thoracic paravertebral blocks in breast surgery patients is planned for the near future.

We also have an epidural study with the research program in the echocardiography lab (ECHO lab) investigating how to improve learning ultrasound techniques through simulation practice.

Accomplishments

We have an environment where our residents have experience that vastly exceeds the ACGME requirements for blocks, with a diverse exposure to various blocks. We have integrated with the ECHO lab to teach fundamentals of ultrasound and prepare the next generation of trainees.



REGIONAL ANESTHESIA UPDATES FROM THE ECHO LAB

1

Use of three-dimensional printing to create patient-specific thoracic spine models as task trainers

- Oral presentation at 15th Annual Pain Medicine Meeting, November 17-19, 2016, San Diego, CA.
- Manuscript accepted, *Regional Anesthesia and Pain Medicine* in January 2017: Jeganathan J, Baribeau Y, Bortman J, Mahmood F, Shnider M, Ahmed M, Mashari A, Amir R, Amador Y, Matyal R. Use of 3-Dimensional Printing to Create Patient-Specific Thoracic Spine Models as Task Trainers. *Reg Anesth Pain Med*. 2017 Mar 3. doi: 10.1097/AAP.0000000000000580. [Epub ahead of print] PubMed PMID: 28263243.

2

Assessment of the efficacy of a low-cost custom-built thoracic epidural anesthesia simulator

- Oral presentation at 42nd Annual Regional Anesthesiology and Pain Medicine Meeting, April 2017, San Francisco, CA.
- Manuscript under preparation.

3

Application of three-dimensional printing in resident education

- Abstract presented at 39th Annual Meeting of Society of Cardiovascular Anesthesiologists, April 2017, Orlando, FL.

4

Summative OSCE Assessment at the End of Anesthesia Residency for Perioperative Ultrasound

- Abstract presented at 39th Annual Meeting of Society of Cardiovascular Anesthesiologists, April 2017, Orlando, FL.
- Manuscript submitted to *Anesthesia and Analgesia* in May 2017.

5

Perioperative ultrasound for faculty with 2-day workshop on regional anesthesia

- 8 hour/day training
- Focused training on upper-extremity and lower-extremity blocks
- Faculty receive 1.5 CME credits for each workshop
- Four faculty have completed the 2-day workshop
- Second cycle of the workshop will be later in 2017

6

Regional anesthesia iBook in the Apple store

- Updated the iBook with inclusion of Pec block
- Addition of new questions







John B. Pawlowski, MD, PhD
Director, Thoracic Anesthesia
Assistant Professor of Anaesthesia

“It is the level of support, respect, openness, and enthusiasm from every member of the multidisciplinary combined thoracic surgery and interventional pulmonology team that make me proud and happy to come to work.”

THORACIC ANESTHESIA

The Division of Thoracic Anesthesia oversees and administers anesthesia services to a variety of thoracic and pulmonology patients in a variety of locations. The combined volume of cases from July 2015 to May 2017 was 2,811, with 1,154 thoracic procedures and 1,657 interventional pulmonology (IP) cases. Thoracic Surgery recently added the POEM (per oral endoscopic myotomy) procedure for acid reflux disorders. These services include the performance of general and regional anesthetics, the use of conventional and jet ventilation, and the management of complex airways and advanced lung disease. In addition to the provision of anesthesia, the Thoracic Division is involved in the teaching of medical students, residents, staff, and allied health professionals. Over the past several years, the Thoracic

Anesthesia Group has provided anesthesia care for an increasing number of IP and thoracic surgery procedures. During this time, there has been an adoption of high-frequency jet ventilation as our usual mode of ventilation during rigid bronchoscopy cases. There has been an increase in the participation of the Thoracic Anesthesia Group in teaching, research, and education. There has been an increase in communication between the surgeons, proceduralists, nurses, and anesthesiologists in the form of more regular, formal meetings. Recent development of a robotic thoracic surgery program has begun. Most of the robotic cases have been for thymectomy or lobectomy procedures. Several innovative robotic safety programs have been started to plan and train for potential crises in robotic thoracic surgery.

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Robina Matyal, MD
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Qi C. Ott, MD
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Deborah S. Reynolds, MD
Assistant Professor of Anaesthesia

Several innovations and systemic improvements have made thoracic surgery safer and more comfortable for patients. The Block Team either supervises or conducts most of the regional techniques to control pain. In the case of thoracotomies, currently 74% receive thoracic epidural catheters. Currently, 2% of video-assisted thoracic surgery (VATS) patients receive epidurals, usually when either pleural decortication or pleurodesis is planned. The carepath for VATS provides multimodal premedications and intraoperative intercostal blocks to relieve pain in these patients. The total amount of opioid medication used in thoracic surgery and in IP has dropped dramatically with the advent of multimodal pain therapy. To make these thoracic cases safer, the use of electronic crossmatching has been extended to the thoracic patients and often obviates the need for additional needlesticks and unnecessary visits to the blood bank. To make the storage of bronchoscopes better and to avoid cross-contamination of instruments, the anesthesia technicians, led by Ed Plant, built a miniature sealed cabinet, complete with fan and HEPA filter to exceed Joint Commission regulations. These improvements and innovations make everyone safer and lower the risk of spreading infection.

The future is bright for all those who participate in thoracic surgery operations and IP procedures. With the addition of new procedural staff, the number of nurses, scrub technicians, and anesthesiologists has increased. The IP procedures have expanded to occur on the East Campus 2 days per week, in addition to the regular block times on the West Campus. The challenge has been to provide excellent care to an aging population of patients with progressive diseases. This year, for example, Dr. Sidhu Gangadharan performed the first redo tracheobronchopexy and aortopexy at BIDMC. Several of the IP patients were so ill as to require ECMO (extracorporeal membrane oxygenation) in order to tolerate the procedure or facilitate recovery. These complex cases test the abilities and knowledge of the whole team and require regular educational and planning meetings.

Education

The Thoracic Anesthesia staff participates in a variety of teaching activities. Local instruction occurs with anesthesia resident lectures, simulations, and virtual bronchoscopy sessions. All of the IP fellows in New England come to BIDMC for a



one-day orientation and demonstration session. This includes lectures on anesthesia and on the practice of airway skills—both taught by anesthesiologists. Local CME courses on bronchoscopy, anesthesia practices, and airway workshops include anesthesiologists from BIDMC. The 2017 Harvard Anesthesiology Update workshop included several lectures, workshops and luncheon discussions on the subjects of thoracic surgery and IP.

Teaching has also occurred at a national level, with Grand Rounds presentations and visiting surgical and anesthesia demonstrations of tracheoplasty cases at other teaching hospitals. The issue of robotic surgical safety was examined by a chartered team during the Faculty Hour program and has expanded into a series of lectures and panels. Most recently, one of the Thoracic Anesthesia group presented at a conference in Tel Aviv, Israel, and at the Annual Meeting of



the Kentucky Society of Anesthesiologists in Louisville, KY. In addition, the subject of curriculum development of robotic surgical safety was selected for presentation by the Best Practices Committee of the American College of Surgery/Accredited Education Institutes in Chicago, IL.

Research

Review Board–approved research projects are currently underway, including:

- Indocyanine green dye for sentinel node biopsy in VATS patients. This protocol is ongoing.
- Transesophageal echocardiography assessment of right ventricular function with inhalational agents during one lung ventilation in noncardiac thoracic surgery. This protocol was completed. Drs. Kim Hollander and Robina Matyal have presented the results at the Society for Cardiovascular Anesthesiologists and the New England Residents Research Forum.
- A novel double lumen tube holder that is made using a 3D printer is ongoing (Dr. Michael Kent).

Summary

These are expanding, exciting, and innovative times for the Thoracic Anesthesia Division. As we try to provide coverage wherever thoracic surgeons and interventional pulmonologists work, we are doing more in the robotic operating rooms and finding ourselves on the East Campus more often. The need for more people familiar with the East layout and processes has required recruitment of new and talented anesthesiologists. Six of the 13 members are

new this year. These added anesthesiologists allow us to be in more places doing more procedures than ever. With the new group members as well as the continued assistance from the Block Team, we regularly perform regional procedures via a multimodal approach to pain management. With input from our surgical colleagues, we are designing and improving newer pain treatments, such as the addition of dexmedetomidine to intercostal blocks and the implementation of ultrasound-guided paravertebral blocks. These are the innovations that will make thoracic and interventional pulmonary procedures safer and less painful in the future.

While expansion in itself can be a cause of stress from over-commitment and unforeseen problems, I am gratified by the level of cooperation and planning that go into each new venture. For example, the robotic thoracic surgical program is now entering its fourth year with one of the best safety and efficacy records in the country. These results are directly a product of extensive preparation, training, and simulation of the potential complications associated with robotic surgery. The nurses, doctors, and technicians from the multidisciplinary team meet frequently to discuss improvements to the way we do these procedures. I am grateful for everyone's effort to make thoracic procedures safer. It is the level of support, respect, openness, and enthusiasm from every member of the multidisciplinary combined thoracic surgery and interventional pulmonology team that make me proud and happy to come to work.

FACULTY  HOUR

A Faculty Hour project to address the issue of unplanned intubations commenced in June 2016. Comprised of clinicians from nursing, surgery, and anesthesia, this chartered team included several members of the Thoracic Anesthesia group. The chartered team was tasked with responding to data that indicated patients at BIDMC are more likely to require unplanned intubation during their hospital stay. In fact, the rate of reintubation of patients who underwent thoracic surgery procedures was in the worst decile in the country. This group met weekly for eight weeks

and came up with a series of suggested improvements in the care of these patients. The recommendations included the teaching of incentive spirometry, the use of advanced neuromuscular blockade monitoring (TOF Watch), and the use of sugammadex as a reversal agent. In addition, the chartered team suggested the use of multimodal pain techniques, established carepaths, and promoted the use of transport monitors with both SaO₂ and ETCO₂ capabilities. In the PACU, allowances for patients to arrive intubated and ventilated were defined.

In 2017, the chartered team reconvened, to assess the progress of the implemented plans. The rate of unplanned intubations did decrease, although the monthly results were not consistent. Programs to teach incentive spirometry and to introduce the TOF Watch were largely successful. The use of sugammadex increased in selected patients. A perioperative carepath for VATS was implemented.

In sum, many of the recommendations by this Faculty Hour chartered team were put into practice.





Jason S. Wakakuwa, MD
Director, Transplant Anesthesia
Assistant Professor of Anaesthesia

*“We care for
the sickest patients
and help to give
the gift of life.”*

TRANSPLANT ANESTHESIA

The Division of Transplant Anesthesia is comprised of nine anesthesiologists who are responsible for the intraoperative care of patients undergoing liver transplant surgery, as well as operations in the immediate postoperative period. The team is available 24 hours a day and also responds to care for other patients requiring the members' expertise, such as trauma patients with major IVC injuries. We also care for the vast majority of patients undergoing hepatic resections and major hepatobiliary surgeries. Kidney transplants, pancreas transplants, donor nephrectomies, and dialysis access procedures are covered by members of the Department of Anesthesia as a whole. This past year, there were 68 kidney transplants, 31 liver transplants, three combined liver/kidney transplants, and nine pancreas transplants. The division di-

rector serves as a liaison between the transplant surgeons and the Anesthesia Department.

Two years ago we saw the arrival of Robert Fisher, MD, as Chief of Transplant Surgery. Dr. Fisher reestablished the Live Donor Liver Transplant Program in the Medical Center, and three patients have been successfully transplanted thus far.

Education

Over the past several years, the Division of Transplant Anesthesia has retained a strong and stable core group of faculty.

The Division of Transplant Anesthesia is actively involved in the academic mission of the department. Members of the division have also been invited to speak at grand

TEAM

Galina V. Korsunsky, MD
Instructor in Anaesthesia

Feroze Mahmood, MD
Professor of Anaesthesia

John D. Mitchell, MD
Associate Professor of Anaesthesia

Sara E. Neves, MD
Instructor in Anaesthesia

Peter J. Panzica, MD
Assistant Professor of Anaesthesia

Satya Krishna Ramachandran, MD

Shahzad Shaefi, MBBS
Assistant Professor of Anaesthesia

Eswar Sundar, MBBS
Assistant Professor of Anaesthesia

Sugantha Sundar, MBBS
Assistant Professor of Anaesthesia

rounds lectures and society conferences throughout the country. A transplant block of resident lectures is also organized on a biannual schedule. This block consists of a number of lectures pertaining to pathophysiology, intraoperative management, surgical considerations, and case presentations.

Beginning in 2017, a joint Liver Anesthesia Transplant Fellowship program was established with the Lahey Medical Center. This new venture will allow for the clinical fellow to participate in the care of transplant patients in two very different clinical settings. The

fellow will also be able to gain experience in intraoperative transesophageal echocardiography (TEE), which will be done in conjunction with the Division of Cardiac Anesthesia.

Research

The division has actively participated in research projects conducted by the Divisions of Transplant Surgery and Hepatology. These included the use of intraoperative carbon monoxide in kidney transplant recipients and the treatment of liver transplant recipients with a Hepatitis C monoclonal antibody.





Feroze Mahmood, MD

Director, Cardiac and Vascular Anesthesia
Director, Perioperative Echocardiography
Professor of Anaesthesia

“The vascular surgery division remains one of the busiest clinical services in the city.

This enables us to provide a high level of clinical experience and teaching environment for the residents and fellows.”

VASCULAR ANESTHESIA

The Division of Vascular Anesthesia continues to provide services for cases undergoing open and endovascular vascular surgery. Simultaneous with their clinical responsibilities, division members participate in numerous research, teaching, and quality improvement initiatives. The clinical volume has remained stable, and the vascular surgery division remains one of the busiest clinical services in the city. This enables us to provide a high level of clinical experience and teaching environment for the residents and fellows. The case mix of vascular surgery cases range from open thoraco-abdominal aortic aneurysm repair surgery to endovascular procedures under monitored anesthetic care. With the new multispecialty “hybrid” operating room becoming functional, multiple hybrid procedures for aortic disease have

also been performed. These procedures require the highest level of vigilance, monitoring, and resuscitation, providing our staff and residents a unique clinical experience.

Education

Under the leadership of Drs. Robina Matyal and Achikam Orin-Grinberg, a faculty training program in perioperative ultrasound for anesthesia faculty was initiated last year. It consists of a multimodality training program to introduce proficiency in various aspects of perioperative ultrasound. A similar ongoing longitudinal training program is already part of the resident education project. Members of the Division of Vascular Anesthesia are national leaders in the introduction of ultrasound in the perioperative arena. The multimodality program

Ruma R. Bose, MD, MBBS
Assistant Professor of Anaesthesia

Galina V. Korsunsky, MD
Instructor in Anaesthesia

Megan L. Krajewski, MD
Instructor in Anaesthesia

Haobo Ma, MD, MS
Instructor in Anaesthesia

Robina Matyal, MD
Associate Professor of Anaesthesia

Satya Krishna Ramachandran, MD

Shahzad Shaefi, MBBS
Assistant Professor of Anaesthesia

Balachundhar Subramaniam, MD, MPH
Associate Professor of Anaesthesia



developed by Drs. Matyal and Oren-Grinberg is shared with multiple national and international anesthesia, cardiology, and surgical training programs. All central venous access and other invasive monitoring lines are placed under ultrasound guidance.

Quality Improvement

Division members participated in multiple quality improvement projects throughout the year. Through multiple collaborative projects with our vascular surgery colleagues, the work-up for multiple vascular surgery procedures has been streamlined and simplified. For example, the availability of type-specific blood products as a prerequisite for elective carotid endarterectomy was eliminated, with resultant improved efficiency and cost savings. Through another multidisciplinary collaborative project, the booking, clinical, and postoperative management of thoraco-abdominal aortic aneurysm repairs was also revised with the adoption of universal protocols for management of thoraco-abdominal aortic aneurysms. With these well-established protocols and evidence-based management principals, our vascular surgery outcomes remain among the best in the country.

Teaching

Members of our division are consistently rated among the best clinical teachers. Their teaching activities range from bedside teaching, formal lectures to the residents, and participation in national and international conferences. With more advanced and high-risk surgeries, the resident's clinical experience continues to improve. With more aortic surgery, the number of cases requiring cerebrospinal fluid drainage and neuromonitoring has also increased—further enriching our clinical and training experience. With multiple staff members certified in perioperative transesophageal echocardiography (TEE), residents also learn various aspects of rescue TEE, cardiac monitoring and point-of-care ultrasound.

Research

Multiple division members participated in various clinical, basic science, and educational research projects. The clinical research ranged from database analysis, pulse pressure variability, use of ultrasound as a screening tool for central venous catheter placement, and three-dimensional printing of patient-specific spine models for resident training for epidural

placement. Dr. Matyal continued her basic science research on the role of neuro-peptide-Y in neuro-angiogenesis and its remote delivery through nano-particles. In addition to publishing her findings, she has presented her research at annual scientific sessions at the American Society of Anesthesiologists (ASA), Society of Cardiovascular Anesthesiologists (SCA), American Heart Association (AHA), and Harvard Medical School. An educational initiative to develop a “proficiency index” to monitor acquisition of proficiency in ultrasound was developed and initiated by Dr. Matyal that was also her Foundation for Anesthesia Education and Research grant.

Various members of the division serve on professional national and international committees, editorial boards, and educational symposia. They have mentored multiple residents in abstract presentations at ASA, SCA, AHA, and Society of Critical Care Medicine (SCCM) annual meetings. Members of the division continue to clinically perform at a high level managing a challenging group of patients. It has been a privilege leading this group, and I look forward to an exciting next year ahead with this team.



Todd W. Sarge, MD

Director, Critical Care Medicine
Assistant Professor of Anaesthesia

“The Anesthesia Critical Care division provides state-of-the-art care for the hospital’s surgical critical care patients 24/7 while also being recognized as leaders in the field for point of care echocardiography and ultrasound as well as clinical research in acute lung injury.”

CRITICAL CARE

The Division of Critical Care is a major division in the department and provides critical care services in the four surgical intensive care units (ICUs) at Beth Israel Deaconess Medical Center (BIDMC):

Trauma Surgical Intensive Care Unit (TSICU) A 10-bed unit caring for trauma, thoracic, and acute care surgery patients admitted largely through the emergency room. Coverage of this unit is shared 50% with the Division of Surgical Critical Care.

Surgical Intensive Care Unit (SICU) An eight-bed unit caring for a variety of surgical patients including transplant, hepato-biliary, and general surgery. Coverage of this unit is shared 50% with the Division of Surgical Critical Care.

Cardiovascular Intensive Care Unit (CVICU) A 15-bed unit caring for patients undergoing cardiac and

vascular surgery. This unit is covered 100% of the time by the Division of Anesthesia Critical Care.

Neuroscience Intensive Care Unit (Neurosciences ICU) An eight-bed unit caring for patients with neurology and neurosurgical patients. This unit dedicated to the care of neuroscience patients opened in June 2016, with coverage of this unit being shared 50% with the Department of Neurology

All of the surgical ICUs are semi-closed, and patients are cared for by multidisciplinary critical care teams. The SICU and TSICU teams consist of an attending critical care physician, a critical care fellow, and dedicated house officers from the Departments of Anesthesia, Surgery, and Emergency Medicine. The CVICU team consists of an attending critical care physician, a nurse

M. Dustin Boone, MD
Assistant Professor of Anaesthesia

Somnath Bose, MB, MBBS
Instructor in Anaesthesia

Megan L. Krajewski, MD
Instructor in Anaesthesia

Akiva Leibowitz, MD
Instructor in Anaesthesia

Alan Lisbon, MD
Associate Professor of Anaesthesia

Melanie R. Loberman, MD
Instructor in Anaesthesia

Sara E. Neves, MD
Instructor in Anaesthesia

Brian P. O'Gara, MD
Instructor in Anaesthesia

Achikam Oren-Grinberg, MD
Assistant Professor of Anaesthesia

Shahzad Shaefi, MBBS
Assistant Professor of Anaesthesia

Daniel Talmor, MD, MPH
Edward Lowenstein Professor of
Anaesthesia



practitioner/physician assistant, and an attending cardiac surgeon. The Neuroscience ICU team consists of an attending critical care physician, critical care fellow, neurology resident, and nurse practitioner. Overnight and on weekends, each unit is covered by a call resident (SICU/TSICU) or nurse practitioner/physician assistant (Neurosciences ICU and CVICU). Each night of the week, a single anesthesia attending provides in-house coverage of all four surgical units and is assisted by an on-call fellow.

The division is actively involved in the ICU coverage of our community affiliates. Since October 2012, the division has covered the critical care unit at BID–Plymouth. Since February, 2016 the Division has covered the critical care unit at BID–Milton. Both community hospitals contain mixed medical surgical ICUs and cover the wide variety of intensive care patients seen at a community hospital through different staffing models. The ICU in Plymouth is a closed unit and is staffed 24/7 by an intensivist and a team of advanced practice providers. Dr. Alan Lisbon serves as the medical director for the Plymouth ICU. The ICU in Milton is a closed unit that is covered 24/7 by an intensivist with overnight help from the hospitalist service at Milton. Directorship of this unit is provided by Dr. Heidi O'Connor in

the Pulmonary Critical Care Division of the Medicine Department, demonstrating the close collaboration between the two ICU divisions from our respective departments.

Additional clinical services provided by the division include:

- Airway management and support for all ICUs and the hospital at large
- Code coverage of the west campus
- Anesthesia for tracheostomies in all ICUs
- Anesthesia coverage of elective cardioversions
- Focused echocardiography support for in-hospital cardiac arrests using hand-held echo devices
- Coverage of the West Campus post-anesthesia care unit.

Education

Teaching in the Division of Critical Care takes place at all levels of training, from medical students through residents, fellows, and trainees. Teaching is accomplished through daily teaching rounds as well as a robust didactic program.

Basic Course

In 2011, the division began teaching the Basic Course to residents prior to their first ICU rotation. This course was designed to teach the principles of caring for the critically ill patient

prior to the residents arriving in the unit. The course has been extremely successful and has since expanded to include nurse practitioners and residents from Surgery, Medicine, Neurology, and Emergency Medicine. Currently, this course is run four to five times per year by critical care faculty from Anesthesia, Surgery, Emergency Medicine, and Pulmonary Medicine.

Anesthesia Critical Care Fellowship

The centerpiece of the teaching program is the Anesthesia Critical Care Fellowship, a council for Graduate Medical Education-accredited program that has been active since 1990. To date, 59 fellows have successfully graduated the program. The Anesthesia Critical Care Fellowship is a 12-month training program (one academic year) that consists of nine months of rotations ICUs and three months of electives/research time. The fellowship is directed by Dr. Shahzad Shaefi and currently accepts four fellows per year into the program through the match system, which began in 2014. The goals of the fellowship are to ensure that by the completion of their 12 months of training, the fellows will be able to provide complete care for critically ill patients, lead a multidisciplinary critical care team, have a working knowledge of the administration and management of a critical care unit, be able

to critically appraise the literature as it pertains to critical care medicine and have a basic understanding of the principles of research in critical care medicine. A particular strength of the fellowship is training in bedside ultrasonography and echocardiography, and we believe that we remain well positioned to continue to receive the very best candidates.

In June of 2017, a new fellowship in neurocritical care was approved by the United Council for Neurologic Subspecialties and will be directed by Dr. Dustin Boone. Our first fellow in neurocritical care will start fellowship in July 2017 and will spend one year dedicated to managing these very specialized critical care patients.

Post Graduate Education in Critical Care Echocardiography

Members of the division, and in particular Dr. Achikam Oren-Grinberg, have been extremely active in the field of education in critical care echocardiography. The division members founded the extremely successful Fundamentals of Critical Care Ultrasound course at the Society of Critical Care Medicine and have been active internationally with the World Interactive Network Focused On Critical Ultrasound organization. Locally, we continue to teach the Harvard CME course “Ultrasonography for Intensivists and Emergency Medicine Clinicians,” which has been sold out for eight years in a row.

Leadership and Innovation and Faculty Hour Involvement

Over the past two years, the division led an 18-month faculty hour project on critical care documentation and

rounds redesign. The purpose of this project was to improve the quality and compliance of critical care notes and documentation while improving work flow for residents and rounding. The project was led by Dr. Todd Sarge from our division and involved members from the Departments of Anesthesia, Surgery, Emergency Medicine, Internal Medicine, Health Information Management, and HMFP Compliance. The results have led to improved documentation compliance with current standards and significantly decreased resident time to generate notes as well as improved work flow and efficiency on rounds.

Other members of the division have been involved in numerous faculty hour projects, including postoperative reintubation and ultrasound education.

Research

In addition, the division was part of a multimillion-dollar grant and collaborative effort between four academic centers around the country and funded by the Moore Foundation to improve and enhance the quality of care provided in ICUs. Several important products of this collaboration included the development of a tool to allow family engagement through online communication and diary writing entitled “My-ICU,” as well as a tool to monitor for risky states within each ICU based on staffing and acuity. Research

All members of the Critical Care Division maintain active research interests. The following are a sample:

- Dr. Daniel Talmor’s fields of research include intensive care outcomes, echocardiography in the

ICU, and the optimal delivery of mechanical ventilation.

- Drs. Achikam Oren-Grinberg and Todd Sarge perform numerous studies of echocardiography in critically ill patients during cardiac arrest.
- Dr. Todd Sarge collaborates extensively in numerous research projects related to lung recruitment and mechanical ventilation and echocardiography.
- Drs. Michael Cocchi and Dustin Boone have a special interest in resuscitation from cardiac arrest and are collaborating on a research program in this field.
- Dr. Dustin Boone is also the Director of Neuroanesthesia and is using this connection to study the effects of various ventilation strategies in patients with elevated intracranial pressure in the ICUs.
- Dr. Shaz Shaefi, Dustin Boone, and Brian O’Gara have recently completed the Program in Clinical Effectiveness at the Harvard School of Public Health and are working on completion of their respective Masters in Public Health.
- Dr. Shaz Shaefi has been involved in research efforts to evaluate the effects of hyperoxia on patients undergoing cardiopulmonary bypass.

The division has been extremely successful at obtaining research funding. Currently, the division research efforts operate under the following grants:

- LIPS-A: Lung Injury Prevention Study with Aspirin (U01 NIH/NHLBI) — Dr. Talmor, and Valerie Banner-Goodspeed, MPH
- EPVent2: A Phase II study of Mechanical Ventilation Directed by Transpulmonary Pressures (UM1



NIH/NHLBI) — Drs. Talmor, Loring, Sarge, and Valerie Banner-Goodspeed, MPH

- Prevention and Early Treatment of Acute Lung Injury — (PETAL Network;U01 NIH/NHLBI) – Dr. Talmor, and Valerie Banner-Goodspeed, MPH
- IRC 002: A Randomized, Open-Label, Phase 2, Multicenter Safety and Exploratory Efficacy Study of Investigational Anti-Influenza Immune Plasma for the Treatment of Influenza (contract through NIH/ NIAID) — Dr. Talmor
- The Prevention of Early Postoperative Decline: Investigating the feasibility and potential efficacy of iPad-based neurocognitive training to reduce the incidence of delirium and postoperative decline after cardiac surgery (John Hedley-Whyte Award) — Dr. Brian O’Gara
- Anesthetics to Prevent Lung Injury in Cardiac Surgery: An RCT designed to evaluate whether volatile anesthetics can prevent inflammatory lung injury seen after

cardiopulmonary bypass (FAER Mentored Research Grant) — Dr. Brian O’Gara

- The Relative Importance of Outcome Measures in ARDS: A Stakeholders’ Perspective (John Hedley-Whyte Research Award) — Dr. Somnath Bose
- The relationship between administered oxygen levels and arterial partial oxygen pressure to neurocognition in postoperative mechanically ventilated cardiac surgical patients (FAER Mentored Research Grant) — Dr. Shahzad Shaefi
- DAMP-Mediated Innate Immune Failure and Pneumonia after Trauma: A five-year Program Project Grant to provide greater understanding of the cellular and molecular innate immune mechanisms predisposing to pneumonia and lung injury in the traumatic patient population (Department of Defense) — Drs. Talmor and Shaefi, and Valerie Banner-Goodspeed, MPH
- The relationship of administered oxygen levels and arterial partial

oxygen pressure to kidney injury following cardiac surgery (BIDMC Chief Academic Officer Pilot Grant) — Dr. Shaz Shaefi

- SAGE: Severe ARDS: Generating Evidence. A Multicenter Observational Study. — Valerie Banner-Goodspeed
- Disproprius: Study of perception of disproportionate care and the accompanying degree of moral distress among health care providers in the ICU (European Society of Intensive Care Medicine) — Valerie Banner-Goodspeed
- LUNG SAFE: Large observational study to Understand the Global impact of Severe Acute Respiratory Failure. (European Society of Intensive Care Medicine) — Valerie Banner-Goodspeed

None of the division’s research efforts would be possible without the incredible efforts of our research team at the Center for Anesthesia Research Excellence, led by Valerie Banner-Goodspeed and Ariel Mueller, who provides statistical support.



Thomas T. Simopoulos, MD

Interim Division Chief, Pain Medicine
Interim Co-Director, Spine Clinic
Assistant Professor of Anesthesia

“The AWPC is a very friendly and collegial environment.... The feeling one always has is to do what is best for the patient. In addition, the center permits teaching and research that promotes ongoing intellectual challenges and curiosity generating a true passion for pain medicine.”

PAIN MEDICINE

At the Arnold-Warfield Pain Center, our physicians offer compassionate and comprehensive care for patients with chronic and complex pain. We strive to provide multiple modalities to address our patients’ pain and return them to a fuller, more active life. Each patient is fully evaluated by a physician team, which orders tests and treatments appropriate to the patient’s specific pain issues. Each patient is closely followed to assess which treatments are of most benefit. Many of our patients have seen multiple specialists before they reach our clinic. We approach these patients with the most advanced and sophisticated treatments, while recognizing and addressing the difficulties that living with chronic pain has caused in their lives. To meet the needs of our patients, our clinical staff includes a pain psychologist, anesthesiologists, neurologists, a physiatrist, a nurse

practitioner, and a full-time team of nurses. In addition, we work closely with primary care physicians to ensure that we address their concerns about their patients, including opioid consultations.

To ensure the best, most comprehensive treatment for our patients, we coordinate care amongst radiology, physical therapy, acupuncture, and surgical teams. We also treat patients with multiple comorbidities, including cancer pain, osteoporosis, epigastric and pelvic disease, and many other medical conditions. As Beth Israel Deaconess Medical Center (BIDMC) has expanded into the community, our physician staff has continued to expand. We have added four new pain specialists, including our Interim Chief of Pain Medicine, Dr. Thomas Simopoulos. Both in conjunction with BIDMC’s

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Assistant Professor of Anaesthesia

Jatinder S. Gill, MBBS, MD
Assistant Professor of Anaesthesia

Susie S. Jang, MD
Instructor in Anaesthesia

Anthony C. Lee, MD
Instructor in Anaesthesia

Syed H. Mahmood, MD
Instructor in Anaesthesia

Cristin A. McMurray, MD
Instructor in Anaesthesia

Renee Moran, DO
Instructor in Anaesthesia

Jyotsna V. Nagda, MD
Assistant Professor of Anaesthesia

Christine G. Peeters-Asdourian, MD
Assistant Professor of Anaesthesia

John R. Pettinato, DO
Instructor in Anaesthesia and Neurology

Paragi H. Rana, MD
Instructor in Anaesthesia

R. Joshua Wootton, MDiv, PhD
Assistant Professor of Anaesthesia

Cyrus A. Yazdi, MD
Instructor in Anaesthesia

spine surgery group, and as a stand-alone specialty practice, we now see patients at all BIDMC locations in the greater Boston area, including the Chestnut Hill Square facility, Chelsea, Lexington, BIDMC–Needham, and BIDMC–Milton. Together, our providers seek to offer every pain patient cutting-edge care tailored to their individual needs.

The Comprehensive Headache Center offers evaluation and treatment for all types of headaches, including chronic migraines and cluster headaches. Our physicians are neurologists who are board-certified headache specialists. We use both traditional and integrated treatment options such as Botox injections, medication management, and acupuncture. Headache Center practitioners work with patients to develop treatment plans that are carefully monitored to ensure efficacy. We also work closely with the physicians at the Arnold-Warfield Pain Center to make sure that a wide range of treatment options are available to our patients, regardless of the etiology of their pain. All Pain Fellows are instructed by Headache Center neurologists both in lectures and hands-on evaluation and treatment sessions. In this valuable component of the Pain Fellowship, future practitioners are introduced to the intricacies of headache treatment and have numerous opportunities to hone their skills over the fellowship year.



Education

Our Pain Fellowship Program was chosen for the 2015 Pain Medicine Fellowship Excellence Award from the American Academy of Pain Medicine—one of only two fellowship programs recognized this year. In 2017, we had 220 applicants for our seven fellowship slots. Both fellows and the anesthesiology residents that rotate through the Pain Center each month participate in outpatient evaluation and treatment in the clinic and see patients for acute and chronic pain management during inpatient rounds. In addition, residents and fellows participate in didactic rounds several times each week, undergo training in fluoroscopic-guided procedures, as well as hone their skills taking comprehensive patient histories and

Current treatment modalities include:

- Injection therapies and nerve blocks — lumbar, thoracic, and cervical epidural steroid injections, sympathetic blocks, selective nerve root blocks
- Nerve ablation therapies — radiofrequency and cryoanalgesia
- Implantable spinal cord stimulators, Peripheral nerve stimulators and intrathecal drug delivery systems
- Minimally invasive lumbar decompression (MILD)
- Kyphoplasty
- Intradiscal procedures
- Acupuncture
- Psychological counseling
- Meditation and biofeedback
- Physical therapy
- Chronic pain program in conjunction with the Mind/Body Pain Management Program, a 10-session program

conducting general physical, neurological, and musculoskeletal examinations. Fellows also see patients in our Comprehensive Headache Center (which is part of the Division of Pain Medicine), participate with our pain psychologist in initial pain psychology evaluations, and gain exposure to the evaluation and treatment of pediatric pain at Boston Children's Hospital. A variety of affiliated faculty in the areas of pain psychology, neurology, spine surgery, and psychiatry also teach our fellows multidisciplinary and multimodal approaches to pain treatment. The overall goal is to teach the fellows the entire spectrum of pain management from pharmacologic options to interventional procedures as well as alternative and complementary approaches.

In addition to our own physician group, all of whom have appointments at Harvard Medical School, a variety of guest lecturers from different specialties and backgrounds are brought in to foster a multidisciplinary approach to pain medicine. Pain Fellows also participate in the Department of Anesthesia, Critical Care and Pain Medicine Grand Rounds, special seminars and clinical case conferences. Throughout the year,

a comprehensive list of pain medicine topics are covered to meet the current ACGME-required curriculum.

Research

Moving the field of pain medicine forward through our research continues to be a central tenet of our mission. Pain Division faculty design and implement a variety of research projects each year using intramural and extramural grants.

Current studies in our research pipeline include:

- High-frequency 10 kHz implantable neurostimulation system for chronic low back pain programming optimization, using the conus medularis as a reference point. This study investigates the efficacy of a neurostimulation spinal implant for controlling low back pain based on anatomic programming, funded by Nevro Corp. Dr. Gill is the lead investigator.
- Development of a laser surgical device for endoscopic disc decompression.
- Long-term follow-up and outcome of epidural blood patches, survey of anesthetic techniques for placement of spinal cord stimulators, and development and validation of

vertebral fracture severity scoring system. Dr. Gill is the principle investigator.

- Spinal cord stimulator outcomes with respect to trialing methods, equipment longevity, efficacy of high-frequency modes in complex regional pain syndromes and explantation rates. Dr. Simopoulos is the principle investigator.

Accomplishments

The Division of Pain Medicine at BIDMC underwent substantial expansion over the past several years. This has brought the ongoing need to acquire more physicians as well as support staff to deliver necessary care. We have now fully staffed all sites of pain care and have been steadily advancing the necessary support staff. For example, care at BIDMC-Needham and Milton has been transitioning from pain consultation to actual pain medicine practice whereby patients can be closely followed by providers on a long-term and consistent basis. Growth of both patients and insurance demands has also resulted in the restructuring of support staff at the Pain Center. In particular, the administrative support staff has very defined roles which include insurance prior authorization, phone call triage, physician scheduling, billing documentation, and medical record scanning. This will hopefully allow us to improve inflow of patients at the center. The second component is clinical throughput. We have built a check-out desk to allow outflow of patients. Each clinical provider-nurse, medical assistant, radiology tech, fellow, resident, and attending have very defined roles to allow for improved throughput.





Menrika S. Louis, MHA, MPA
Administrative Director of Operations

Elizabeth Carvelli, RN, MSN
Nursing Director

Katherine P. Boyle, RN

Joanne Cullen, RN

Susan B. Dwyer, RN

Nancy L. Hartshorn, RN

Anne S. Hooley, RN

Marian A. George, RN

Patricia A. Smith, RN

Mary M. Alfred
Medical Assistant

Ana A. Cabrera-Delgado
Lead Medical Assistant

Sean H. Abiera
Administrative Assistant II

Meron Ayele
Diagnostic Technologist II

Sandy S. Barbosa
Managed Care Coordinator

Nathaniel Beyer, MA, MAT
Practice Manager

Christopher Burgos
Diagnostic Technologist II

Maureen Burke
Diagnostic Technologist III

Kemeisha T. Daley
Administrative Assistant I

Jose Garcia
Admin Assistant I

Juan Garcia
Practice Representative

Tiffany Haley
Practice Assistant

Renetta L. Johnson, AS
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Thomas Knudson
Diagnostic Technologist II

Elizabeth Kranich
Diagnostic Technician II

Victoria Kronillis
Diagnostic Technologist II

Marissa E. Maldonado, AS
Administrative Assistant I

Genesis A. Martell
Administrative Assistant I

Gabrielle Mobayed
Diagnostic Technologist II

Rahama Mokdad
Diagnostic Technologist II

Julie Nickolson
Diagnostic Technician III

Norma J. Nighelli, AS
Practice Manager - Revenue Cycle

Roosevelt Poulard
Diagnostic Technologist II

Alexander Raymond
Diagnostic Technologist II

Emmanuel Rosado
Pain Nursing, Practice Representative

Josmar Silva
Diagnostic Technologist II

Shaw' Tae T. Sullivan
Administrative Assistant II

Suani Tejada
Practice Representative

Najibi Tejada
Administrative Assistant III

Aziza L. Wilkerson
Managed Care Coordinator

Earlena Williams, B.A.
Referral Specialist

TEAM

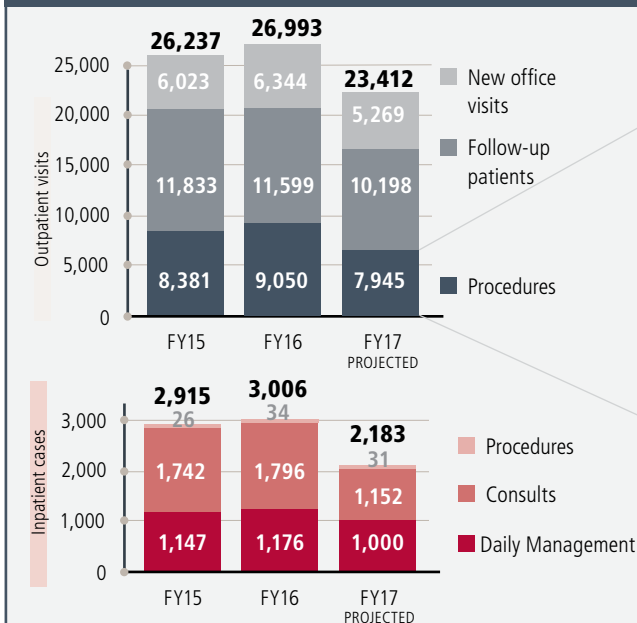
These changes will hopefully improve patient access to our center.

On the clinical side: We now offer a new mode of spinal cord stimulation that does not involve any sensation for it to be effective. There have been more responders to this therapy so far than traditional stimulation. There will be a concerted effort to re-establishing the Minimally Invasive Lumbar Decompression procedure for elderly patients with spinal stenosis.

In addition, the fellowship program director, Dr. Peeters-Asdourian, and assistant program director, Dr. Paragi Rana, together have established root cause analysis/quality assurance and morbidity sessions for fellows.

Finally, we have established a 15-year database on all spinal cord stimulator patients. This will allow for future research as well as safety/quality measures.

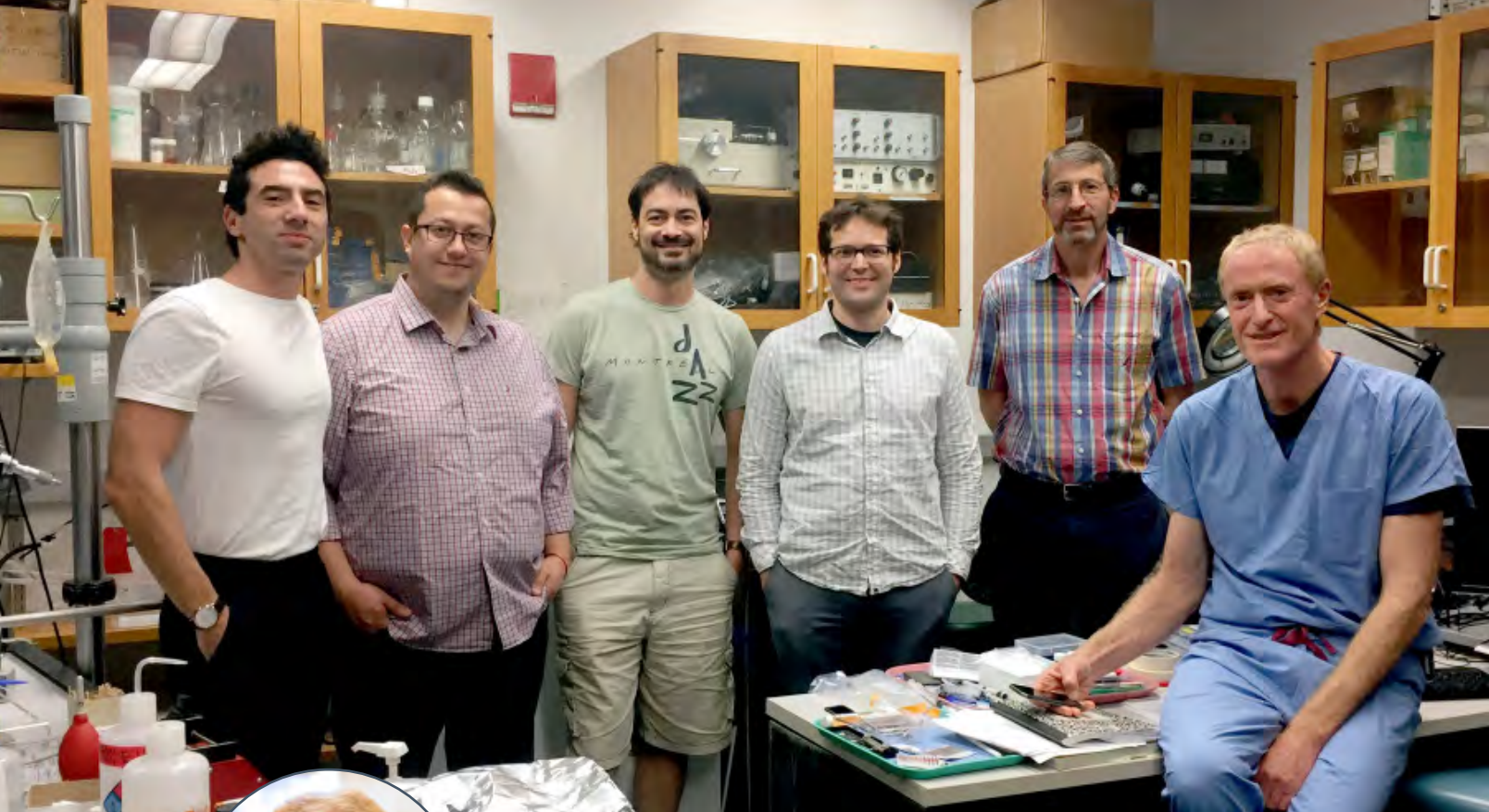
Pain Services Across Locations FY15 – FY17



Procedures	FY15	FY16	projected FY17
Lumbar	3,006	2,974	2,663
Cervical	473	369	347
Radiofrequencies	246	246	248
Permanent placements of SCS	25	41	46
Spinal cord trials	49	79	134
Blood patches	36	21	13
Discographies	12	7	1
Kyphoplasties	4	8	41
Other procedures	4,530	5,305	4,452
Total	8,381	9,050	7,945

BIDMC provides pain services at our following locations and affiliates:

Arnold-Warfield Pain Management Center, BIDMC's Spine Center, BIDMC West Procedural Center, BID-Milton, BID-Needham, Chestnut Hill, Chelsea Clinic, and Lexington Clinic.



Rami Burstein, PhD

Vice Chair, Research and Neuroscience
John Hedley-Whyte Professor of Anesthesia

“We are a group of scientists and clinicians dedicated to easing the burden of migraine by unraveling its many pathophysiologies and by inventing novel approaches for treatment.”

RESEARCH

The Burstein-Nosedá-Strassman Lab

Who we are? We are a group of scientists and clinicians dedicated to easing the burden of migraine by unraveling its many pathophysiologies and by inventing novel approaches for treatment.

What we do? We conceive, design, and execute parallel clinical and pre-clinical studies that define the power of true translational research in headache medicine.

How we do it? We combine molecular, genetic, epigenetic, cellular, immunological, anatomical, physiological, behavioral, and psychophysical techniques, with clinical and therapeutical approaches to answer questions to which no answers are available.

Basic research on headache focuses on the pathophysiology of neural pathways that underlie migraine pain and their modulation by molecules with potential therapeutic effects. Anatomical, physiological, pharmacological, molecular, behavioral, and genetic studies include characterization of plasticity that develops during migraine in peripheral nociceptors innervating the meninges, dorsal horn trigeminothalamic circuits mediating cephalic pain of intracranial origin, and thalamocortical neurons that convey nociceptive signals from the meninges to cortical areas involved in the perception of pain, vision, sound, and smell as well as memory, motor, affective, and cognitive functions. The lab is located on the sixth floor of the Center for Life Science and consists of several postdoctoral fellows. In the past two years, basic research in the

TEAMS

BURSTEIN, NOSEDA, STRASSMAN LAB

Rodrigo Nosedá, PhD
Instructor of Anaesthesia

Aaron J. Schain, PhD
Instructor in Anaesthesia

Andrew Strassman, PhD
Associate Professor of Anaesthesia

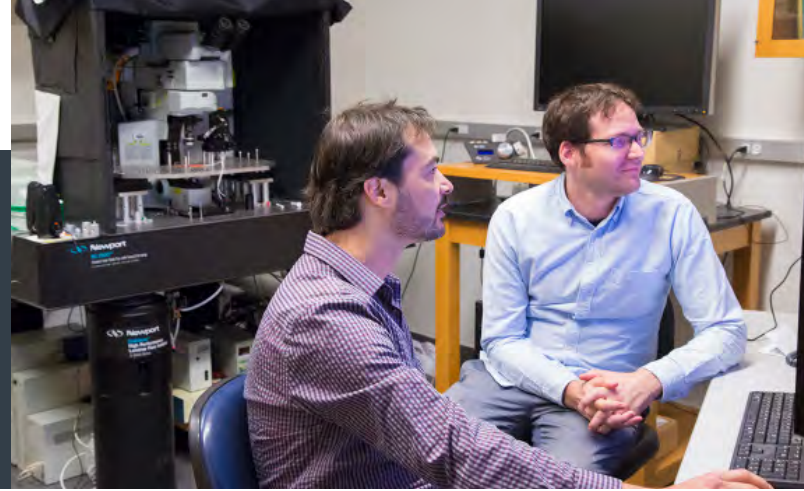
Agustin Melo-Carrillo, MD, Ph.D.

LEVY LAB

Dan Levy, PhD, MSc
Associate Professor of Anaesthesia

Jun Zhao, PhD

Dara Bree, PhD



lab has attempted to determine (a) how migraine headache begins by studying neuronal, inflammatory, environmental, and behavioral triggers and their effects on the trigemino-vascular system; (b) how postictal headache begins and ends after focal and generalized seizure; (c) the mechanism by which aura induces activation along pain pathways underlying migraine headache; (d) how light exacerbates migraine headache; (e) the thalamus's role in migraine and the way by which it transforms different colors of light into pain; (f) the hypothalamus role in migraine and the many ways by which it generates negative emotions and a variety of sympathetic, parasympathetic, physiological, and endocrine changes during migraine; (g) the intracranial origin of extracranial pain and the extracranial origin of intracranial pain; (h) the cerebellum and what role it plays in occipital headache, vestibular migraine, vertigo, dizziness, motion sickness, and potentially vomiting; (i) the mechanisms of action of Botox; and (j) the mechanism of action of CGRP monoclonal antibodies. These studies are conducted in collaboration with Drs. Rodrigo Nosedá, Andrew Strassman, Aaron Schain, and Agustín Melo-Carrillo.

To ensure that our basic research

program is relevant to the clinical condition of migraine in patients, we also conduct translational studies in the Clinical Research Center located on Feldberg 8. Our clinical studies focus on (a) the multiple aspects of photophobia in migraine patients and in blind subjects suffering from a variety of retinal degenerative diseases; (b) the inflammatory role in headaches of extracranial origin and chronic muscle tenderness; (c) the relationship between epileptic seizures and postictal headache; (d)

identification of the most effective ways to terminate status migrainosus; (e) the placebo role in individualizing migraine therapy; (f) the prophylactic potential of a combination of statin and vitamin D for the treatment of episodic migraine; and (g) the therapeutic and physiological effects of cambia, a liquid NSAID that contains potassium-channel openers, approved recently for the acute treatment of migraine. In the past two years, these studies were conducted in collaboration with Drs. Catherine Buettner



(Medicine), Carolyn Bernstein (Anesthesia), Ted Kaptchuk (Medicine), and Alexandra Hovaguimian (Neurology)—all at BIDMC. Outside BIDMC, we collaborated with Drs. Carlton Perry (Plastic Surgery) and Pamela Blake (Neurology) at Memorial Herman Hospital in Houston. In these studies, we examined genetic and epigenetic aspects of post-traumatic headache and chronic migraine by studying biopsies of relevant muscles, fascia, perineurium, and periosteum tissues. In addition, in collaboration with Dr. David Borsook at Children's Hospital, we continue to use advanced imaging (fMRI) to determine (a) the neural basis of facial and cephalic allodynia; (b) the neural basis of whole-body allodynia; (c) the consequences of repeated migraine attacks on brain areas involved in pain modulation and affective and cognitive functions; and (d) the mechanisms of postconcussion headache in adolescents.

19 Grants awarded in 2015–2017

2012-2019: R37 NS079678-01 National Institute of Neurological Disorders and Stroke, NIH, PI, "Photophobia During Migraine: Sensory, Autonomic and Emotional Responses to Light"

2012-2017: RO1 NS073977 National Institute of Neurological Disorders and Stroke, NIH, "Brain Markers of Low and High Frequency Episodic Migraine"

2015-2017: R21 NS090254 National Institute of Neurological Disorders and Stroke, NIH "Neural Basis of Occipital Headache"

2015-2020: RO1 NS095655 National Institute of Neurological Disorders and Stroke, "Post-Traumatic Headache (PTH) in Children: Alterations of Brain Function, Blood Flow and Inflammatory Processes"

2015-2017: R21 NS091627 National Institute of Neurological Disorders and Stroke, NIH "Short Sleep Duration and Sleep Disturbance as a Trigger of Migraine"

2016-2021: RO1 NS094198 National Institute of Neurological Disorders and Stroke, NIH "Cortical Mechanisms of Headache: Beyond CSD"

2017-2022: RO1 NS104296 National Insti-

tute of Neurological Disorders and Stroke, NIH "Pathophysiology of Occipital Headache"

2005-2020: Allergan, "Botulinum Toxin Type A Mechanism of Action in Migraine Headache—Focus on TRPV1 and TRPA1 Receptors"

2016-2018 Allergan, "Novel Concepts for BoNT-A Mechanisms of Action: Role in Altering the Molecular Environment in which Pain Fibers Exist" (pre-clinical)

2016-2020: Allergan, PI, "Novel Concepts for BoNT-A mechanisms of action: role in altering the molecular environment in which pain fibers exist" (clinical)

2017-2019: Allergan "Expanding the Framework of Botox Mechanisms of Action from Sensory to Parasympathetic and Sympathetic Effects"

2015-2018: Trigemina (Targeted neurological therapies), PI, "Can Intranasal Oxytocin Inhibit Peripheral and Central Trigeminovascular Neurons After Their Activation by Topical Application of Inflammatory Soup to the Dura"

2015-2017: Strategic Science & Technologies, LLC., PI, "Can an Ointment Containing Imitrex and Ketorolac Reverse and/or Prevent Peripheral and Central Sensitization in an Animal Model of Migraine Headache"

2015-2016: Depomed, "Cambia Mechanisms of Action in Terminating Migraine Headache and Central Sensitization"

2016-2018: Teva Pharmaceutical Industries, Ltd., "Mechanisms of action of TEV-48125 Anti-Calcitonin Gene-Related Peptide (CGRP) Monoclonal Antibody (mAB)—Neuronal"

2016-2018: Teva Pharmaceutical Industries, Ltd., PI, "Mechanisms of Action of TEV-48125 Anti-Calcitonin Gene-Related Peptide (CGRP) Monoclonal Antibody (mAB)—In Males and Females"

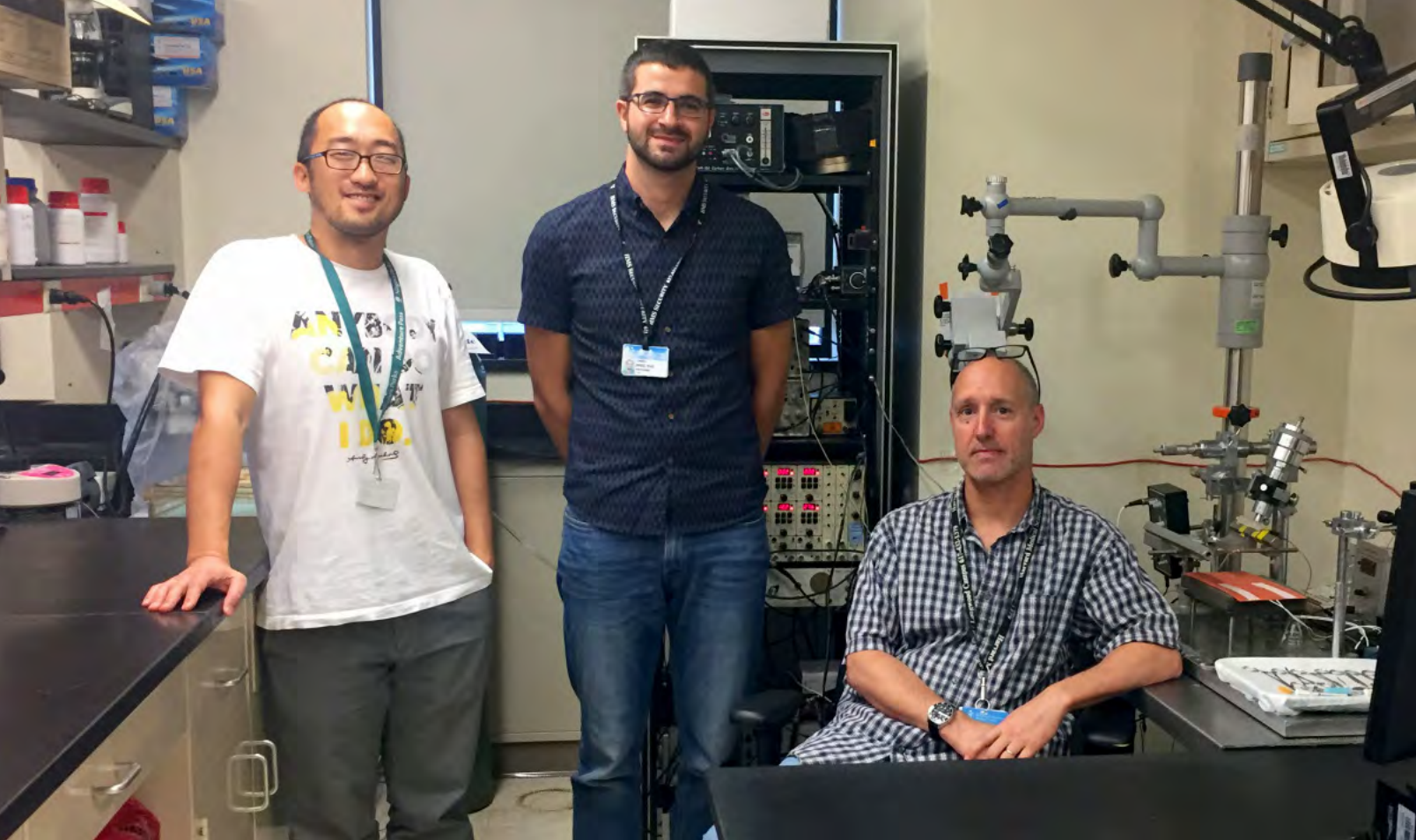
2016-2019: Teva Pharmaceutical Industries, Ltd., PI, "Mechanisms of Action of TEV-48125 Anti-Calcitonin Gene-Related Peptide (CGRP) Monoclonal Antibody (mAB)—Inflammation"

2016-2019: Teva Pharmaceutical Industries, Ltd., PI, "Mechanisms of Action of TEV-48125 Anti-Calcitonin Gene-Related Peptide (CGRP) Monoclonal Antibody (mAB)—Activation by CGRP"

2017-2019: Dr. Reddy Laboratories "Can Celecoxib Reverse Inflammatory Responses in the Meninges"

We also had 27 publications in peer-review journals during 2015–2017.





The Levy Lab

Dan Levy's laboratory, located on the seventh floor of the Dana research building, continues to conduct research using rodent models on peripheral mechanisms underlying the triggering of migraine and post-traumatic headache. The lab has been sponsored in 2016 by three NIH grants and a grant by Teva. Research in the lab employs electrophysiology and calcium imaging to study changes in the activity and sensitivity of trigeminal meningeal afferents. The lab also utilizes various methods to assess headache-related metabolic changes in the cortex including changes in cerebral blood flow, oxygen tension, and other metabolites. In addition, various behavioral models related to headache are employed, including testing of facial allodynia, employing the grimacing-scale open-field activ-

ity and place-preference paradigms. In 2016, research in the Levy lab continued to a) decipher meningeal and cortical factors that contribute to the persistent activation of meningeal nociceptors in response to cortical spreading depression, a putative migraine trigger; b) determine the changes in the activity and sensitivity of meningeal and calvarial perios-teal afferents that occur following concussive mild brain injury (mTBI); c) develop behavioral rat and mice models of post-traumatic headache following closed-head injury, and study the role of immune mediators. These studies were conducted by Dr. Jun Zhao, PhD (a senior research associate) and Dr. Dara Bree, PhD (a postdoctoral fellow). In addition, the lab now also collaborates with Dr. Andermann at the Department of Endocrinology to develop tools to study trigeminal meningeal afferents

activity in awake-behaving animals. In 2016, Drs. Levy and Andermann received a NIH grant to develop this method to establish a two-photon calcium-imaging approach to study changes in the activity and mechano-sensitivity of meningeal afferents in awake, freely running behavior.

Grants

2013-2018: R01NS078263 National Institute of Neurological Disorders and Stroke, "Mechanisms of CSD-Evoked Persistent Activation of Meningeal Nociceptors"

2014-2019: R01NS086830 National Institute of Neurological Disorders and Stroke, "Peripheral Mechanisms of Posttraumatic Headache"

2017-2019: R21NS101405 National Institute of Neurological Disorders and Stroke, "Chronic Two-Photon Calcium Imaging of Intracranial Meningeal Afferents in Awake Behaving Mice"

2016-2018: Teva, "The Role of CGRP in Chronic Headache"



CENTER FOR ANESTHESIA RESEARCH EXCELLENCE



Balachundhar Subramaniam, MD, MPH
Director, Center for Anesthesia Research Excellence
Associate Professor of Anaesthesia

“What drives me to work here is the leadership, which is passionate about the department, a chair who desires to bring clinical research front and center to the department and the frontline that is as diverse as where I am from.”

The Center for Anesthesia Research Excellence (CARE) serves as a one-stop shop for assisting department members conduct successful clinical research. The goal is to simplify and streamline research endeavors and develop a pipeline of strong Clinician Investigators to increase research in the area of anesthesiology. CARE works across all anesthesia divisions to provide research and compliance education, manage internal grants, foster collaboration, provide mentorship, and promote independence.

How does CARE work?

The researcher brings the research idea to CARE. The idea is presented in front of an ad hoc Physician Review Panel from within and outside CARE. The feasibility of the project is determined by the panel after which the research may move forward with

appropriate mentorship, resources, periodic review, identification of bottlenecks, and steps to move it forward for publication. In parallel, the researcher will be given support to identify, apply, and obtain a research grant. Ultimately, the idea is to make them an independent researcher.

Education

Education lectures held during Faculty Hour are open to faculty and trainees. The topics are determined through a periodic poll identifying the needs within the department. These lectures are archived within the intranet for trainees and investigators to access when required. Examples of such topics are statistics: power calculations, sample size estimates, grantsmanship, IRB application process, research consenting, and source documentation.

Valerie M. Banner-Goodspeed, MPH
Clinical Research Administrator

Ariel L. Mueller, MA
Biostatistician II

Kristin J. Brierley, BS
Clinical Trials Specialist

Doris Gasangwa, BS
Clinical Research Coordinator

Miguel Ángel Armengol de la Hoz
Clinical Sponsored PhD Graduate Student

Research Fellows

Sayuri Jinadasa, MD

Senthil Packiasabapathy Kuthalingam, MBBS

Ammu Thampi Susheela, MBBS

Research Students

Rony Thomas

Pantos Skritakis, BS

Data Analysts

Priyam Mathur, BS

Pooja Mathur, BS

Clinical Research Assistants

Julia Larson, BS

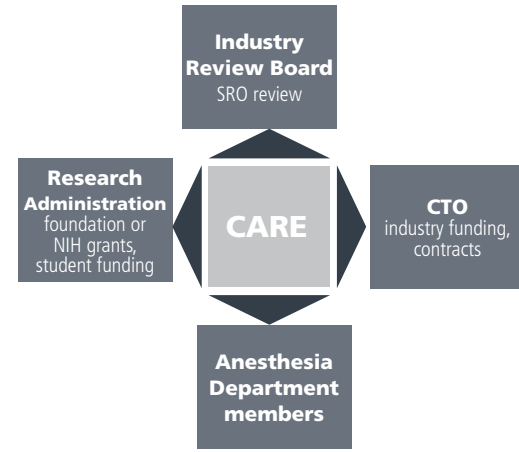
Melissa Patxot, BS

Alyssa Rossi, BA

Tereza R. Pinkhasova, BS

Ray Ritz, RRT
Clinical Trials Specialist

Vanessa T. Wong, BS
Project Coordinator



In addition, the research support staff receive weekly training on research conduct, consenting, and compliance. A monthly department-wide research focus topics have been organized. This is an exciting opportunity for trainees, peers and young investigators to educate themselves about the ongoing research in each division and labs.

Periodic grand rounds are given to the entire Department updating them of ongoing research work, changes, current state, and successes. This increases the visibility of ongoing research and increase awareness of local experts among the peers.

PIPELINE investigators

Currently, there are two investigators on T-32 (NIH), two Foundation of Anesthesia Education and Research (FAER) mentored research training grants, and two prospective T-32 applicants from the resident research pool. Two prospective residents have opted for a dedicated research track during residency. In the past two years, four faculty members completed the Harvard School of Public Health Program in Clinical Effectiveness and all are continuing to finish their Masters in Public Health (MPH).

Successes

In this early stage, 27 anesthesia faculty, 6 faculty from other departments, and 22 residents have used CARE in one form or another.

Currently the Department has 29 research grants including NIH-(10), Department of Defense (1), Industry (15), Foundation (3), and three BIDMC internal grants. The research revenue is \$5.2 million, with \$3.4 million of it coming from the federal government. A major indirect cost rebate was obtained from BIDMC. In 2015, Doximity and U.S. News & World Report rankings based on physician and alumni surveys ranked BIDMC Anesthesia Department in the top 10 in research revenue nationally.

Initiatives

A dedicated resident research track year (Loring research scholars) has been started this year. This is an ACGME-approved track with incentives for successful applicants. The track is aimed to individualize the research program, improve the research pipeline, and, importantly, increase the clinician investigator pool for the field of anesthesiology.

PRINCIPAL INVESTIGATORS

Valerie M. Banner-Goodspeed, MPH
Research Associate in Anaesthesia

Sheila R. Barnett, MBBS, BSc
Associate Professor of Anaesthesia

M. Dustin Boone, MD
Assistant Professor of Anaesthesia

Somnath Bose, MD, MBBS
Instructor in Anaesthesia

Jatinder S. Gill, MBBS, MD
Assistant Professor of Anaesthesia

Philip E. Hess, MD
Associate Professor of Anaesthesia

Cullen D. Jackson, PhD
Cognitive Psychologist

Stephanie B. Jones, MD
Associate Professor of Anaesthesia

Cindy M. Ku, MD
Instructor in Anaesthesia

Yunping Li, MD
Assistant Professor of Anaesthesia

Stephen H. Loring, MD
Professor of Anaesthesia

Feroze Mahmood, MBBS
Associate Professor of Anaesthesia

Robina Matyal, MD
Associate Professor of Anaesthesia

Meredith W. Miller MD
Instructor in Anaesthesia

John D. Mitchell, MD
Associate Professor of Anaesthesia

Brian P. O’Gara, MD
Instructor in Anaesthesia

Achikam Oren-Grinberg, MD
Assistant Professor of Anaesthesia

Satya Krishna Ramachandran, MD
Instructor in Anaesthesia

Shahzad Shaefi, MBBS
Assistant Professor of Anaesthesia

Thomas T. Simopoulos, MD
Assistant Professor

Daniel S. Talmor, MD, MPH
Edward Lowenstein Professor of Anaesthesia



Stephanie B. Jones, MD

Vice Chair, Education and
Faculty Development

Associate Professor of Anaesthesia

*“It’s inspiring to witness
the professional and
personal success of our
graduates, knowing that
our hard work—and
theirs—has paid off.”*

EDUCATION

Our educational mission is to develop leaders in our profession through excellent clinical experience, strong mentorship, innovative teaching curricula, and a flexible program of unique offerings that can be adapted to meet each learner’s needs. This is accomplished via a relentless pursuit of excellence through continuous quality improvement and creativity grounded in sound educational theory and evidence. In recognition of our success, our core residency program and our Cardiac, Pain Management and Critical Care fellowships all hold the maximum 10-year cycle under the ACGME Next Accreditation System. We are one year into the accreditation of our Obstetric Anesthesia fellowship, and have already increased our fellow complement to two per year. Our other fellowship training programs continue to expand. The Critical Care, and Cardiac fellowships have added positions; a six-month Structural Heart Fellowship has been created as well. A Neurocritical Care fellowship was

approved by the United Council for Neurologic Subspecialties. It is the first anesthesia-led program of its kind and will be directed by Dr. M. Dustin Boone. Dr. Boone will also direct our new Neuroanesthesia fellowship. Drs. Johann Patlak and Lauren Buhl, two of our recent graduates, will be the inaugural fellows in this important clinical area. The core residency program has added two Loring Scholars, named in honor of Dr. Steve Loring, a long-serving member of our department and nationally prominent pulmonary researcher. This integrated program includes 18 months of research over five years of training. Each scholar is paired with an individual mentor; our goal is to develop the next generation of anesthesiologist investigators.

Our division, while encompassing the entire anesthesia faculty, continues to recruit core members in order to accomplish our diverse and wide-ranging goals. Dr. Justin Stiles has taken on the challenging role of

TEAM

John D. Mitchell, MD
Program Director, Anesthesia Residency
Associate Professor of Anaesthesia

Cindy M. Ku, MD
Associate Program Director, Anesthesia Residency
Instructor in Anesthesia

Sheila R. Barnett, MBBS, BSc
Associate Professor of Anaesthesia

M. Dustin Boone, MD
Program Director, Neuroanesthesia Fellowship
Program Director, Neurocritical Care Fellowship
Assistant Professor of Anaesthesia

Ruma R. Bose, MD, MBBS
Assistant Professor of Anaesthesia
Cindy M. Ku, MD
Associate Program Director, Anesthesia Residency
Instructor in Anaesthesia

Philip E. Hess, MD
Program Director, Obstetrical Anesthesia Fellowship
Associate Professor of Anaesthesia

Bozena R. Jachna, MD
Assistant Professor of Anaesthesia

Cullen D. Jackson, PhD
Director, Innovation
Instructor in Anaesthesia

Susie S. Jang, MD
Instructor in Anaesthesia

Rikante O. Kveraga, MD
Instructor in Anaesthesia

Adam B. Lerner, MD
Assistant Professor of Anaesthesia

Yunping Li, MD
Associate Program Director, Obstetrical Anesthesia Fellowship
Assistant Professor of Anaesthesia

Alan Lisbon, MD
Associate Professor of Anaesthesia

Feroze Mahmood, MD
Director, Perioperative Echocardiography
Professor of Anaesthesia

Jeffrey Martel, MD
Director, Medical Student Education (until 3/17)
Instructor in Anaesthesia

Robina Matyal, MD
Associate Professor of Anaesthesia

Sara E. Neves, MD
Associate Program Director, Anesthesia
Critical Care Fellowship
Instructor in Anaesthesia

Peter J. Panzica, MD
Assistant Professor of Anaesthesia

John B. Pawlowski, MD, PhD
Assistant Professor of Anaesthesia

Christine G. Peeters-Asdourian, MD
Program Director, Pain Medicine Fellowship
Assistant Professor of Anaesthesia

Paragi H. Rana, MD
Associate Program Director, Pain Medicine Fellowship
Instructor in Anaesthesia

Marc R. Shnider, MD
Assistant Professor of Anaesthesia

Shahzad Shaefi, MBBS
Program Director, Anesthesia Critical Care Fellowship
Program Director, Adult Cardiothoracic Fellowship
Assistant Professor of Anaesthesia

Justin K. Stiles, MD
Director, Medical Student Education (4/17-)
Instructor in Anaesthesia

Balachundhar Subramaniam, MD, MPH
Program Director, Center for Anesthesia Research Excellence
Associate Professor of Anaesthesia

Sugantha Sundar, MBBS
Assistant Professor of Anaesthesia

Daniel S. Talmor, MD, MPH
Edward Lowenstein Professor of Anaesthesia

Scott D. Zimmer, MD
Director, Categorical Internship
Instructor in Anaesthesia

Susan Herlihy Kilbride, BSN
Faculty Development and Education Specialist

Mary Jane Cahill, MBA, C-TAGME
Manager, Medical Education Programs

Ronald C. Mayes
Medical Education Coordinator

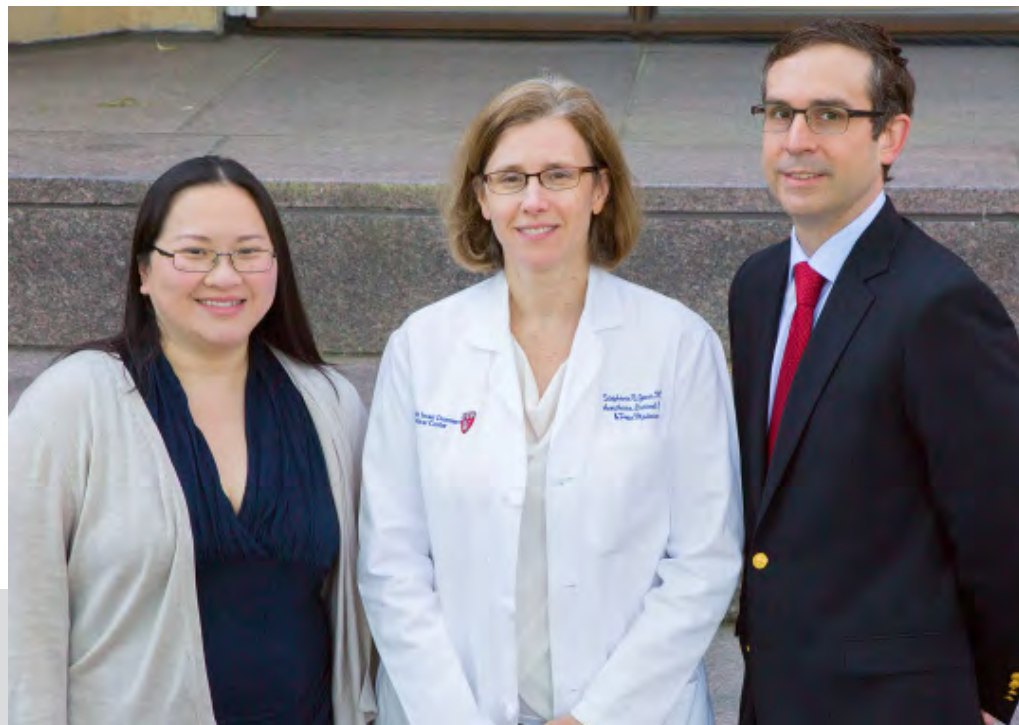
Emma J. Breibart-White, BA
Residency/Fellowship Program Coordinator

Vannessa T. Wong, BS
Project Coordinator

Director of Medical Student Education. Pinpointing the learning needs of everyone from beginning second-year clerks to highly motivated visiting senior students “auditioning” for residency requires an uncommon degree of flexibility and enthusiasm. Dr. Scott Zimmer directs our categorical internship program, which is highly sought after by the residency program applicants. The internship schedule provides a unique mix of exposure to medicine and surgery and includes a month of anesthesia, significant ultrasound training, and instruction in quality and safety concepts. We currently have six internship positions per year but hope to expand that number soon. Drs. Zimmer and Sapna Govindan have joined our simulation curriculum subcommittee, tasked with creating and running the simulation sessions that

are an important part of our didactic curriculum. Drs. Somnath Bose and Meredith Miller run our monthly resident Journal Club; Dr. Miller also heads our thrice-yearly mock oral sessions along with Dr. Lior Levy. Dr. S. Krish Ramachandran arrived from the University of Michigan with

an innovative Root Cause Analysis (RCA) curriculum in tow. After some rigorous train-the-trainer sessions with enthusiastic faculty members, three resident group RCA projects were successfully completed under Dr. Cindy Ku’s leadership. Dr. Sara Neves will be continuing this effort



during the upcoming academic year. We continue to train new and existing faculty in provision of feedback and

novel teaching strategies, and plan to turn our attention to auditing the written feedback to improve its utility in resident performance improvement. Dr. Raj Doshi is a master of feedback provision; we hope to benefit from his example when instructing others. We have incorporated a novel game-based approach to teaching communication and crisis management skills. Using a modified version of the board game Pandemic, residents are taught to apply principles of team communication and resource management. We have piloted this curriculum with excellent feedback from participants at two centers. Dr. Cindy Ku, along with Dr. Cullen Jackson, is currently leading a multicenter group exploring whether this game-based approach improves performance on communication and teamwork in simulated operating room events.

Stephanie Jones is Secretary, and Dr. John Mitchell is a member of the Board of Directors for the Society for Education in Anesthesia (SEA). Dr. Cindy Ku is chair designee for the SEA Committee on Resident Education and is program co-chair for the fall meeting in October. Drs. Jones, Mitchell, Sugantha Sundar, Shaz Shaefi, and Robert Leckie continue in their role as ABA Part 2 (Oral) Board Examiners. Drs. Mitchell, Jones, and Robina Matyal sit on the ABA OSCE committee, where Dr. Mitchell oversees the “interpretation of echocardiograms” section. We continue our partnership with the Anesthesia Toolbox and its peer-reviewed curricular offerings. Dr. John Mitchell sits on the steering committee and directs the cardiovascular content. We will be beta testing an online nonoperating room anesthesia (NORA) curriculum with the University of Pennsylvania. Dr. Haobo Ma will be directing the new CA3 NORA rotation, as our seniors refine their practice of anesthesia in remote locations: GI, various

Anesthesia Education

Number of Interns, Residents, Fellows

6 Interns 52 Residents 19 Fellows

Percent of Residents Who Entered a Fellowship

Class of 2017 100% into Fellowship
 Class of 2016 63% into Fellowship
 Class of 2015 100% into Fellowship

Percent Academic vs. Private

Class of 2017

100% into Fellowship

Class of 2016

26% into Academic Practice
 52% into Non-Academic Practice
 21% into Fellowship

Class of 2015

53% into Academic Practice
 47% into Non-Academic Practice

Class of 2014

68% into Academic Practice
 32% into Non-Academic Practice

National and International

Our national reputation as preeminent educators continues to grow. Dr.



CME Course Listing July 2015–June 2017

CME Course	Date	Directors
The Boston Echo Course: 12th Perioperative Echocardiography; A Transitioning from 2 to 3 Dimensional Echocardiography	September 25-27, 2015	Feroze Mahmood, MD, FASE Peter J. Panzica, MD Adam B. Lerner, MD
Three-Dimensional (TEE) Workshop	November 28-29, 2015	Feroze Mahmood, MD, FASE
Training in Perioperative Transesophageal Echocardiography	October – November 2015	Feroze Mahmood, MD, FASE
Anesthesia Grand Rounds	January 1 – December 31, 2015	Alan Lisbon, MD
Maintenance of Certification in Anesthesiology (MOCA)	January 1 – December 31, 2015	John B. Pawlowski, MD, PhD
Three-Dimensional (TEE) Workshop	March 19-20, 2016	Feroze Mahmood, MD, FASE
Ultrasonography for Intensivists and Emergency Medicine Clinicians: Focused Echocardiography and Beyond	April 29 – May 1, 2016	Achikam Oren-Grinberg, MD, MS Todd W. Sarge, MD Akiva Leibowitz, MD
Harvard Anesthesiology Update	May 9-13, 2016	Sugantha Sundar, MBBS
Evaluating and Treating Pain	June 20-24, 2016	Carol A. Warfield, MD R. Joshua Wootton, PhD Christopher J. Gilligan, MD, MBA
Three-Dimensional (TEE) Workshop	August 27-28, 2016	Feroze Mahmood, MD, FASE
Three-Dimensional (TEE) Workshop	November 28-29, 2016	Feroze Mahmood, MD, FASE
Training in Perioperative Transesophageal Echocardiography	October – November 2016	Feroze Mahmood, MD, FASE
Anesthesia Grand Rounds	January 1 – December 31, 2016	Alan Lisbon, MD
Maintenance of Certification in Anesthesiology (MOCA)	January 1 – December 31, 2016	John B. Pawlowski, MD, PhD
Three-Dimensional (TEE) Workshop	March 11-12, 2017	Feroze Mahmood, MD, FASE
Ultrasonography for Intensivists and Emergency Medicine Clinicians: Focused Echocardiography and Beyond	April 28-30, 2017	Akiva Leibowitz, MD Achikam Oren-Grinberg, MD, MS Todd W. Sarge, MD
Harvard Anesthesiology Update	May 8-12, 2017	Sugantha Sundar, MBBS
Evaluating and Treating Pain	June 26-30, 2017	Carol A. Warfield, MD R. Joshua Wootton, PhD Thomas T. Simopoulos, MD
Anesthesia Grand Rounds	January 1 – June 30, 2017	Alan Lisbon, MD
Maintenance of Certification in Anesthesiology (MOCA)	January 1 – June 30, 2017	John B. Pawlowski, MD, PhD

radiology suites, ECT, and more. In addition, Dr. Ma is cultivating relationships with PUMC Hospital, one of the largest and most academic hospitals in China. We will be working as a division to organize rotation experiences and design courses for visiting educators.

Ultrasound

Our rigorous perioperative ultrasound curriculum continues to expand. We recently developed a structured skills exam to demonstrate competency in workflow and application of knowledge to scenarios and are submitting this work for publication. We have also developed a proficiency index to demonstrate when learners have achieved a threshold of skills, knowledge, and workflow to be able to apply skills learned in the simulator

lab and workshops to direct patient care. We are now in the second year of our structured ultrasound boot camp sessions for our CA1 class. We incorporated these sessions to ensure those residents joining the program as CA1s are able to quickly get proficient with these skills. Based on feedback and results of testing, we revised the ultrasound curriculum this year to focus less on theory and more on hands-on practice with live models, simulators, and tissue task training. On the CME front, we have also augmented staff ultrasound teaching to ensure that supervision and continued clinical teaching of residents applying these new skills will remain robust. As a follow-up to a series of faculty workshops, Drs. Robina Matyal, Achi Oren-Grinberg, and others will be offering individualized training to faculty seeking to improve their ultrasound skills in

areas ranging from regional anesthesia to transthoracic echocardiography and lung examination. Our new departmental learning lab is under construction, and we expect it to be completed later this academic year. This new space will have advanced simulation and multimedia learning capabilities that will further augment our already substantial educational resources for trainees and open up exciting new teaching opportunities.

Awards

BIDMC received three different awards at the 2017 SEA Spring Meeting. Dr. Mitchell accepted the inaugural Philip Liu Award for Innovation in Anesthesia Education—Education Research for the project “Improving Resident Communication Skills with a Customizable Curriculum.” Dr. Ku



collected the second annual SEAd Grant, a \$10,000 education research grant, for “Project Pandemic: Efficient and Effective Teamwork and Communication Skills Training Using a Tabletop Game,” described above. Dr. Anna Budde (CA2) received a SEA-HVO Traveling Fellowship. Dr. Budde will serve a one-month teaching and clinical assignment in Rwanda. At home, Drs. Vwaire Orhurhu and Lindsay Sween were awarded the Principal Clinical Experience (PCE) Award for Outstanding Resident Teaching by the rotating HMS students. 2017 Excellence in Education awards were granted to four graduating residents. Part of our resident-as-teacher track, residents receiving this award must commit time and energy to demonstrating expertise in teaching and education theory across a range of environments and situations. This year we were proud to recognize Drs. Maggie O’Donoghue, Stanley Eosakul, Beth VanderWielen, and Alex Shapeton. We look forward to watching their future careers as anesthesia educators develop.

Research

Several past and current education research efforts have culminated in publications over the past year. Multicenter collaboration is a critical element of enhancing the rigor of anesthesia education research. Drs. Ku and Mitchell were part of a multicenter project looking at flipped classroom versus conventional teaching. We already incorporate this approach heavily in our perioperative ultrasound teaching and were pleased to be included as a study site. Based on the results, we will be expanding this flipped classroom



approach to other areas. Drs. Robina Matyal and Feroze Mahmood have helped position us at the forefront of perioperative ultrasound education. Our group has been active in all elements of teaching and research in this prolific project. Dr. Matyal’s FAER education research grant is coming to an end but has resulted in significant progress in the core areas of defining and evaluating workflow in perioperative ultrasound and developing a proficiency index for ultrasound training. Dr. Jones continues her NIH-supported work with engineers from Rensselaer Polytechnic Institute on a virtual airway skills trainer (VAST). The major goal of this project is to develop a virtual airway model to teach direct laryngoscopy and cricothyroidotomy, with particular attention to the difficult airway. Multiple members of the department, including residents, CRNAs, and faculty, have been instrumental in providing feedback on device prototypes and assisting with the development of the assessment metric that will eventually be incorporated into the simulator.

Dr. Bala Subramaniam continues to guide our resident research efforts with the able assistance of Ariel Mueller and CARE, approving and coordinating research rotations and acting as a personal mentor for many. Our residents had an outstanding showing at the New England Anesthesia Residents Research Conference (NEARC) this year with a near-sweep of the original research oral presentations: Dr. Vwaire Orhurhu (CA1) was awarded first place, Dr. Bijan Teja (CA2) second, and Dr. Beth VanderWielen (CA3) honorable mention. Dr. Orhurhu also won first place for best original research poster. Stan Eosakul’s (CA3) work on learning style preferences has been submitted to the *Journal of Education in Perioperative Medicine* and is under review.

We must also thank our talented administrative staff: Emma Breitbart-White, Mary Jane Cahill, Susan Kilbride, and Vanessa Wong. Without their unfailing support of the education mission, we would not be able to accomplish all that we have over the last two years.



Satya Krishna Ramachandran, MD
Vice-Chair, Quality, Safety, and Innovation

“Anesthesia is a highly technical field that blends the science and art of medicine into the delivery of care in the perioperative setting. There is much to be done as we continue exploring and define best practice through data analytics.”

QUALITY, SAFETY, AND INNOVATION

The Division of Quality, Safety, and Innovation supports the delivery of safe and efficient patient care through several processes directed at the site, division, and individual level. The three foundational arms of this division aim to create more effective ways to modify both human and system drivers of quality and safety.

The Innovation group participates in both quality and safety missions by enhancing our methods for evaluating and implementing solutions. We are actively engaged in human factors research and developing innovative technologies for assessing real-time safety or quality vulnerabilities in teams and systems.

Clinical Quality

The Clinical Quality Committee comprises division directors and

liaisons who are actively engaged in tracking metrics relevant to their divisions. The engine for this process is the Anaesthesia Datamart which combines data from multiple local and organizational databases in order to link processes of care with outcomes that matter to our patients, department, and organization.

Specific cross-departmental issues that are identified through threshold indicators are explored in depth through the Faculty Hour mechanism using multidisciplinary project teams. It is estimated that the combined efforts of these project teams continues to reduce costs by several million dollars a year, while enhancing safety. In addition to this, we have a superb project management team to support the clinical leadership in executing key interventions.

SAFETY, QUALITY, AND INNOVATION

Cullen D. Jackson, PhD
Director, Innovation
Instructor in Anaesthesia

Sara E. Neves, MD
Program Lead, Resident Root Cause Analysis Program
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Sugantha Sundar, MD
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Assistant Professor of Anaesthesia

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Fellow

Robert A. Carlin, BS
Senior Project Manager

INFORMATION SYSTEMS

David M. Feinstein, MD, MS
Director, Anesthesia Clinical Informatics Fellowship Program
Assistant Professor of Anaesthesia

Sarah Y. Nabel, MS
Manager, Anesthesia Informatics

Laura I. Ritter-Cox, MSN, RN-BC
Informatics Nurse Specialist

Kalpana Sachinthanandham, BS
Systems Analyst

Thomas S. Xie, BS
Systems Analyst

Clinical Safety

The Safety Committee comprises 11 standing members and three consultants who are all trained in industry standard techniques for retrospective and prospective safety investigations. Their focus is solely on identifying systems factors that cause or contribute to actual patient harm or increased risk thereof. Through standardization of these processes, we have created a mechanism to perform root cause analyses, safety assurance and failure mode effects analysis, to name a few. In addition to event-based processes, the committee also tracks national safety indicators and investigates threshold changes in concert with clinical leadership.

The department performs more than 35,000 anesthetic procedures using an electronic anesthesia recording system. Each case requires that intraoperative outcome data be entered into the QA field before the case can be closed. Approximately 99% of the cases are associated with no adverse intraoperative events. However, nearly 1% (or about 300 cases per year) do have one or more events.

These cases are reviewed, and appropriate follow-up determined. This can include no needed follow-up, case presentation at the weekly clinical meeting for both peer review and departmental education, and/or reporting to outside regulatory agencies. Major adverse events are presented at the twice-monthly multidisciplinary hospital Quality Improvement Directors meeting for further review and potential reporting to state agencies.

Cases may be reviewed for many reasons other than identification through the intraoperative anesthesia QA process. The division reviews approximately 200 incident reports annually. Review of these events helps to drive both educational and quality improvement effort. The division handles 10–20 formal (and many lesser) patient complaints each year. The Surgical Care Improvement Project (SCIP) and the National Surgical Quality Improvement Program (NSQIP) perform structured review of closed surgical charts to identify lapses in clinical care or complications. Events relevant to anesthesia are further reviewed by the members of the Quality and Safety Division.

Finally, interdepartmental QA processes may bring cases forward after they are identified by QA members within surgery, obstetrics, internal medicine, or other clinical departments. After case identification and review, members of the Quality and Safety Division liaise with members of the BIDMC Department of Health Care Quality to ensure appropriate follow-up, regulatory compliance, and external reporting as indicated.

Education

Once problems have been identified or new solutions created, appropriate implementation and education of clinical staff occurs. This takes place through individual counseling related to specific events, the development of new policies or protocols, at staff meetings, through quarterly Quality and Safety Division meetings open to the entire department, and through specific education events.

Professional Standards

Ongoing Professional Performance Evaluation (OPPE) is a major responsibility for the Division of Quality and Safety. Once referred to as peer re-

view, OPPE places an emphasis on the continual assessment of clinical and professional performance, as opposed to the episodic review generally done only at the time of reappointment. The division tracks several types of clinician-specific data at various intervals. Patient complaints, incident reports, narcotics discrepancies, and complications associated with clinical error are all tracked continually. Focused professional performance evaluations are undertaken for clinicians with any of these problems.

The division is actively working to develop an online dashboard that will report both departmental and individual performance for multiple metrics, including adherence to specialty-specific clinical pathways, completion of mandated training modules, performance of post-

anesthesia patient assessment, and other quality outcomes.

Performance Improvement

In addition to the OPPE process, which sets out to define concepts of competence, the Professional Standards Committee is actively engaged in defining domains and elements of clinical excellence. The goal of this highly-respected peer group of anesthesiologists is to create opportunities for personal quality journeys by defining the “BIDMC anaesthesia excellence brand.” Through these frameworks, we plan to support individual faculty members’ efforts to relevant domains of performance improvement. This committee actively practices respect to our faculty confidentiality while ensuring unwavering patient-outcome centeredness.

INNOVATION

The Innovation Division spearheads efforts to discover improvements that will positively impact health care delivery in the perioperative environment. This work involves both quality improvement initiatives and rigorous research projects. The results influence areas such as team and organization design, communication pathways and transitions of care, information management systems, and training and education. By virtue of being part of the Anesthesia Department, we work across all phases of the perioperative environment (pre-, intra-, and postoperative). We also strive to work across departments—Surgery, Orthopaedics, Obstetrics/Gynecology, Perioperative Nursing, Pharmacy, Healthcare Quality and Safety—to ensure our improvement and research

SAFETY COMMITTEE



efforts encompass the interdisciplinary nature of our perioperative work.

Quality Improvement

Quality improvement efforts within the division center on two areas: the Perioperative Surgical Home and Faculty Hour Chartered Teams.

Perioperative Surgical Home

The Perioperative Surgical Home (PSH) is an initiative started by the American Society of Anesthesiologists (ASA). Surgical care is frequently episodic and siloed, yet it often represents a lengthy and confusing journey for a patient moving through diagnosis, surgery, and rehabilitation. The PSH provides a patient-centric experience emphasizing continuity of care and communication—two essential features that are frequently lacking in today's health care environment.

At BIDMC, we intend for the PSH to be a multidisciplinary, collaborative, and patient-centered model of care for our surgical patients. Since 2014, members of the department—partnered with patient advocates as well as staff from the Departments of Surgery, Orthopaedics, Obstetrics/Gynecology, Healthcare Quality and Safety, and Patient and Family Care Services—have worked to determine how best to implement the tenets of PSH at Beth Israel Deaconess Medical Center.

To date, we have implemented several aspects of PSH at BIDMC. We have a robust Pre-Admission Testing Clinic that serves our ambulatory surgical patients by providing preoperative assessments, and we've implemented a better method for alerting anesthesia

teams to potential risks for complications based on these assessments. In 2015, we undertook a year-long effort to reduce length of stay in our Post-Anesthesia Care Units (PACU) by implementing service-based guidelines for perioperative clinical management of ambulatory surgical patients, which was fully rolled out in 2016.

We're currently developing a method to electronically track the outcomes of these carepaths so that we can provide objective, timely feedback to our frontline staff and clinical managers and continue to sustain and grow our improvements; this effort should be rolled out by the end of 2017.

In 2015, our team was awarded a BIDMC Innovation Grant to develop the PSH Portal. The PSH Portal on the BIDMC Intranet will provide the perioperative community with a resource that consolidates information—from clinical guidelines and pathways to process and outcome metrics—across multiple disciplines in order to provide a more comprehensive and efficient mechanism for multidisciplinary collaboration for the perioperative team. The two chief innovations related to this effort are: (1) the consolidation of information across separate departments that all collaborate to provide perioperative care across continuums of time, space, and clinical practice; and (2) the integration of process, quality, and outcome metrics across these departments into metrics that speak to the perioperative environment as a whole rather than three separate parts (surgery, anesthesia, nursing). To date, we have created the website infrastructure to host the PSH Portal and have populated it with guidelines, policies,

educational materials, and carepaths related to perioperative care. As our PSH model becomes more established at BIDMC, we will work with leaders at our other hospitals to share and replicate our results in order to provide a seamless patient experience across our network.

Faculty Hour Chartered Teams

In 2015, we celebrated the fifth anniversary of the launch of Faculty Hour. Started in April 2010 through the leadership of Dr. Brett Simon, Faculty Hour affords anesthesiologists, surgeons, nurses, and others the opportunity to meet once each week at the start of the day (currently Tuesday mornings) to advance quality and outcomes for patients, to accelerate learning and innovation, and to foster mutual joy in work. In order to facilitate this multidisciplinary opportunity, operating room start time is set 30 minutes later, which shows the tremendous endorsement and investment that BIDMC and the participating departments are making with the Faculty Hour program.

Multidisciplinary teams lead projects initiated by clinical providers within the medical center and chartered by the Faculty Hour Steering Committee, which is comprised of leaders from Anesthesia, Surgery, Perioperative Services, Orthopaedics, and Obstetrics/Gynecology. These “chartered” teams are guided by input from various sources: other health care providers, patient advocates from the Patient-Family Advisory Council, observations of external facilities and processes, and more. A triad leads each team to strengthen the multidisciplinary nature of the

project and to ensure endorsement across the constituent departments, and they recruit additional members (generally 6–10) to complete the team’s membership.

Each Chartered Team is supported with data, literature, and a facilitator trained in process improvement (as well as other resources as needed).

To date, 52 interdisciplinary teams have completed projects, and there are generally three to six projects in progress or in the planning stage at any given time. One example of past project-processes in the surgical ICUs is: Implementing interventions for controlling unplanned intubations. More examples are listed on page 14.

Research

In addition to our focus on improvement, the division also conducts cutting-edge applied research focused on enhancing our methods for evaluating and implementing solutions for both our quality and safety missions. Over the past three years, we have been actively engaged in human factors and cognitive systems engineering research to understand and mitigate safety and quality vulnerabilities for our individual providers, teams, and systems. Currently, our research focuses on three areas:

Individual Performance Assessment and Augmentation

Our work in individual performance assessment and augmentation has centered around a project called Measuring INTubations Techniques in the OR (MINTOR). The goal of MINTOR is to develop a teaching approach for DL intubation using

feedback on hand motion (captured via hand-worn accelerometers) to improve the performance of novice trainees and enhance patient safety during intubation.

Simulation-Based Training and Education

We also are conducting research in simulation-based training and education of surgical teams. This work started in 2015 when we initially conducted a workshop with our Interns to see if a table-top simulation (i.e., cooperative board game) could engage them in team activities with the idea that we might be able to augment our high-fidelity, simulation-based team training with a low-cost, low-fidelity “simulator” for training teamwork. We then conducted a three-workshop education sequence with the rest of our residents, and determined through their feedback that our idea might be feasible.

To date, we have conducted seven game-based team training workshops with our residents at BIDMC and also have conducted three external workshops:

- Selected workshop at the Spring 2016 Society for Education in Anesthesia (SEA) meeting in Baltimore, MD;
- Part of the Resident Leadership Workshop at the 2016 American Society of Anesthesiologists (ASA) meeting in Chicago, IL; and
- Invited Visiting Professors for a course at the University of Florida-Jacksonville with combined anesthesia and surgery residents.

We are now moving this work into the research phase, and we recently

received a SEAd Grant from the Society for Education in Anesthesia to collect pilot data on the efficacy of this curriculum for teaching teamwork to Anesthesia residents as compared to using high-fidelity simulation; this effort will start in July 2017 with our incoming class of residents.

System-Level Collaboration and Resilience

Our research in system-level collaboration and resilience currently focuses on understanding the complexity of managing OR floor operations, which is the work of the floor manager (FM). The FM, who coordinates interdisciplinary resources between multiple operating rooms (ORs) and procedure areas and manages the day’s OR schedule, has to trade off between competing organizational goals such as efficiency, frontline workload optimization, and quality and patient safety. Previous studies on OR floor management have largely taken a retrospective, deterministic approach to characterizing work. Such an approach may not fully reflect the adaptive nature of work on the frontline, which is marked by uncertainty and variability. Given the need for the FM to maintain a flexible and adaptive OR floor, we are studying OR floor operations using a resilience engineering approach.

Our future work in this area will expand on our current results by interviewing and surveying FMs as well as OR caregivers to gain a holistic perspective on performance of FMs. We will use the insights gleaned from this study to develop a measurement framework for FM performance.



INFORMATION SYSTEMS

The Division of Information Technology promotes the effective use of information technology and information sharing within and outside the department. The division has worked successfully on many clinical and administrative IT related areas. Although the Division of Information Technology is not a clinical division, we provide technological support to every aspect of our clinical departmental efforts at BIDMC and affiliated sites. We also provide technical support for department and hospital-wide research efforts.

Anesthesia Information Management System

Our Anesthesia Information Management System (AIMS) (Philips, CompuRecord) (CR) was deployed

at BIDMC in 2005. It has been used extensively in almost all areas of anesthesia care. Our Manager of Anesthesia Information Systems, Sarah Nabel, continues to maintain and grow our systems. Since our last biannual report, we have successfully deployed new hardware and a new version of the CompuRecord software, which added a laboratory interface bringing patient lab data into our anesthesia records. With this new configuration, we are now able to explore importing maternal vital signs into AIMS in the labor and delivery non-OR locations.

Our IT group works with the medical center to provide information for the NSQIP), SCIP, and other national and medical center quality initiatives. PDF documents of our anesthesia record can be viewed seamlessly by authorized BIDMC employees on the medi-

cal center's WebOMR application. We continue to develop new web-based tools to supplement and enhance the functionality of our AIM system.

BID-Needham/Milton AIMS

Digital Reasoning (formerly known as Shareable Ink) has been deployed as the AIM system at BID-Needham and BID-Milton.

In 2015, this system was upgraded to an iPad tablet version and is currently being used. The iPad version has allowed providers to quickly and accurately create anesthesia records that are reliably stored and retrieved from the "cloud."

Anesthesia Department Intranet Project

The Department of Anesthesia, Critical Care, and Pain Medicine has had

IS TEAM



a robust intranet site since its creation 12 years ago. Its creator, Kalpana Sachithanandham, continues to add new functionality to ensure its use will enhance department communications. Since our last annual report, our department intranet has continued to grow, providing important administrative and educational information to the department. These changes have been driven by our new affiliations and involvement with satellite hospitals. As our organization has evolved and our department has expanded to include our new BID enterprise facilities, our intranet has made the appropriate changes and allowed for the dissemination of vital information to the department.

In addition, we introduced a daily feedback system on the department intranet site. Using attending-resident pairings acquired from AIM system data, attending staff are emailed a feedback request for the residents they have worked with during the day.

The anonymous data has been helpful to the educational process in the department. In 2014, we deployed an analogous feedback system for resident's evaluation of attendings. This feedback system, spearheaded by Drs. John Mitchell and Stephanie Jones, has achieved national recognition with the Society for Education in Anesthesia.

Education

Each year, all the incoming CA1 residents, fellows, new attendings and CRNAs are oriented to AIMS, the department intranet, and the hospital IS systems.

Our division has also been teaching anesthesia informatics at Harvard Medical School for both the Introduction to Clinical Informatics and the BIDMC Multidisciplinary Clinical Informatics Fellowship programs.

The Anesthesia Department Educational Library (ADEL) located on the Department intranet, is continually updated. This material includes video, slides, handouts, and other educational materials.

Research

With the AIM system in place for over 10 years, we are now using this data for research and quality improvement. The AIM system has an increasingly important role in hospital-wide data collection, reporting and analysis for pay for performance, ACS NSQIP, the Surgical Site Infection Bundle Committee, and other patient safety initiatives at BIDMC.

Meanwhile the future for clinical research is now changing as AIM systems are becoming more prevalent and electronic health care records are being encouraged by the government.

The Future

In the coming year, the IT Division will continue to enhance the AIM systems used at BIDMC and its affiliate hospitals. The Digital Reasoning Shareable Ink system, which has been so successful at BID-Needham, will be modified to work for affiliated sites as the BIDMC community expands. In general, we will be exploring ways to share patient data in a more secure and reliable fashion between our different facilities.



We will also be using our data to develop dashboard views summarizing certain aspects of our care to help characterize and shape the way we approach our anesthesia delivery.

Finally, we will be working with our nursing colleagues to find electronic documentation solutions that provide us with better outcome data for our patients.

It is our hope that the data collected at all our facilities will be available for larger QA/QI and research uses. We will continue to collaborate with large database initiatives (AQI, SCIP) to better appreciate how we currently practice and how we might change to improve patient care.

RESIDENTS

Graduated in June 2016

Autumn Brockman, MD
Non Academic Practice
CO - Private Practice

Viet Cai, MD
Fellowship
MA - BIDMC (Pain Medicine)

Sherry Chang Kinnaird, MD
Fellowship
MA - BIDMC (Pain Medicine)

Mohamed Bilal Chaudary, MD
Fellowship
MA - BIDMC (Pain Medicine)

Irina Fishman, MD
Fellowship/Academic
MA - BIDMC (Regional)

John Gonzales, MD
Non Academic Practice
Dallas Texas-Private Practice

Sapna Govindan, MD
Academic Practice
MA- BIDMC

Erica John, MD
Fellowship
PA- Thomas Jefferson University
(Regional)

Patrick Kinnaird, MD
Fellowship
MA - BIDMC (Cardiac Anesthesia)

Abirami Kumaresan, MD
Fellowship
MA - BIDMC (Cardiac/CC)

Lauren Madoff, MD
Fellowship
MA- Children's Hospital (Pediatric Anesthesia)

Aaron Mittel, MD
Fellowship
NY - Columbia University Medical Center (Cardiac/CC)

Cameron Nelson, MD
Fellowship
MA - Children's Hospital (Pediatric Anesthesia)

John O'Hara, MD
Non Academic Practice
MA - Brockton Hospital

Ameeka Pannu, MD
Academic Practice
MA - BIDMC (CC)

Shachi Patel, MD
Fellowship
NY - Weill Cornell (Pain Medicine)

Johann Patlak, MD
Fellowship
MA - BIDMC (CC)

Clara Sanders, MD
Fellowship
MA - Children's Hospital (Pediatric Anesthesia)

Shrenik Shah, MD
Fellowship
NY - Mount Sinai Hospital, St. Luke's-Roosevelt Hospital Center (Regional)

Graduated in June 2017

Lauren Buhl, MD
Fellowship
MA - BIDMC (Neuroanesthesia)

Sarah Hart (Burnett), MD
Fellowship
PA - Penn State (Pediatric Anesthesia)

Erin Ciampa, MD
Fellowship
MA - BIDMC (OB)

Susan Eklund, MD
Fellowship
MA - Children's Hospital (Pediatric Anesthesia)

Stanley Eosakul, MD
Fellowship
MA - BIDMC (Pain Medicine)

Kimberly Hollander (Naden), MD
Fellowship
MD- John Hopkins (Cardiac)

Nayema Khan, MD
Fellowship
KS - University of Kansas Medical Center (Pediatric Anesthesia)

Diana Liu, MD
Fellowship
MA - Children's Hospital (Pediatric Anesthesia)

Obaid Malik, MD
Fellowship
MA - BIDMC (Pain Medicine)

Margaret O'Donoghue, MD
Fellowship
MA - BIDMC (OB)

Julia Parzych, MD
Fellowship
PA - Children's Hospital Philadelphia (Pediatric Anesthesia)

Alyce Richard, MD
Fellowship
WA - Virginia Mason (Regional)

Lindsay Rubenstein, MD
Fellowship
MA - BIDMC (Pain Medicine)

Alexander Shapeton, MD
Fellowship
MA - BIDMC (Cardiac)

Alan Sheydwasser, MD
Fellowship
MA - BIDMC (Pain Medicine)

Tori Sutherland, MD
Fellowship
MA - Children's Hospital (Pediatric Anesthesia)

Beth VanderWielen, MD
Fellowship
WI - University of Wisconsin (Regional)

2017 GRADUATES



FELLOWS

Graduated in June 2016

Cardiac Fellows

Fernando Mujica, MD
Academic Practice
KS - University of Kansas Medical Center (Cardiac)

Colin Nabb, MD
Non Academic Practice
NC-Pinehurst Anesthesia (Cardiac/Anesthesia)

Critical Care Fellows

Amit Bardia, MD
Academic Practice
CT - Yale Medical Center (CC/Cardiac)

Kevin Jenner, MD
Non Academic Practice
MN - Anesthesia Associates of St. Cloud

Eric Tesoriero, MD
Non Academic Practice
PA - Anesthesia Specialists of Bethlehem, P.C.

Obstetric Anesthesia Fellow

Laura Sorabella, MD
Academic Practice
MA - BIDMC (OB)

Regional Anesthesia Fellow

Elizabeth Fouts-Palmer, MD
Academic Practice
NY - Weill Cornell Medical Center

Pain Medicine Fellows

Nima Adimi, MD
Non Academic Practice
WI - Medical Pain Clinics (MAPS)

Lucien Alexandre, MD
Academic Practice
FL - Mount Sinai Medical Center

Mohammed Almalki, MD
Returning to Saudi Arabia
SB - Government Service

Craig Best, DO
Non Academic Practice
IN Orthopaedic Specialists of Northwest Indiana

Ravi Bhalodia, MD
Non Academic Practice
CO - Colorado Clinic

Efrain Cubillo, MD
Non Academic Practice
AZ - The Pain Institute of Southern Arizona

Peter Evangelista, DO
Non Academic Practice
MI - Excell Physical Medicine and Rehab

Kathleen Killilea, MD
Academic Practice
MA - West Roxbury VA Hospital

Graduated in June 2017

Cardiac Fellows

Patrick Kinnaird, MD
Anesthesia Service Medical Group
San Diego, CA

Abirami Kumaresan, MD
Fellowship
MA - BIDMC

Critical Care Fellows

Barry Kelly, MD
Academic Practice
MA - BIDMC

Ilan Mizrahi, MD
Academic Practice
MA - Mass General Hospital

Ameeka Pannu, MD
Academic Practice
MA - BIDMC

Johann Patlak, MD
Academic Practice
MA - BIDMC (Neurocritical Care)

Obstetric Anesthesia Fellow

Nathan Liu, MD
Academic Practice -
NY - New York Weill Cornell,

Regional Anesthesia Fellow

Irina Fishman, MD
Good Samaritan Medical Center
West Palm Beach, FL

Pain Medicine Fellows

Ross Baker, DO
Nova Spine Pain Institute
Sun City West, AZ

Viet Cai, MD
Academic Practice
MA - BIDMC

Sherry Chang Kinnaird, MD
San Diego, CA

Mohamed Bilal Chaudary, MD
Sturdy Memorial Hospital
Attelboro, MA

Kim Hoang, MD
Virginia

Andrew Rubens, MD
Academic Practice,
MA - Newton Wellesley Hospital

Omar Syed, MD
Valley Pain Consultants
Gilbert, AZ



Selected Publications

Studies and Case Reports

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glycemic variability on a 30-day major adverse outcomes following isolated cardiac valvular surgery. *Anesth Analg*. 2017 Jan;124(1):16-22. PMID: 27861432.

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BIDMC Anesthesia By the Numbers

339 Current Department Members



52 ORs



55 ICU beds



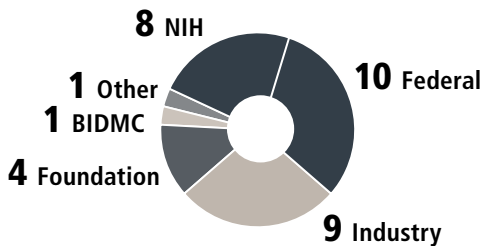
17 Labor and Delivery suites



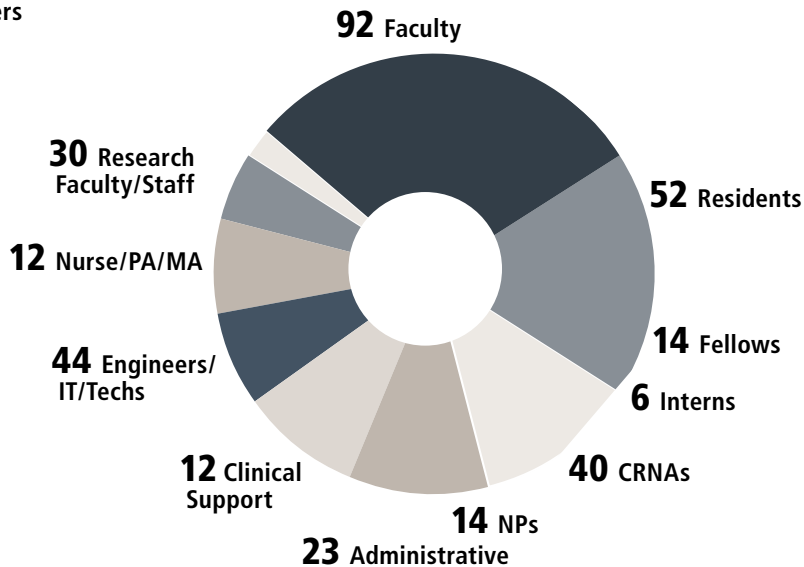
7 Pain treatment rooms and Headache Clinic



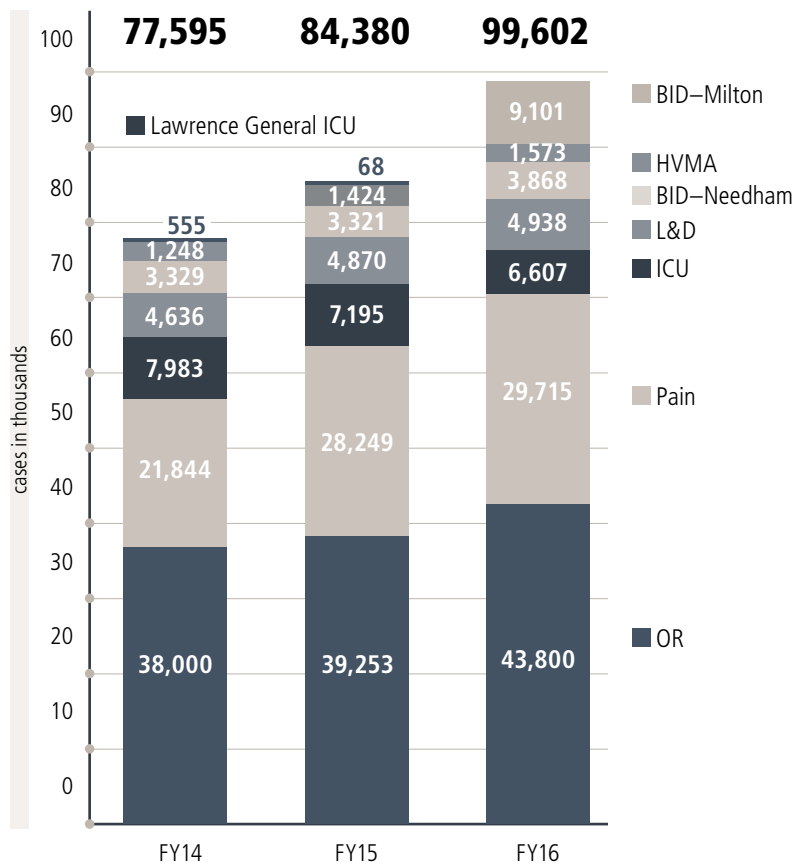
33 Research Grants



\$3,011,721 FEDERAL
\$5,178,219 TOTAL



Volume 2014–2016



ANESTHESIA STAFF



ADMINISTRATIVE TEAM ▲

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Administrative Associate

Emma J. Breibart-White, BA
Residency/Fellowship Program Coordinator

Mary Jane Cahill, MBA, C-TAGME
Manager, Medical Education Programs

Robert A. Carlin, BS
Senior Project Manager

Roberta Cousineau, CPC
Lead Coder

Heather Derocher, MA
Director of Communications and
Special Projects

Susan Giordano, CPC
Senior Coder

Joanne Grzybinski, MBA
Manager, Scheduling Operations

Gidget F. Hunter
Administrative Associate

Cullen D. Jackson, PhD
Director of Innovation

Elizabeth A. Kiernan
Administrative Manager-Operations

Susan H. Kilbride, BSN
Faculty Development and Education Specialist

Ronald C. Mayes
Medical Education Coordinator

Nora T. McCarthy, BA
Executive Assistant to the Chief

Letisha Phillips, BS
Credentialing Coordinator

Ann M. Plasso
Administrative Coordinator

Melissa Quinchia, BA
Administrative Coordinator

Laura Ritter-Cox, RN
Application Systems Analyst II

Daniel L. Scotina, BS
Financial Administrator

Chloe L. Setayesh, BS
Coder Analyst

Elizabeth A. Slowinski, BA
Project Coordinator

Trinia Thompson
Coder/Analyst

Kassandra Primatello
Intern

Vanessa T. Wong, BS
Project Coordinator (Education)

NURSE PRACTITIONER TEAM ►

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Elisabeth M. Baker, NP

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Norine M. Gentner, NP

Brian A. Hoell, NP

Joyce Larson, NP

Ashley A. Lowery, NP

Sheila M. McNaught, NP

Mary-Ellin Moore, NP

Devon O'Connell, NP





TECHNICAL TEAM ▲

Edward K. Plant, CE
Technical Director

Thomas J. Malboeuf Cer.AT
Clinical Manager

Bejan Abaspour
Clinical Engineer Specialist

Michael J. Chen, BS
Anesthesia Technician

Elvira P. Clarke, BS
Anesthesia Technician

Agnes E. Clermont
Anesthesia Technician—Lead

Desinor Dely
Anesthesia Technician

Bethany F. Dye
Anesthesia Technician

Frantz Gilbert
Cardiac Monitoring Technician

Matthew J. Harrell
Cardiac Monitoring Technician

Anson J. Harrison
Anesthesia Monitoring Technician

Clarisa B. Joseph
Anesthesia Technician

Nick I. Rami
Anesthesia Technician

Grant Richards
Cardiac Monitoring Technician

Alyssa M. Rossi
Cardiac Monitoring Technician

Joseph A. Salas
BMET II

Derick R. Sealy
Anesthesia Technician

Edlin W. Silcott Jr.
Anesthesia Technician

Tammy L. Staffier
Anesthesia Technician

Janette E. Stephenson
Anesthesia Technician

Carolina Swarton,
Anesthesia Technician

Penee D. Wiggins
Anesthesia Technician

Ron Wilburn
Anesthesia Technician—Lead



◀ NURSE PRACTITIONER TEAM

- Norma Osborn, NP
- Yolanda Perez-Schulman, NP
- Peguy Philemon, RN
- Eileen Pimentel-Smalling, NP
- Meghan A. Saund, NP
- Virginia A. Sheppard, NP
- Eileen M. Stuart-Shor, NP
- Bethany W. Thomas, NP
- Lauren E. Wilson, NP



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- 2016 stats: Inpatient discharges – 40,217; Outpatient visits – 638,449; Emergency Department visits – 56,959
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