

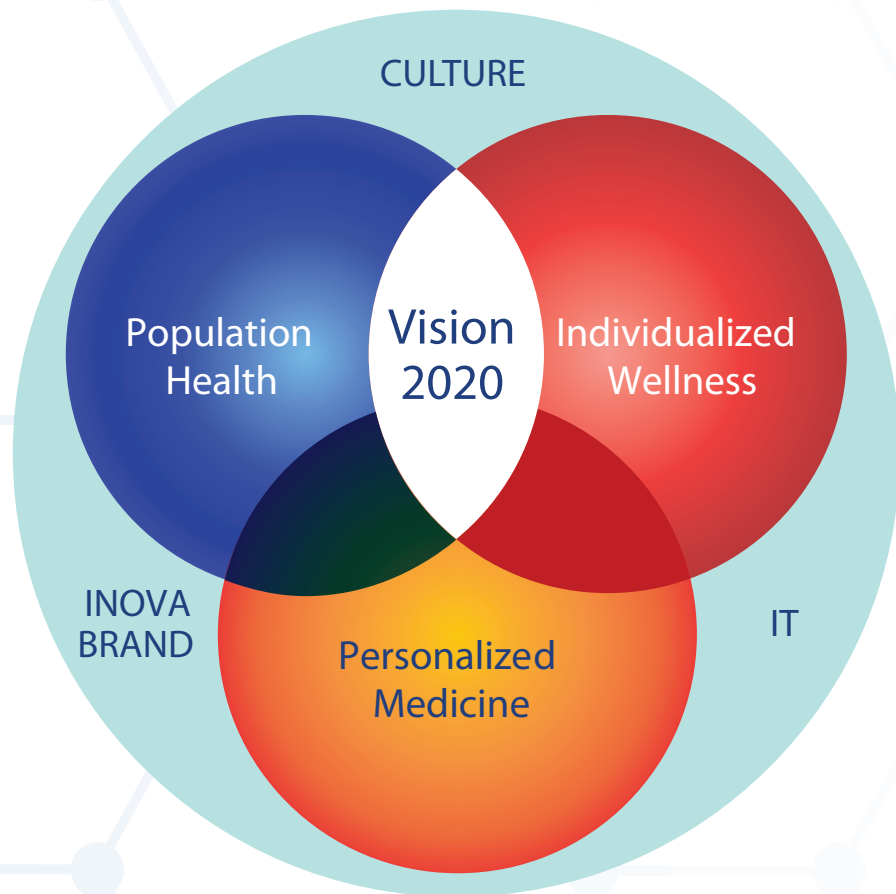
Inova Fairfax Medical Campus

# DEPARTMENT OF MEDICINE



# 2017

ANNUAL REPORT



***Acknowledgements:***

*We would like to thank the following Beatty Liver & Obesity Research Program team members for their valuable contributions and excellent work in developing this annual report:*

*Puneetinder Kaur Mann*

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## MESSAGE FROM THE DEPARTMENTAL LEADERSHIP



### CHAIR OF THE DEPARTMENT OF MEDICINE

**Zobair Younossi, MD, MPH**  
**Chair of the Department of Medicine**

We are proud to report that the Department of Medicine (DOM) has continued its productive journey to provide excellent high quality clinical care in an academic environment. In this context, DOM's programs and divisions have shown tremendous growth and productivity. Furthermore, DOM takes pride in championing and promoting a culture of justice and trust with highly engaged and productive teams, both necessary for a highly reliable organization.

For quality and general medicine, 2017 was a year highlighted by many accomplishments. On the general medicine side, we came together as a section to create standards of practice for inpatient internists that apply to all of our physicians, whether employed or in private practice. All of our inpatient internists demonstrated support of the overall timely

discharge initiative by participating in trio rounds, entering the expected discharge date in EPIC, and starting to adopt usage of the 4W boards. Our hospitalist team grew by welcoming many advanced practice providers (APPs) to the team. This change was consistent with our goal of facilitating physicians practicing at the top of their licenses. As always, the hospitalist team partnered with nurses and the hospital to improve quality of care by participating in local and

system-wide improvement projects. This dedication and skill helped to result in less hospital acquired infections, 30-day readmission rates 5 percent less than expected, top decile mortality, and improvement in patient perceptions of teamwork when surveyed. Another exciting enhancement to the hospitalist team was the addition of a dedicated consult physician. This service has grown from an average of 2-4 patients at any given time to 12-16 patients at any given time and has provided our colleagues with the medical expertise necessary to assist patients through a hospitalization for another primary reason.



### ACADEMIC AFFAIRS AND CRITICAL CARE SERVICES

**Madeline Erario, MD, FACP**  
**Vice Chair of Academics and Critical Care Services**  
**DIO / Director for Graduate Medical Education for Inova Health System**

For the medical sub-specialties, there has been much growth and progress in 2017. While each of our medical directors will provide details about their own areas, we would like to briefly summarize some of the accomplishments. In 2017, the Department of Medicine leadership became service line leaders for the IMG endocrinology and rheumatology outpatient practices. This allows for greater integration across the inpatient and outpatient arenas, improved mutual support for our practicing physicians, and the opportunity to better synthesize the entire clinical spectrum of care to inform strategic growth and development. Nagashree Gundu-Rao, MD recently accepted an offer to become the IMG outpatient endocrinology medical director. She will work closely with all outpatient practices as well as Stephen Clement, MD. Dr. Clement continues to lead the inpatient endocrinology service line which has seen an increase in the scope of both

clinical services and research. Jessica Heintz, MD stepped down as the Medical Director for Palliative Care in 2017. Her tenure as medical director resulted in tremendous growth and demand for palliative care services across the campus. She continues to serve as one of our physician leaders. Alva Roche-Green, MD was hired as the Medical Director for Palliative Care in late 2017 and will start in April of 2018. Our geriatrics program, under the leadership of Denise Mohess, MD, has also experienced growth in the inpatient services provided and the integration with our geriatric community partners. Pragya Singh, MD joined our outstanding rheumatology

team in 2017. She provides inpatient consults on Fridays and works in our outpatient clinic Monday-Thursday. In 2017, the rheumatology program under the leadership of Lynn Gerber, MD has become a very active program to make excellent clinical and academic contributions to our patients and the institution.



## MESSAGE FROM THE DEPARTMENTAL LEADERSHIP



### QUALITY AND GENERAL MEDICINE

**Chapy Venkatesan, MD**  
**Vice Chair of Quality and  
General Medicine**

In 2017, Dr. Trimble also led the effort to develop a system-wide business plan for gastroenterology. With the leadership of our medical directors and our section chiefs, we will continue to develop our programs and service lines in order to provide the best care to our patients.

Finally, our Medical Critical Care Services (MCCS) program continues to grow and develop under the leadership of Albert Holt, MD. The program cares for adult patients across the campus in four different intensive care units. In 2017, plans were approved to increase the MCCS presence in IHVI for both the CVICU and the CCU, given the increasing complexity of patients in both areas. The MCCS program continues to participate in patient safety and quality initiatives across the campus and the system, and their involvement has resulted in improved patient care in multiple areas. We look forward to another successful year working with this talented group of physicians and advanced practice providers.



### MEDICAL SUB-SPECIALTIES

**Gregory Trimble, MD**  
**Vice Chair of Medical  
Sub-Specialties**  
**Assistant Dean for Faculty  
for VCU School of  
Medicine Inova Campus**

exemplary and our research programs continue to be one of the strongest for the institution. We look forward to continued growth and success as we all work to improve the lives of our patients and educate the next generation of physicians.

Academically, our internal medicine residency continues to thrive under the leadership of Alita Mishra, MD. We proudly graduated our first class of senior residents in June 2017, and for the first time, hosted our own Inova Chief Residents! We continue to place our residents into highly competitive fellowship programs, as well as hospitalist and primary care positions. In 2017, we also received Accreditation Council for Graduate Medical Education (ACGME) accreditation for a new cardiology fellowship. The fellowship is the first one for the internal medicine program and planning continues for the development of additional fellowships. We look forward to welcoming our new interns and fellows in July 2018. With regards to undergraduate medical education (UME), the Department of Medicine continues to host a number of medical students from the Virginia Commonwealth University (VCU), as well as, those from our affiliates. The students continue to enjoy the robust teaching services and we are thankful for our talented teaching faculty from Inova Medical Group (IMG) and our private practice colleagues that make this all possible.

The Department of Medicine continues to provide superb clinical service, both for general medicine and specialty medicine. Our teaching programs are



Ashiq Mannan, MD was recently recognized for his collaboration with PCCU nursing in coaching his physician partners on effective trio rounds.

## DEPARTMENT OF MEDICINE VISION AND GOALS



### VISION

The Department of Medicine at Inova Fairfax Medical Campus (IFMC) will be recognized as a leader in delivering compassionate and personalized patient care by ensuring innovative and superior medical services for its patients and community. We strive to assure our future as a highly reliable organization. We will continue to train future physicians and create an environment that will attract and retain highly talented physicians and staff. We will integrate cutting-edge research into our clinical practice and educational activities.

### GOALS

- 1) **Clinical and Quality** – Become a national leader in delivering high quality, evidence-based personalized care that provides the highest value to our patients, while improving the work life of our health care providers.
- 2) **Education** – Develop a top-tier Internal Medicine Residency Program and fellowship programs to ensure the development and retention of highly qualified physicians.
- 3) **Safety** – Improve the culture of safety in the department and Inova by implementing principles of a just culture.
- 4) **Research** – Develop a patient-focused research portfolio including clinical, translational, and health services research.
- 5) **Reputation, Growth, and Development** – Expand the depth and reputation of the Department of Medicine programs and services to better integrate and support Inova's vision, and to be recognized for clinical excellence by patients, physicians, staff, and the community.
- 6) **Physician Relations** – Develop the best physician team which will provide collaborative opportunities with hospital and community-based physicians allowing us to develop and achieve quality and growth objectives despite location of employment.
- 7) **Fundraising and Philanthropy** – Collaborate and enhance philanthropic efforts for the Department of Medicine in order to fund research, education, and clinical programs.

## DIVISION OF HOSPITAL MEDICINE



### MEDICAL HOSPITALISTS

**Ashiq Mannan, MD**

**Medical Director of the Medical Hospitalist Program**

The medicine hospitalist team has had a productive 2017. We have continued to make significant progress in working closely with the hospital to continue to improve the geographic cohorting of our hospitalist patients. The primary focus for this has been on tower 10, a combined 48 bed unit, where nearly all patients are covered by 4 hospitalist services. This allows for more efficient rounding, ready availability of hospitalist teams, and much closer collaboration with nursing and case management teams. All patients are seen together with the nursing team during daily bedside trio rounds (trio of patient, hospitalist, and nurse) and care plans are again discussed during afternoon multidisciplinary rounds. Shortly after this reinvigorated cohorting effort, staff satisfaction was measured and showed

marked improvement due to this improved collaboration and communication. A performance metric dashboard was created as well to track improvements with this care delivery model. Although Wali Azizi, MD has been working hard to develop the tower 10 rounding model for a few years now, recently he was formally appointed the tower 10 medical director and has several further improvements planned, including a comprehensive plan to improve patient experience. One part of this, for example, involves having a dedicated TV channel established to cycle our patient care team video, which does an excellent job of explaining our often complex care team structure to patients and their families. We invite you to watch the brief 3 minute video which is highlighted on our Inova Fairfax Medical Campus (IFMC) hospitalist website: (<https://www.inova.org/departments-of-medicine/medical-hospitalist-program>).

Similar efforts are currently underway on the tower 6 observation unit managed by internal medicine hospitalist and observation unit medical director Shari Maletsky-Smith, MD.

In the Inova Heart and Vascular Institute (IHVI), we have continued this year to develop our cardiac hospitalist program. Current structure in IHVI has not yet allowed for similar patient cohorting but we have been able to create a smaller cohort of cardiac hospitalists who round in IHVI and are able to form closer working relationships with our cardiology colleagues, as well as, IHVI nursing and case management teams. We have also been working to establish hospitalist unit directors in several IHVI units to be able to create close working dyads with physician and nursing unit directors. Recently, Kate Gibson, MD has been named the hospitalist medical director of the Acute Pulmonary Unit (APU) and is partnering closely with pulmonologist and APU director Eric Libre, MD. We are currently in process of establishing hospitalist unit directors in the PCCU, CTUN, and CTUS to work closely with the existing unit physician and nursing unit directors.

Another area of focus this year has been the continued growth and development of our APP [advanced practice provider team of physician assistants (PAs) and nurse practitioners (NPs)] program under the leadership of our Chief APP Yaa Serwaah, NP and with the guidance of Mary Reyes, MD, our hospitalist / APP liaison. Our APPs have become an invaluable part of our hospitalist team and will continue to greatly enhance the quality of the patient care we are able to provide, as well as, our communication with others in the years ahead.

The hospitalist team is proud to recognize two recent team members who received significant awards for their work in 2017. Gigi Gaudiano, MD was the recipient of the American College of Physicians Virginia Chapter's attending physician of the year award for IFMC for 2017. She was recognized for her mentorship and contribution to resident and medical student education and for always giving residents feedback on their clinical performance. One of the past winners of this award was Ivan Garcia, MD, who won the VCU Inova Campus Golden Apple Award in April 2017 (top clinical educator for all of IFMC).

I am fortunate to be able to work with Sam Elgawly, MD (Associate Medical Director of the Medical Hospitalist Program), Brigid Gray, MD (Medical Director of CNS Hospitalists), and Anne Summers, MD (Medical Director of the Cardiac Hospitalist Program), who are all very devoted to making our group as successful as possible and helping us meet the needs of our community and hospital.



## DIVISION OF HOSPITAL MEDICINE



### CARDIAC HOSPITALISTS

**Anne Summers, MD**

**Associate Chief Medical Officer of Inova Fairfax Medical Campus  
Medical Director of the Cardiac Hospitalist Program**

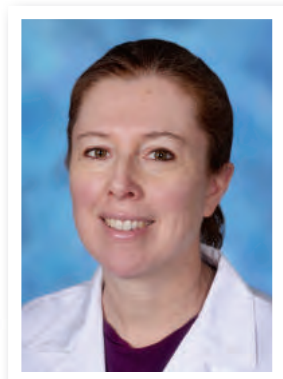
The Cardiac Hospitalist Program continues to serve patients in the Inova Heart and Vascular Institute (IHVI) since November 2014. A core group of hospitalists and advanced practice providers (APPs) staff four rounding teams and one teaching team that provide improved communication with cardiologists, pulmonologists, advanced heart failure physicians, advanced lung disease physicians, cardiac / thoracic surgeons, and vascular surgeons in the joint care of these complex patients. Major focuses continue to revolve around robust MDRs supported by psychological safety of honest, open, and compassionate discussion of transition barriers from the acute care setting to the next level of care. This comes with the expectation that improvement of the HCAHPS scores, reduction of HACs, and safety measures all start with the team approach. Trio rounds, CL / Foley duration and indication, diagnostic stewardship, and patient throughput are all critical to the best possible outcomes for every one of the patients we serve. The mission of the cardiac hospitalist team fits seamlessly with the IOS 2.0 Cultural Belief journey and impacts the True North Board of “Likely to Recommend” and “Do No Harm.” Also, through the comradery between nursing, case management, ancillary teams such as PT / OT / SLP / RT, and many other co-workers, we hope will drive Inova as a “Great Place to Work.”

Anne Summers, MD (Associate CMO for Inova Fairfax Medical Campus) continues to lead the team and serves as a liaison with the cardiology section and many specialists within IHVI. A collaborative, patient-first and maintaining collegial relationships approach remains paramount to the mission of delivering guideline driven and advanced therapies in this critically ill population. Dr. Summers was recently honored with the 2017 Employee of the Year Award from the Healthcare Council of the National Capital Area.





## DIVISION OF HOSPITAL MEDICINE



### CNS HOSPITALISTS

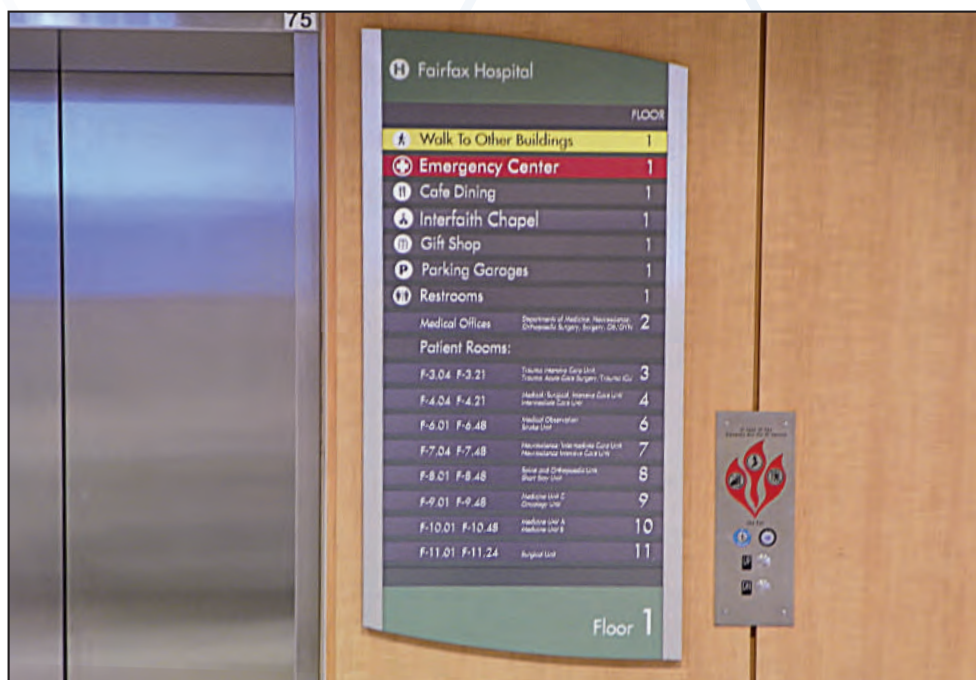
**Brigid Gray, MD**

**Medical Director of the CNS Hospitalist Program**

The CNS (central nervous system) Hospitalist or Neuro Hospitalist Program at Inova Fairfax Medical Campus (IFMC) was created in 2010. The team provides specialized care for neurology and neurosurgery patients 24 hours a day, 7 days a week. The CNS team triages and accepts neuroscience transfer patients from outside hospitals providing care that patients are not able to obtain at outside facilities. In combination with radiation oncology, neurosurgery, and other neurologic specialists, the team brings together many best practices on both the neuroscience and stroke units.

The CNS hospitalists conduct daily discharge rounds with the nursing and case management leadership to ensure that transition of care is satisfactorily accomplished. The CNS team now includes two advanced practice providers.

Brigid Gray, MD is the Medical Director of the CNS Hospitalist Program. She had previously served as Director of Primary Care Services at the Northern Virginia Mental Health Institute. Under her experienced leadership the CNS team hopes to continue to improve and provide excellent care for all neuroscience patients.



## DIVISION OF MEDICAL CRITICAL CARE SERVICES



### MEDICAL CRITICAL CARE SERVICES

**Albert Holt, MD**

**System Medical Director for Adult Critical Care**

**Medical Director for Medical Critical Care Services  
at Inova Fairfax Medical Campus**

As we look toward continuing to develop Inova Fairfax Medical Campus (IFMC) as a tertiary care medical center, we know that at the core of adult medicine services of any advanced care hospital is a strong critical care team. Medical Critical Care Services (MCCS) is a highly specialized team of critical care physicians and advanced practice providers working collaboratively to care for the acutely ill or decompensating patients at IFMC. Our team cares for patients in the Neurosciences ICU (NSICU), the Medical-Surgical ICU (MSICU), the Cardiovascular ICU (CVICU), and the Coronary Care Unit (CCU).

The MSICU, led by Svetolik Djurkovic, MD, continued to improve the approach to care for patients requiring mechanical ventilation. This included consistent support of evidence-based measures of spontaneous awakening and spontaneous breathing trials. This resulted in continued low ventilator days and the liberation of patients from mechanical ventilation when they had recovered from their respiratory illnesses. The team efficiently manages a combination of critically ill patients to have an average length of stay (LOS) of 2.7 days and an average ventilator length of stay (VLOS) of 2.6 days for 2017.

Our team in the CVICU has expanded the Extracorporeal Membrane Oxygenation (ECMO) program to record levels of patients and survival rates on both V-V ECMO and V-A ECMO that mirrored and surpassed national standards, which is exceptional for a nascent program. Mehul Desai, MD became the MCCS medical director for ECMO, working with Heidi Dalton, MD and Charles Murphy, MD to provide ongoing operational and clinical support to ECMO patients.

Our team in the NSICU has led multiple Emergency Neurologic Life Support courses, both at IFMC and Inova Alexandria Hospital (IAH), which has enabled our hospitals to have the appropriate education for comprehensive and mechanical thrombectomy-ready stroke centers. Our neuro-intensivists have collaborated with the Inova Heart and Vascular Institute (IHVI) in order to provide acute stroke care to cardiovascular patients, resulting in optimal neurologic outcomes for patients who already have complicated cardiac conditions. We have also supported the ongoing Joint Commission initiatives for stroke, and the ongoing development of IFMC as a comprehensive stroke center.

Our team continues to lead and support educational opportunities through mentoring medical students, residents and fellows, and acute care nurse practitioner students. Megan Terek, MD has developed and enhanced the skill set of our medicine residents through the procedural elective with the MCCS team. In addition, she continues to offer the Fundamentals in Critical Care Support seminar to both house staff and other physicians interested in improving their knowledge and skills in managing more acutely ill patients. Dr. Djurkovic co-hosts the Pulmonary and Critical Care Conference at IFMC, which has seen record attendance and continued engagement of nationally recognized speakers.

Osman Malik, MD has continued to support IFMC's quality initiatives and expanded our case reviews for monthly morbidity and mortality case reviews for our ICU patients. He has also spearheaded the efforts for improved transfers of care into IFMC from other institutions as well as internal transfer. In addition, he coordinated our efforts in ongoing dialogue on patient care with the other hospitalists, as well as ED physicians, to ensure optimal care of patients at IFMC. Likewise, Soleyah Groves, MD has built the eICU team to enable more rapid transfers of patients within the Inova Health System, in addition to supporting initiatives such as stroke, ECMO, and sepsis.

In 2018, our team will continue to strive to expand our specialized skills and knowledge, as we increase the coverage of patients in the CCU and expand night time coverage for all of IHVI, as the complexity and care of cardiac patients' increases. We expect to add at least 4 new critical care physicians and 4 new advanced practice providers to our team in 2018.

## DEPARTMENT OF MEDICINE CLINICAL PROGRAMS



### TRANSITIONAL SERVICES PROGRAM

**John Paul Verderese, MD, FACP**

**Medical Director of Inova Transitional Services**

Optimizing care transitions continues to garner major focus among health systems nationwide as the reimbursement model for healthcare shifts from a fee-for-service to fee-for-value system. The Department of Medicine (DOM) continues to lead this realm of quality improvement at Inova Fairfax Medical Campus (IFMC) and throughout the entire Inova Health System.

Inova Transitional Services Transitional Care Management Program (TCM) and Inova Transitional Services Clinics (ITSC), in partnership with Inova VNA Home Health, all under the medical direction of John Paul Verderese, MD, have evolved to form the “collective hub” for post-acute transitional care support for patients serviced by the health system. Particular attention has been given to patients with heart failure, chronic obstructive pulmonary disease (COPD), pneumonia, CABG, and myocardial infarction. This ambulatory multidisciplinary program bridges patients from an acute care episode of care back to stability and wellness, and works to primarily prevent unnecessary hospital readmissions. All three programs service both the insured and uninsured populations and many of the initiatives are focused on mitigating financial and quality penalties that Medicare patients are subject to in the current environment.

The team consists of high-functioning physicians who are adept at inpatient and outpatient care, nurse practitioners, nurses, pharmacists, case managers, social workers, and licensed practical nurses (LPNs). ITSC works hand-in-hand with inpatient nurses, case managers, and navigators to ensure a safe, coordinated discharge from the hospital to home. In addition to recently hospitalized patients without access to primary care, the ITSC also services Inova’s emergency room facilities so that patients can be given expedited follow-up as an alternative to a hospital admission. ITSC also has an anti-coagulation clinic and performs pre-operative evaluations for those in need. ITSC is a favorite site among medical residents and students as well as pharmacy and nurse practitioner students.



Inova Transitional Services continues to prove its effectiveness as readmission rates for participating patients are consistently well below the Inova Health System’s observed over expected (O/E) goals. ITSC clinicians saw over 10,000 patient encounters in 2017 (5,000 were unique patients), and the TCM telephonic case management program oversaw the care for roughly 5,000 unique patients in that same time frame. The program is dedicated to the overarching vision to provide “concierge-level” wrap around services to patients at the highest risk for hospitalization each and every day and to lead national efforts to develop best practices in transitional care.



## DEPARTMENT OF MEDICINE CLINICAL PROGRAMS



**Stephen Clement, MD**  
**Medical Director of**  
**Endocrinology Services**

### ENDOCRINOLOGY SERVICES

#### Inpatient Clinical Care

We continue to experience a high demand for our endocrinology inpatient diabetes and consultative services. The endocrinology consult service supports all departments, including cardiothoracic surgery, general surgery, OB/GYN, and anesthesiology. We are staffed by two full time endocrinologists, Stephen Clement, MD and Michelle Jeffery, MD, as well as a full time Physician's Assistant, Chris Detrick. The part-time members of the team are Shirley Kalwaney, MD and Nahrain Alzubaidi, MD. The endocrine providers are well connected with both outpatient Inova Medical Group (IMG) practices and the Centers for Wellness and Metabolic Health, working to ensure the proper coordination of care of patients from the hospital into the larger Inova system.

The result of our work has made us a regional referral center for complex endocrine problems. Inova Fairfax Medical Campus (IFMC) has become a destination care center for the treatment of severe diseases. A substantial number of patients hospitalized at IFMC for treatment of hyperglycemic emergencies, thyrotoxicosis and thyroid storm, and adrenal insufficiency are referred from outside hospitals.

Regarding quality, Dr. Clement has led or participated in multiple quality improvement (QI) initiatives both for IFMC and the system, including the system-wide hypoglycemia sprint.

#### Outpatient Clinical Care

The outpatient endocrinology service continues to grow, and the demand for their expertise continues to increase. Currently, there are four practice sites staffed by a total of seven endocrinologists. Shivam Champaneri, MD and Leena Jha, MD are located in the Springfield office. Mehreen Husain, MD and Maria Ramirez, MD are located in the Lakeridge office. Michael Horwath, MD is located in the Reston office. Amish Gandhi, MD and Nagashree Gundu Rao, MD are located in the Ashburn office. Evangeline Delgado, FNP joined the Ashburn and Reston offices recently as well. Work is underway to develop a comprehensive strategy to build on the existing success of each practice and expand the service line to meet the increasing needs of the community as well as the other Inova hospitals.



**Nagashree Gundu Rao, MD**  
**Medical Director of Outpatient**  
**Endocrinology Services**

#### Research

Dr. Clement is the principal investigator of a project to test the efficacy of two devices that allow physicians and their patients to communicate regarding their diabetes via an app on their smart phones. The projects are a joint venture among Inova, Innovation Health, Aetna, and Sanofi. Patients were enrolled from August through December 2017 and enrollment was completed by May 2018. The potential benefit of the study for Inova is that it provides exposure to both patients and providers to a new method to improve medication adherence and improve diabetes control. If the studies are successful, it will position Inova as a leader in using technology to improve diabetes management.

#### Teaching

Internal medicine residents are encouraged to perform an elective month rotation with the endocrinology consult team for in-depth teaching in clinical endocrinology. Medical students in other specialties also frequently choose to spend 2-4 weeks as a teaching elective with us. Due to the incredible teaching experience, the faculty is frequent recipients of teaching awards from the residents.

## DEPARTMENT OF MEDICINE CLINICAL PROGRAMS



### PALLIATIVE MEDICINE AND COMPREHENSIVE CARE

**Jessica Heintz, MD**

**Medical Director of Palliative Care**

The palliative care service continues to be very busy with volume of approximately 1,900 referrals per year. Additionally, this year we have expanded our reach within Inova Fairfax Medical Campus (IFMC) into the pediatric realm, with the addition of Candyce Greene, MD, a pediatrician with neonatology background, in addition to fellowship training in palliative care medicine. While she sees both adult and pediatric patients, her primary focus will be the development of an interdisciplinary pediatric program, aided by her participation in the Harvard Palliative Care

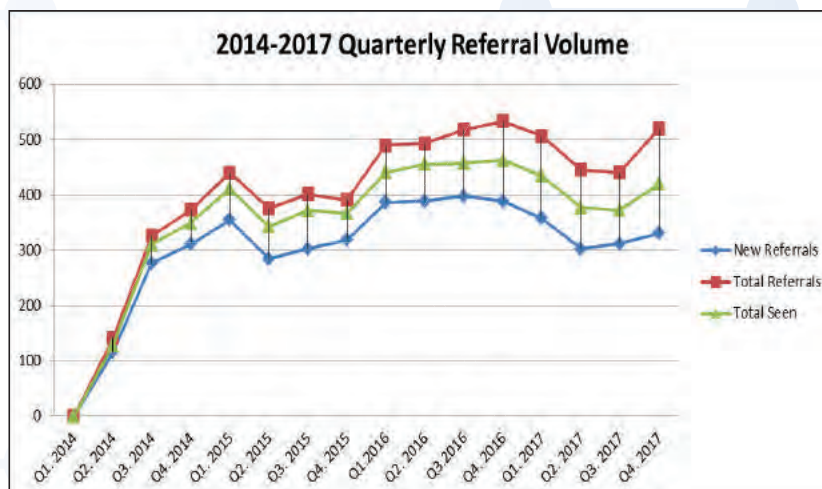
Education and Practice program (PCEP), which was funded by the Department of Pediatrics through a grant from the Hyundai foundation.

In May 2017, Jean-Paul Pinzon, DO joined the Inova Medical Group (IMG) oncology practice as the medical director for oncology-based palliative care. He began his practice in the office setting, as well as, rounding part-time with the IFMC Palliative Medicine & Comprehensive Care Team to develop relationships and enhance continuity of care. In November 2017, his responsibilities shifted full-time to embedded palliative care in the IMG outpatient oncology practices located in the Prosperity and Fair Oaks offices. This has allowed for increasing partnership

between IMG oncology and palliative care and formed a unique collaboration between inpatient and outpatient palliative care services that focus on optimizing symptom management, improving outcomes for cancer patients, as well as, aiding in patient centered goals of care determination.

We continue to advocate for more community based palliative care, partnering with regional palliative care providers to expand the reach to other patient populations, as well as other settings.

Our business plan, created in 2013, set the vision for our subsequent four years, factoring in predicted volume growth in referrals, staffing needs, and projected cost savings. In May 2017, we were able to report the findings of Inova's finance department of over \$5 million in direct cost savings for palliative care in the 2016 population. This savings is directly related to ensuring care is patient centered and takes into account individual's values and preferences for care in the face of serious illness. This savings matched projections based on volume and continues to help support Inova's investment in this essential interdisciplinary service.



## DEPARTMENT OF MEDICINE CLINICAL PROGRAMS



### GERIATRICS SERVICES

**Denise Mohess, MD**

**Medical Director of Geriatrics Services**

2017 was a very dynamic year for the geriatrics service line. We saw significant growth at Inova Fairfax Medical Campus (IFMC), and in collaboration with population health, the outpatient geriatrics services have also continued to grow.

#### **The Inova Geriatrics Services**

In July 2017, Denise Mohess, MD joined forces with the inpatient team of Sangeetha Shan-Bala, MD, Nikki Taylor, NP, Keiko Kuykendall, NP, Suvi Hyytiainen, NP and Anna Lea as the Program Manager. Dr. Shan-Bala became the new Medical Director for Inpatient

Geriatrics Service in October 2017. This team provided care to 2,054 patients in 2017 across the IFMC campus, which was a 52% increase from 2016. There were 569 new consults seen in the last quarter of the year, which was a 60% increase compared to Q4 2016. The inpatient geriatrics consult service continues to be a standard rotation site for pharmacy students, internal medicine residents, and psychiatry residents. It continues to be a popular elective rotation for medicine students and nurse practitioner students. We are currently engaged in initiatives to assist with polypharmacy, frailty, decreasing falls and improved mobility, delirium, and advanced care planning.

#### **No One Dies Alone (NODA)**

Volunteers provide compassionate companionship to patients otherwise dying alone. It is adapted from the NODA program that was created in 2001 at Peace Health Oregon, inspired by Sandra Clarke, RN and is one of over 300 programs nationwide. The program at IFMC was launched in August 2017 and is being funded by philanthropy. Initially, it started as a pilot on five units with vigils available from 9:00am to 5:00pm. Over the last quarter of 2017, we held 64 vigils in several units and vigils are now available from 9:00am to 9:00pm. Our hope is to eventually be available over the weekends as well.

#### **Hospital Elder Life Program (HELP)**

HELP is an internationally-recognized program that prevents delirium and functional decline in hospitalized geriatric patients. The program at IFMC is recognized as a HELP Center of Excellence due to its success in combatting delirium and its expansion to several units throughout the hospital. HELP piloted the Mobility Action Group pilot on units NPT 10 and CTUS at IFMC. This led to a system-wide Mobility Action Sprint that has incorporated the seven step mobility program in EPIC to enhance patients' mobility.

HELP manager, Susan Heisey, has served as a faculty contributor with CMMI / CMS, and along with Sharon Inouye, MD, developed a national Mobility Action Group Change package and toolkit. HELP hosted Dr. Inouye, a world renowned expert on delirium, to present at Medical Grand Rounds on delirium in older persons. HELP was recently quoted in The Wall Street Journal article: "Hospitals Increasingly Tell Patients to Get Up and Move" in the September 2017 issue, which further showcases the program's importance.

#### **NICHE (Nurses Improving Care for Healthsystem Elders)**

NICHE has grown significantly at IFMC since its initiation in 2001. Re-education is in process on three medical units (Med A, B, and C) using NICHE learning modules and has been completed by 113 RNs (20 hours), 31 clinical technicians (16 hours), and 3 non-clinical staff (5 hours) in the past year related to management changes and staff turnover. Education is planned to begin on Tower 11S, Tower 9S, GYN and IHVI in 2018. IFMC has maintained its NICHE exemplar status in 2017.



## DEPARTMENT OF MEDICINE CLINICAL PROGRAMS

### **The Geriatrics Grand Rounds**

This is a continuing medical education (CME) multi-disciplinary rounds that is held the 4th Wednesday of the month from January through October. Attendees include healthcare professionals from many disciplines that provide care to elderly patients, such as physicians, nurses, rehabilitations services, psychiatry, population health, and the community. This CME provides interesting topics which focus on caring for elderly patients with one CME credit being available after attending.

### **Inova Cares for Seniors TM PACE®**

We specialize in providing medical and social services to those who require medical and nursing care, but prefer to live at home rather than a nursing facility. PACE is a 3-way agreement between InovaCares for Seniors, the Department of Medical Assistance Services (DMAS), and the Centers for Medicare and Medicaid Services (CMS).

### **The Geriatric Advanced Illness Clinic**

This clinic is headed by Erica Campbell, MD who was the most recent addition to the geriatrics team. She joined us in October of 2017 to provide primary or consultative geriatrics care for our elderly patients in the community. The clinic will serve as a medical home to our most medically complex patients. These patients tend to have multiple comorbidities, multiple medications, high risk of emergency visits, and avoidable hospitalizations.

### **The Inova House Calls Program**

The program is an interdisciplinary team of providers (physicians, nurse practitioners, and social workers) poised to provide comprehensive biopsychosocial primary care services for homebound patients with advanced and complex illness.



## DEPARTMENT OF MEDICINE CLINICAL PROGRAMS



### RHEUMATOLOGY CONSULT SERVICE

**Lynn Gerber, MD**

**Section Chief of Rheumatology**

**Director of Research for Department of Medicine**

The rheumatology program of the Department of Medicine (DOM) consists of the administrative section chief and three clinical rheumatologists who serve in the inpatient and outpatient settings. The inpatient consultative service is available 5 days per week and provides consultative services to all requests from Inova Medical staff. In particular, the rheumatologists provide evaluation, treatment, and assistance with discharge planning for in-patients with rheumatic conditions, with special expertise in systemic vasculitis, lupus, and inflammatory arthritis. Additionally, the rheumatologists provide support to all Inova physicians for challenging diagnostic problems pertaining to rheumatic disease and connective tissue disorders. The outpatient rheumatologists provide consultation and comprehensive care for inflammatory and non-inflammatory rheumatic conditions, with special expertise in osteoarthritis and osteoporosis.

There were several noteworthy accomplishments during 2017. Inova Fairfax Medical Campus (IFMC) became an approved site for a drug trial in scleroderma and recruitment began in 2016. This effort is collaboration between the advanced lung disease and rheumatology service lines and has continued through 2017 by evaluating the efficacy of oral nintedanib treatment in scleroderma patients with interstitial lung disease.

The Inova rheumatology program members recruited our third clinical rheumatologist, Pragya Singh, MD, who joined us from George Washington University and has been able to provide both outpatient and inpatient consultations.

Scholarly activity involving the rheumatology program includes:

- Provision of a chapter, “Rehabilitation of the Patient with Rheumatic Diseases” for the 6th Edition of DeLisa / Frontera Physical Medicine and Rehabilitation: Principles and Practices (authored by Ramona Raya, MD and Lynn Gerber, MD)
- Participation in the study of myofascial pain syndromes (contributed by Dr. Singh and Dr. Gerber)

We have taken an active educator role with medical students and internal medicine residents providing several educational conferences for them during their rheumatology rotations. The rheumatology section has also hosted journal clubs for community rheumatologists. The club meets quarterly and serves as a rheumatology section meeting and provides opportunity to discuss upcoming clinical trials and patient management.



## DEPARTMENT OF MEDICINE QUALITY PROGRAM



### DEPARTMENT OF MEDICINE QUALITY

**Rishi Garg, MD**

**Medical Director of Quality, Compliance, and Documentation**

In 2017, the Department of Medicine's (DOM) Quality and Safety Team continued to make improvements towards our goal of providing our patients with the highest quality care, and for our practitioners, a just and great place to work. This year we supported our Clinical Outcome Specialist, Karen Adamouski-Marion, in receiving her Certification as a Professional in Healthcare Quality (CPHQ). As a whole, our DOM Quality Team reviewed 580 cases that were referred to us via Safety Always, Patient Relations, or other departments, and 83 of these cases were then sent for practitioner peer review as appropriate.

We recognized the need to share our quality processes with our physicians and allied health practitioners by creating a DOM Welcome Brochure. This brochure introduced the Department of Medicine Team and their roles, defines OPPE (Ongoing Professional Practice Evaluation), FPPE (Focused Professional Practice Evaluation), New Provider FPPE, and described the peer review process. These brochures can be picked up at the DOM main desk.

The DOM continues to be up-to-date with the Joint Commission's mandate for OPPE. We have continued to enlist the assistance of our sub-specialty section chiefs to identify and report out on various quality metrics specific to each section.

The process of collecting OPPE for the allied health professionals was automated in 2017. The database was created in-house in collaboration with members of our DOM Informatics Team. This new process was piloted from the December 2016 to May 2017 cycle for the fall data collection period. We received valuable feedback during the pilot which will enable us to improve this system before it is fully implemented.



In addition to these improvements, Chapy Venkatesan, MD and relevant stakeholders developed standards of practice for hospitalists and consultants in the areas of: documentation, post-discharge responsibilities, reachability, consultation interaction, in-service attendance, timeliness of initial evaluation, remote EMR access, and telephone orders. In order to solidify a culture of accountability, these standards were implemented in the fall of 2017.



## DEPARTMENT OF MEDICINE CLINICAL SECTIONS



Pictured in the front row, from left to right, are:

Lynn Gerber, MD (Rheumatology); Madeline Erario, MD (Vice Chair of Academics and Critical Care Services and DIO / Director for Graduate Medical Education); Zobair Younossi, MD (Chair of Department of Medicine); Chapy Venkatesan, MD (Vice Chair of Quality and General Medicine); and Gregory Trimble, MD (Vice Chair of Medical Sub-Specialties and Assistant Dean for Faculty for VCU School of Medicine Inova Campus)

Pictured in the back row, from left to right, are:

Behzad Kalaghchi, MD (Gastroenterology); Richard Rosenthal, MD (Allergy and Immunology); Jennell Nelson, MD (Dermatology); Albert Kim, MD (Cardiovascular Disease); Stacy Oshry, MD (General Internal Medicine); Svetolik Djurkovic, MD (Critical Care); Denise Mohess, MD (Geriatrics); Ranjit Cheriyan, MD (Nephrology); John Paul Verderese, MD (General Internal Medicine); Stephen Clement, MD (Endocrinology); Eric Libre, MD (Pulmonology); and Timothy Cannon, MD (Hematology / Oncology)

## DEPARTMENT OF MEDICINE EDUCATION PROGRAMS



### DEPARTMENT OF MEDICINE EDUCATION PROGRAMS

**Alita Mishra, MD**

**Director of Education**

**Program Director for the Internal Medicine Residency Program**

#### Department of Medicine (DOM) Education Programs

The educational programs in the DOM are thriving under Zobair Younossi, MD and Madeline Erario, MD's leadership. We graduated our first class of residents in 2017. We have a class of nine for each of the three years of Internal Medicine residency training. Despite the youth of our residency program, we have been able to recruit top tier medical students to come to train with us at Inova Fairfax Medical Campus (IFMC). The enthusiasm, support, and dedication to teaching and mentorship of our faculty members in general medicine, hospital medicine, pulmonary medicine, infectious diseases, gastroenterology, cardiology, nephrology, rheumatology, endocrinology, hematology, oncology, and critical care have been outstanding. Our core curriculum foundation is based on inpatient training on our inpatient wards, critical care units, and continuity clinics at Inova Medical Group primary care clinics. We are able to augment and individualize electives to include all Internal Medicine sub-specialties and also have a focus on quality improvement, procedural training, residents as teachers, ambulatory medicine, and scholarly activities. In addition, we also incorporate women's health, office-based orthopedics, dermatology neurology, and geriatrics in our training. Our residents are a crucial part of the rapid response team at IFMC. All of our residents also rotate through the Transitional Care Clinic and help in our efforts to keep vulnerable patients out of the hospital. Our residents have felt welcome and enjoyed the opportunity of being able to work directly with faculty experts during their required and elective rotations. In partnership with the National Institutes of Health (NIH), we have successfully had five of our residents' complete rotations in oncology and rheumatology at the NIH and plan to send additional residents in the upcoming year.

We are pleased to report a very successful fellowship match in our first and the most recent fellowship match in 2017. Nina Badoe, MD, graduate of 2017, is a cardiology fellow at University of Louisville and Eleni Footman, MD is completing her geriatrics fellowship at Cornell University. For this current academic year, Trevor Locklear, MD has matched at Tulane University for Gastroenterology, Natsu Fukui, MD at Mt. Sinai Icahn School of Medicine for Palliative Medicine and Zainab Wasti, MD at Drexel University of Infectious Diseases. We are extremely proud of our residents and look forward to their continued success.

Complementing a robust clinical training, we also provide ample opportunities for scholarly and quality improvement activities. In 2017, our residents, in collaboration with Inova faculty, had several publications in peer reviewed journals, and have presented at many regional and national meetings. Our resident presentations for 2017 include presentations at the American College of Physicians (ACP) annual Virginia chapter meeting, Alliance for Academic Internal Medicine (AAIM) annual meeting, American Thoracic Society (ATS) meeting, Institute for Health Care Improvement (IHI) conference, Greater Washington Infectious Disease Society (GWIDS), and Digestive Diseases Week (DDW). Two residents were also invited speakers at the Department of Medicine 2017 Research Day. In addition, our internal medicine residents present and lead all of our monthly interdisciplinary Medicine-Pathology-Radiology conferences and monthly Morbidity and Mortality / Patient Safety conferences. The residents and chief residents run weekly resident reports and get many opportunities to teach their peers and medical students. With regards to quality improvement (QI), they are working on four key quality improvement initiatives that have direct impact for improving patient care at IFMC: 1) hand hygiene, 2) minimizing interruptions and improving communications across health care teams, 3) standardized rounding checklist to improve outcomes, and 4) evidence-based educational resource for high value care. Their QI projects are presented at the annual Graduate Medical Education annual QI symposium and our residents were recipients of the top podium presentation in 2017.

## DEPARTMENT OF MEDICINE EDUCATION PROGRAMS

Our program continues to be fully accredited by the Accreditation Council for Graduate Medical Education (ACGME) without any citations or areas of concern which is an honor for a new program. In addition, we recently got approval for an ACGME accredited cardiovascular medicine fellowship. Two fellows will start in July 2018. The American College of Physicians (ACP) also recently recognized our residency program as an elite program in the country for



resident engagement and activities in the college. Our very own Director of Graduate Medical Education and Vice Chair of Medicine, Madeline Erario, MD, was the recipient of the prestigious Parker J. Palmer Courage to Lead Award in 2017. This national award from the ACGME honors designated institutional officials who have demonstrated excellence in overseeing residency programs at their sponsoring institutions.

Last but not the least, retention of our trainees is a reflection of our success. We are pleased to report that we will have two of our graduating seniors staying with us as

chief medical residents in 2018-2019, Danubia Hester, MD and Brad Nitta, MD. In addition, four others will be staying as staff physicians in the department and will be serving our community. We will be welcoming Amanda Morgan, MD, Larry Istrail, MD, Denny Song, MD, and Chad Zik, MD as our colleagues upon their graduation from the program.

### Continuing Medical Education (CME)

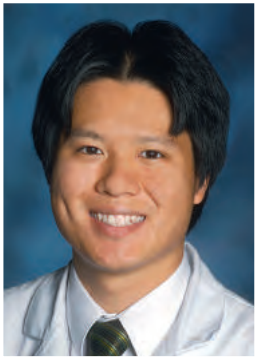
The DOM continues to be a leader in high quality Medical Grand Rounds series. In 2017, we had an impressive number of our Inova-based physicians, as well as, national and internationally known experts give important updates on their areas of expertise. Our Grand Rounds topics have been chosen based on needs assessment of our physicians and we have been encouraged by the high quality of speakers in the last few years.

Our annual DOM Research Day in 2017 included a key note and a number of oral and poster presentations from DOM scientists and physicians. Our residents, Dr. Istrail and Mehmet Sayiner, MD, presented their research on this day. We also had another successful CME event on Advances in Pulmonary and Critical Care Medicine in March. This full day symposium included many nationally well-known speakers and cutting edge advances in pulmonary and critical care medicine. We hope to continue inviting many more speakers in 2018 that can provide their expertise and education to DOM.

We welcome all of our staff physicians and their guests to our weekly Grand Rounds. Your suggestions for speakers and topics are welcome. Our CME planning committee meets monthly to discuss topics and speakers and our aim is to include both innovative updates in the field of internal medicine, as well as, review of common medical conditions and management updates.



## DEPARTMENT OF MEDICINE EDUCATION PROGRAMS



### UNDERGRADUATE MEDICAL EDUCATION

**Homan Wai, MD**

**Medicine Clerkship Director for Virginia Commonwealth University (VCU)**

This year, the Department of Medicine is focusing our educational mission on the third and fourth year medical students from Virginia Commonwealth University (VCU). While we have retained the CCU rotation for the fourth year Georgetown students, our partnership with George Washington University was phased out. This was done in conjunction with ending our affiliate relationships on the Graduate Medical Education (GME) level in order to concentrate on our own thriving Inova residency program. The clerkship continues to be led by Homan Wai, MD (Clerkship Director), Meena Raj, MD (Associate Clerkship Director and Director of the Acting Internship), and Kristin Liska (Academic Administrator). Our students continue to rate internal medicine as one of their most fulfilling rotations thanks to dedicated faculty and programmatic innovations.

During this past academic year, we have significantly restructured our curriculum including:

- 1) The incorporation of a “trust” model called Entrustable Professional Activities (EPA) in the student evaluations.
- 2) The alignment of clerkship elements around clinical care and performance with a “Key Features Exam” which focuses heavily on clinical reasoning.
- 3) The implementation of a successful orientation with workshops that set the stage for success before a student starts the rotation.

In 2021, we will be transitioning from being a VCU regional campus to a regional campus for the University of Virginia (UVA). While we are laying the groundwork for these changes, we have no doubt that more exciting developments will come out of our ongoing partnership with VCU over the next three years. Due to the pioneering endeavors by internal medicine, the VCU School of Medicine is revamping the grading structure this upcoming year across all clerkships based on our model.



## DEPARTMENT OF MEDICINE EDUCATION PROGRAMS

### INOVA FAIRFAX MEDICAL CAMPUS INTERNAL RESIDENCY PROGRAM

RESIDENT CLASS OF 2017



RESIDENT CLASS OF 2018



RESIDENT CLASS OF 2019



## DEPARTMENT OF MEDICINE PHYSICIAN COMMUNICATION PROGRAM



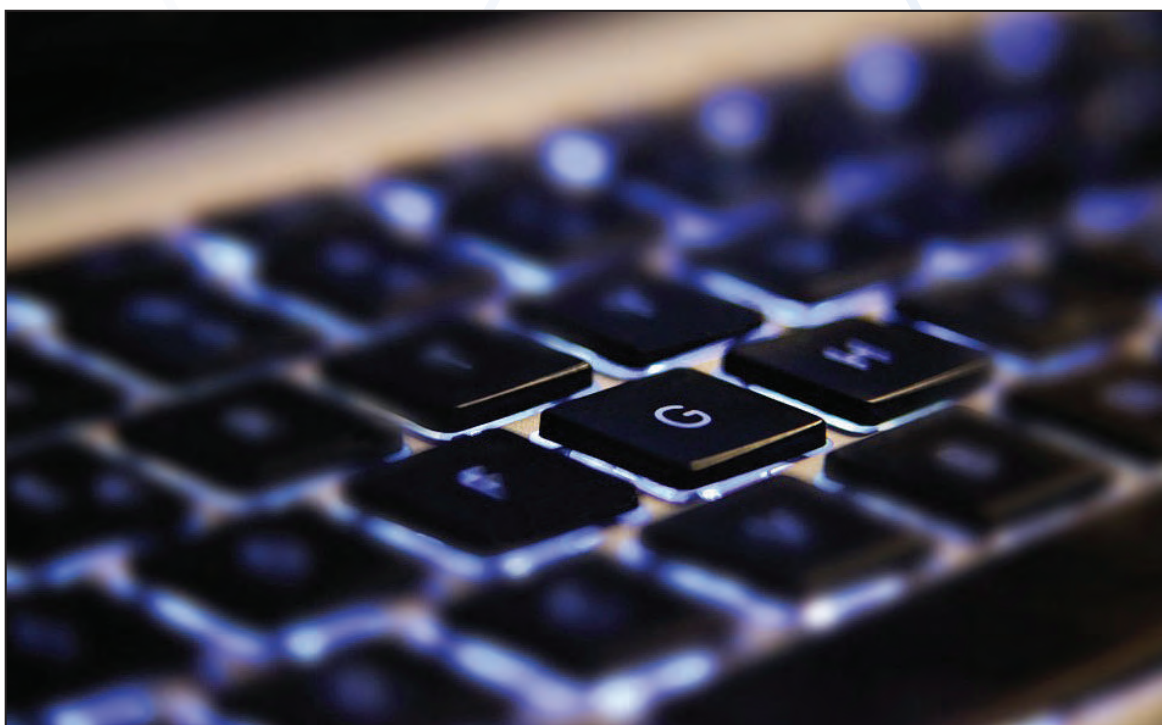
### HEALTH INFORMATION TECHNOLOGY

**Maruf Haider, MD**

**Medical Director of Clinical Integration**

Our Medicine Informatics Team has continued to meet and share technical expertise to support data driven projects. The team carries on its directive to facilitate Department of Medicine (DOM) collaboration with technology and administrative departments and to streamline data collecting and reporting. The team also continues to be available for in-house IT training and consultation, such as with Microsoft Excel / Word programs for DOM medical directors and staff, as well as the DOM administrative staff. We are continually looking to improve our own processes and providing continuing education to our team members so we can better serve our stakeholders.

2017 marked the third year for the Med Hospitalist dashboard being integrated into the Oracle database program which allows for continued streamlining and data mining capabilities. During the year, the Allied Health Provider Ongoing Professional Practice Evaluation (OPPE) database was completed and put into production. This database has been praised for being user friendly, critical for Joint Commission compliance moving forward, and allows for better data mining and trend reporting. The team has been working with the Epic reporting builders in order to set up DOM specialty service patient reports which allow for comprehensive and timely data mining of their patients. These will be particularly useful for current and future quality improvement and program growth projects. The DOM recognizes that analyzing its own data is vital to success. Starting in late 2017 and into 2018, the team is working to develop a DOM provider compliance tracking Oracle database, which will allow for consolidating and tracking of a number of time sensitive metrics, such as medical license numbers and expiration dates, DEA numbers and expiration dates, as well as ACLS expiration dates.





## DEPARTMENT OF MEDICINE PHYSICIAN COMMUNICATION PROGRAM



### JUST CULTURE INITIATIVE Joseph Hallal, MD

The Department of Medicine (DOM) continued its “Culture of Accountability” (formerly known as “Just Culture”) initiative in 2017 led by DOM quality physician leaders: Chapy Venkatesan, MD and Rishi Garg, MD. The DOM “Just Culture” team accomplished a number of achievements and milestones in 2017.

In January 2017, approximately 30 leaders from across the Inova Health System, including 8 from the DOM were certified by Outcome Engenuity in “Workplace Accountability.” Over the past year, “Workplace Accountability” has been successfully integrated into both the Internal Medicine Peer Review by Dr. Garg as well as the MCCC Peer Review processes by Osman Malik, MD. The driving force behind this journey is the use of workplace accountability principles. They are shown to improve patient safety, reduce errors, and give voice to physicians and staff without the fear of punitive responses for reporting errors.

In the fall of 2017, Dr. Venkatesan submitted a poster entitled: “Journey to a Culture of Accountability” to the Institute of Healthcare Improvement (IHI). He presented his poster at the prestigious 2017 IHI National Forum on Quality Improvement and Healthcare held in Orlando, Florida in December 2017.

Also, there have been changes to the peer review process, so we now interview the relevant physician prior to the meeting; we blind the outcome, and render a score utilizing the Just Culture algorithm on difficult to determine cases. We are currently considering next steps to determine whether “A Culture of Accountability” principles in peer review improve near miss reporting and outcome bias.

In addition, the DOM Safety and Quality Concerns Committee began weekly quality rounding on the medicine units in 2017. Quality rounding has given the DOM team the opportunity to connect with frontline staff and address concerns in real time. We have been able to make improvements in work processes that have been shown to have a direct impact on patient safety and staff satisfaction. Due to the success of quality rounding an expansion of this process is planned for 2018.



Chapy Venkatesan, MD presented a poster study at the Institute for Healthcare Improvement (IHI) National Forum on Quality Improvement in Healthcare in December 2017 in Orlando, Florida.



## DEPARTMENT OF MEDICINE PHYSICIAN COMMUNICATION PROGRAM



**Barry Strauch, MD**

### **Chair Emeritus and Consultant to the Department of Medicine**

Barry Strauch, MD, in his role as Chair Emeritus of the Department of Medicine (DOM), continues to use his years of experience and expertise in quality and safety initiatives. He also utilizes his experience over the past five years as an appointee to the Armstrong Institute for Safety and Quality at Johns Hopkins and experience with the safety and quality committee of the Board of Trustees of Johns Hopkins Medicine to continue monitoring several sections of DOM at Inova Fairfax Medical Campus (IFMC). Dr. Strauch continues to attend the DOM monthly meeting on the morbidity and mortality conference, as well as, the ethics committee of the hospital, which is a committee that is undergoing a major transformation and assuming a major role in the functioning of the hospital.



### **DEPARTMENT OF MEDICINE PHYSICIAN LIAISON PROGRAM**

**Richard Binder, MD**

The Physician Liaison Program continued in 2017 to interface with the wide variety of physicians that make up the Department of Medicine (DOM) which include both community and employed physicians. The program is designed to be a resource and support to physicians so that they have an avenue for feedback and enhanced communication. 2015 marked the first full year that the Inova Simulation Center has been open and continues to be a successful facility used by both community and employed physicians to refresh and enhance their medical skills, as well as build competence in new skills. Also, the free standing Internal Medicine Program had its first three classes of residents and the presence of these talented residents has enhanced the quality of care of both inpatients and outpatients. They continue to be mentored by voluntary staff,

particularly in the subspecialty areas, as well as by our hospitalist teams. In addition, the hope is to develop specialty fellowships in the near future.

An additional focus has been teaching medical students and residents the art of taking a medical history and performing physical examinations focusing on four principles. These principles include: 1) asking the right question to get the right answer; 2) if you don't look you won't see; 3) if you don't touch you won't feel; and 4) if you don't listen you won't hear. The patient is the reason and focus of all we do.



### **GLOBAL HEALTH INITIATIVE**

**Ian Shenk, MD**

We continue to be actively involved in global health research projects with undergraduate and graduate students from various affiliated universities to help highlight the major global health issues present in the world today. We are particularly conscious of the ever increasing number of global health problems and aware that all health is global health. We are also especially aware of the socio-political factors that currently compromise our ability to study and respond to these many issues.

We maintain our desire to educate our community and reinforce our community's devotion to our global neighbors. These efforts are reflected in our encouragement and support of global health educational activities both on our own campus as well as neighboring venues. Many members of our faculty are connected with international and global health organizations.

## DEPARTMENT OF MEDICINE PHYSICIAN COMMUNICATION PROGRAM



### PATIENT EXPERIENCE

**Denise Mohess, MD**

**Medical Director of Geriatrics Services**

**Leader of Patient Experience Initiative for the Department of Medicine**

Patient experience in 2017 continued to focus on connecting the behaviors of the care delivery model to quality and safety, improving efficiency, and provider and patient experience. Purposeful rounding, bedside reporting (ISHAPED), the white board, and leader rounding all have led to standardized processes. The patient experience team worked with staff to ensure that these translated into episodes of care that were meaningful for the patients, their families, and care teams.

Ashiq Mannan, MD and the medical directors of the Department of Medicine (DOM) units were very involved in improving patient and family experience in 2017. Here are some of the highlights for 2017:

- Med A and B Units – Providers and patients were geographically cohorted to the 10N and 10S tower units to improve relationships, foster trio rounding, and create a collaborative inter-professional team.
- Having specific medical directors for units allowed for improved physician and nursing leadership.
- Tracking of trio rounds and an increase in patient reported rates of trio rounds in Press Ganey scores and initiatives were made to improve the efficiency and quality of trio rounding.
- Having physician reference card with “to do’s” for physicians and nurses during trio rounding was beneficial.
- There were monthly focused meetings on physician communication and current scores.
- Physician attendance at staff meetings improved.
- Improved usage of the 4Ws on the white board for patients / families so everyone was on the same page regarding the plan of care.
- Daily MDRs to improve communication among care team included physicians, nurses, and case managers.
- A CNS hospitalist was able to attend the Press Ganey conference.

A few other updates regarding specific measures:

- Press Ganey trio rounding – The group improved from 66% “yes” response in 2016 to 72% “yes” response in 2017.
- The other 4 HCAHPS domains we focus on (physician communication, pain management, care transitions, and discharge information) were very similar from 2016 to 2017 with a ~3% change.
- Our mortality observed over expected ratio (O:E) remained very good with scores of 0.47 in 2016 and 0.44 in 2017.
- Length of stay is still a work in progress with scores of 1.13 in both 2016 and 2017.

To support the culture of appreciation for staff, the patient experience team shared stories that exemplify the Inova Promise: “We Seek Every Opportunity to Meet the Unique Needs of Each Person We Are Privileged to Serve – Every Time, Every Touch.” The Inova Promise stories are the real stories of the amazing actions of our staff across campus that is shared weekly with the Administrative Council. Inova staff is encouraged to go to the administration board room to share their story with the leaders who then are able to give their appreciation and regards to the staff and the teams. The stories come from emails, letters, and phone calls from patients, families, and even other staff members.

We look forward to continued collaboration in 2018.

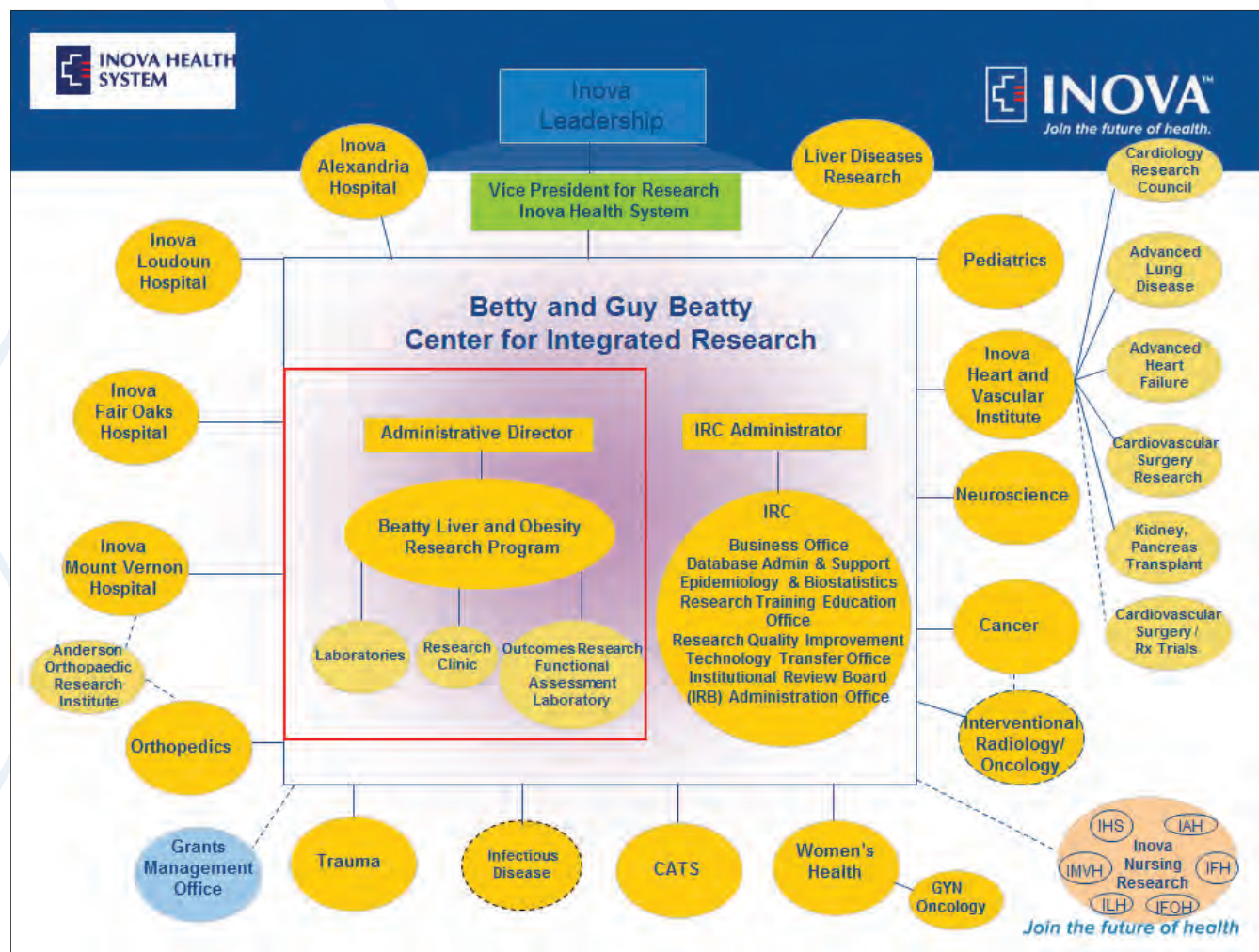


## DEPARTMENT OF MEDICINE GROUP PHOTO





## DEPARTMENT OF MEDICINE RESEARCH PROGRAMS



The number of active protocols and research funds make the Department of Medicine Research Programs the most active and well-funded department.



## DEPARTMENT OF MEDICINE & BEATTY LIVER & OBESITY RESEARCH PROGRAMS

The Department of Medicine (DOM) continues to implement a varied and innovative research program. Our patient-centered research program allows our investigators to bring together cutting-edge personalized research protocols to our patients, institution, and community, as well as, offer research and education opportunities for our students, residents, and fellows.

Research activities in the DOM have been directed toward program evaluation, quality improvement, assessing impact of patient educational interventions, and use of technology to track patient status. Studies aimed at exploring causes and possible remedies for physician burnout have been discussed. Two specific studies were funded through the seed grant mechanism: 1) Addressing staff perceived barriers in advance care planning in critical care and oncology units (Denise Mohess, MD was the Principal Investigator); and 2) Can we characterize the gut microbiome in patients with heart failure? (Mary Schmidt, MD was the Principal Investigator).

The DOM Research Program includes the Beatty Liver & Obesity Research Program (BLORP), Outcomes Research Program, Liver Pathology Research Program, and the Diabetes Research Program.

BLORP continues to conduct and to be at the forefront in obesity and non-alcoholic fatty liver disease (NAFLD) research. Over the past two decades, there has been an increase in our understanding of obesity-related NAFLD and non-alcoholic steatohepatitis (NASH). NASH is the subtype of NAFLD which can progress to cirrhosis and liver-related mortality. In the United States, at least one-third of Americans are estimated to have NAFLD and approximately 6 million have progressed to NASH. Consequently, NASH has become the second most common reason for liver transplants in the United States. By 2020, NASH is expected to become the leading cause for liver transplants in the United States.

Our investigators continue to shed new light on NAFLD and NASH by sharing their findings on the world stage. They have presented at numerous international conferences and written articles which have been published in reputable peer-reviewed journals. Such exposure adds to the body of research and positions Inova as a major player in this critical area of investigation.

The following are the core program areas within BLORP and a more detailed description of their aims and accomplishments will be described later in the Annual Report:

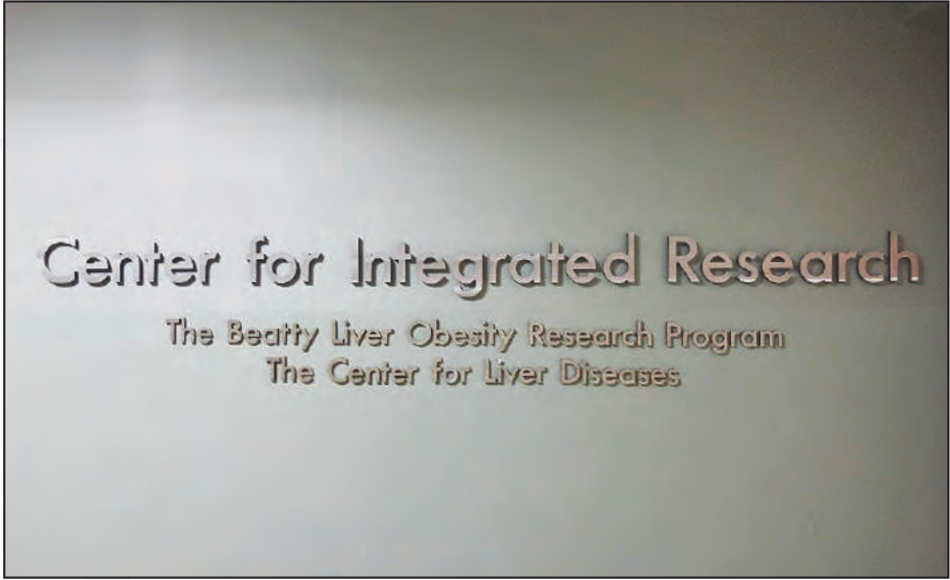
- **Clinical Trials Research Team** – The team has successfully conducted numerous phase II and phase III clinical trials over the past year with our main focus being non-alcoholic steatohepatitis (NASH). The studies are currently using medications that may improve fibrosis measures and potentially result in a resolution of NASH.
- **Liver Pathology Research** – Continue to lead investigations into the pathogenesis of chronic liver diseases, by providing accurate assessment of patient material from participants in translational research and clinical trials, and collaborates with other academic institutions and industry as the central reference laboratory in multicenter clinical trials.
- **Basic Science Laboratory** – Continue to refine techniques for identifying and quantifying particular liver lesions, aiding in the grading and staging of fatty liver disease, as well as, utilizing various techniques such as gene expression technologies, proteomic assays, cell culture, and immunology assays to investigate numerous components of obesity-related liver disease. The investigators generate original discoveries and pursue clinical trials for new pharmaceutical interventions and aid in the development of novel biomarkers for the diagnosis and treatment of NAFLD.

## DEPARTMENT OF MEDICINE & BEATTY LIVER & OBESITY RESEARCH PROGRAMS

- **Outcomes Research Program** – Continue to determine an individual's performance, perception, and overall quality of life as they pertain to general human physical, social, and psychological activities. The team also tries to understand which approaches are successful in helping patients achieve lifestyle changes.
- **Clinical Translational Research Team** – Performed research using ultrasounds and FibroScan to measure the amount of steatosis, hepatic fibrosis, or fatty deposits within the liver. The team collected and managed a large clinical data and specimen bio-repository specifically designed to house -80°C freezers in a temperature controlled environment with backup sophisticated electronic monitoring system.
- **Mental / Emotional Health Program** – The program was developed to describe the correlation between mental, emotional, and cognitive dysfunction with the presence or absence of fatty liver disease and Type 2 diabetes.

The staff includes PhD-trained scientists, data analysts, clinical trial research coordinators, and other research support staff. A large number of graduate and undergraduate students are trained at this center. In 2017, the group has presented more than 95 abstracts and published more than 56 manuscripts in internationally peer-reviewed journals.

Additionally, the Beatty Liver & Obesity Research Program support staff members include: Manirath Srishord (Senior Director); Trevor Gogoll (Director); Deena Hallaji (Executive Assistant); Gerry Rice (Program Manager); Aimal Arsalla (Program Manager); Puneetinder Kaur Mann (Project Manager & Research Coordinator); Brian Lam, PA-C (Physician Assistant); Kathy Terra (Nurse); and Pegah Golabi, MD (Research Fellow)



Center for Integrated Research  
The Beatty Liver Obesity Research Program  
The Center for Liver Diseases

Elzafir Elsheikh Abdelrahman, PhD

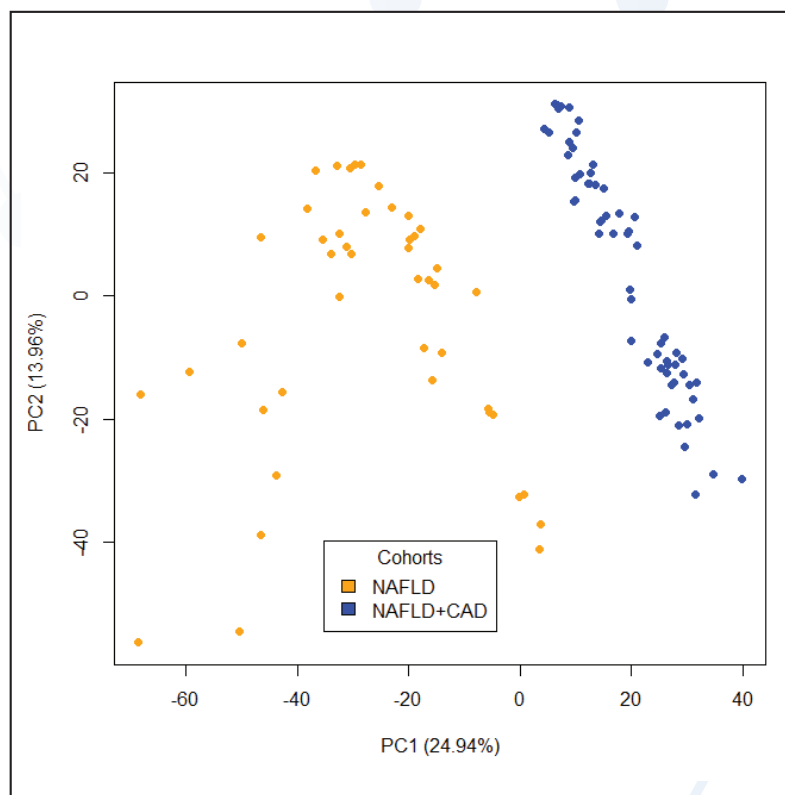
### Association Between Non-Alcoholic Fatty Liver Disease (NAFLD) and Coronary Artery Disease (CAD)

NAFLD is expected to become a serious public health issue because of the increasing prevalence of obesity and aging. Metabolic syndrome (MetS) is a cluster of metabolic abnormalities that can lead to cardiovascular disease, and patients with NAFLD have a higher rate of MetS than those without NAFLD. Moreover, NAFLD has also been reported to be independent of the traditional risk factors for cardiovascular disease (CVD) and MetS and to increase the risk of mortality. The role of NAFLD as a potential independent CVD risk factor has recently gained considerable importance. The purpose of our study is to investigate relationship between NAFLD and CVD, the mechanisms that link both conditions, and the clinical implications that may influence NAFLD and risk of CVD.

To achieve this goal, we performed serum (blood) metabolomics profiling for patients with NAFLD and CAD. Metabolomics, the study of metabolites or ‘chemical fingerprints’ related to specific cellular processes, is a powerful technique to detect disease-induced alterations in metabolism.

We found that patients with both NAFLD and CAD (blue dots in Figure 1 below) have different metabolomics profiling than patients with NAFLD only (yellow dots in Figure 1). This figure can be used as a template to predict / diagnose the presence of CAD in NAFLD patients. This information can then be utilized to develop targeted drug therapy that could prevent CAD development in NAFLD patients.

Figure 1



### Aybike Birerdinc, PhD

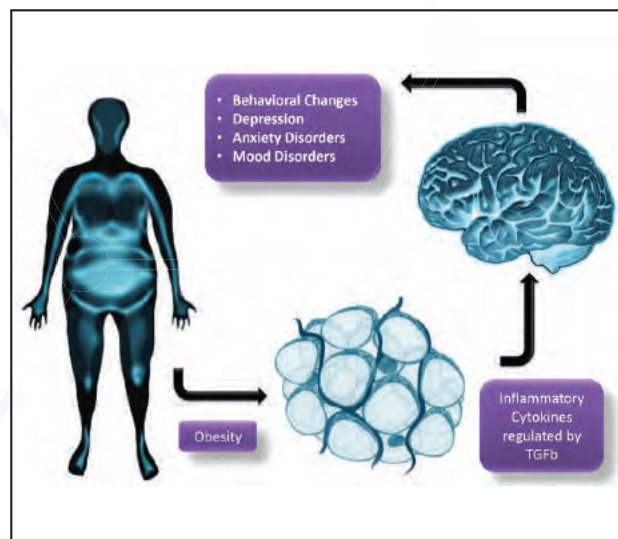
Aybike Birerdinc, PhD focuses on research aimed at understanding the role of visceral adipose tissue (VAT) on the overall signaling deregulation in metabolic syndrome in general and non-alcoholic fatty liver disease (NAFLD) in particular. Her background in both biochemistry and molecular biology has allowed the analysis of these signaling cascades, tracing them from the genetic, metabolic, and protein levels. Some of the most prominent research projects are presented below.

#### HPLC Methodology in the Biomarker Discovery of Metabolic Syndrome in a Cohort of Morbidly Obese Patients

The objective of this research course is to harness the application of High Performance Liquid Chromatography (HPLC) and its methodology to assess accurate and sensitive markers of comorbidities of metabolic syndromes, such as fatty liver disease and diabetes. HPLC technology is used in analytical chemistry to separate, identify, and quantify each component in a mixture. This methodology could serve as a promising technique in our studies to successfully identify differentially expressed metabolites involved in these metabolic syndromes through the analysis of area peaks generated by HPLC chromatograms. The use of serum for these studies will allow these results to be better expanded for biomarker studies in future cohorts. The data generated in this study will also serve to complete our understanding of the pathways studies via our other studies utilizing gene and protein expression by adding the component of the levels of enzymatic reactions being activated.

#### TGFb, a Master Regulator of the TH1/TH2 Pathways, May Also Be Involved in the Depression Disorders Seen in Patients with NAFLD

The aim of this study is to determine the association of VAT-related TGF- $\beta$  gene expression, tissue protein, and serum protein with levels of serotonin and BDNF in a cohort of obese NAFLD subjects. Using serum and VAT tissue from biopsy-proven NAFLD patients and the Bio-Plex platform from Bio-Rad Laboratories in the United States, TGF $\beta$ 1, 2 and 3 were quantified on a genetic level, in tissue protein, and in circulation from serum. In addition, the serum levels of serotonin and BDNF were measured with ALPCO ELISA kits. Spearman's correlations were done on all variables; a statistically significant cutoff of  $p \leq 0.05$  was used. To date, our data suggest that the TGF- $\beta$  signaling is not only involved in the metabolic crosstalk between the liver and VAT, but does indeed contribute to the inflammatory cascade leading to reduced levels of serotonin, but not BDNF, in NAFLD patients with depression.



#### The Fibrosis Component of NASH with Fibrosis May Have Upstream Pro-Fibrosis Signaling Originating in VAT

Although VAT is known to be an endocrine organ that contributes to the pathogenesis of NAFLD, its exact contribution to the development of the fibrotic process is yet to be elucidated. There has been some promising research to indicate that the pro-fibrotic signaling cascades seen in NAFLD may be aided by feedback or de novo signaling from VAT. The aim of this research is to determine the pro-fibrotic signaling molecules in VAT, both on the genetic and protein level and to assess these in tandem with circulating protein levels, as well as, liver histology in a cohort of obese NAFLD subjects. To date, our research indicates that certain pro-fibrotic signaling pathways are indeed initiated in the VAT and the signal can be traced and is amplified and transmitted outward. This project highlights the role of VAT not only in metabolic syndrome, but also the fibrotic component of NAFLD.



## BEATTY LIVER & OBESITY RESEARCH PROGRAM – SCIENTIST SUMMARIES

### Michael Estep, PhD

2017 has been another exciting year of studying the basic science behind clinically relevant questions in the Beatty Liver & Obesity Research Laboratory. Specific examples of 2017 studies include the following:

#### **Integrin Beta 3 Subunit Leu48->Pro Polymorphism is Positively Associated with Pericellular Fibrosis in Non-Alcoholic Fatty Liver Disease (NAFLD)**

Integrin complexes have been implicated as central players in the pathogenesis of hepatic fibrosis. Nevertheless, integrin polymorphisms are rarely discussed in relation to hepatic pericellular fibrosis, a common feature of non-alcoholic steatohepatitis (NASH). The aim of this study is to assess allelic variation of integrin subunits in a balanced cohort of diabetic NAFLD patients with and without pericellular fibrosis. DNA was extracted from obese diabetic subjects with biopsy-proven NAFLD. Integrin polymorphisms were chosen based on having a measurably high minor allele frequency (MAF), being a missense or loss of function mutation, and previous association of the parent gene with TGF $\beta$  signaling/fibrosis, and were measured by TaqMan genotyping assay. Polymorphism that met the criteria for measurement were rs988574 (ITGA1, MAF=0.05778), rs2279587 (ITGA1, MAF=0.09545), rs5918 (ITGB3, MAF=0.1224), and rs2291090 (ITGB5, MAF=.04566). A total of 100 NAFLD subjects with 50% with pericellular fibrosis and 49% with NASH (age, gender, BMI) were included. Of the alleles measured, only rs5918 (ITGB3) was significantly associated with pericellular fibrosis in NASH (chi-square statistic = 4.2431,  $P=0.039$ ); other alleles were distributed almost evenly between patients with and without pericellular fibrosis in accordance with their MAF. Pericellular fibrosis was also associated with elevated AST ( $\rho=0.37$ ,  $P=0.0001$ ), and other histologic features such as lymphocytic infiltration ( $\rho=0.35$ ,  $P<0.001$ ), portal inflammation ( $\rho=0.38$ ,  $P<0.0001$ ), ballooning degeneration ( $\rho=0.49$ ,  $P<0.0001$ ), and presence of portal fibrosis ( $\rho=0.57$ ,  $P<0.0001$ ). The rs5918 polymorphism of ITGB3 is positively associated with pericellular fibrosis in a morbidly obese, diabetic with NAFLD. Since this allele has been linked to coronary artery disease (CAD), it may provide a common pathogenic pathway between NAFLD and CAD.

#### **Patient-Reported Outcomes (PROs) are Associated with Serum Analytes in Patients with Hepatitis C Virus-Genotype 1 Both Prior to and After Achieving Sustained Virologic Response**

This year, we investigated the association of circulating cytokines, growth factors, neurotransmitters, and of PROs in patients before and after treatment for HCV. Of the domains measured by PROs (physical health, mental health, and fatigue), measurements of physical health using the SF-36 revealed the greatest number of significant associations with circulating analytes in pre-treatment HCV patients. For instance, SF-36 measurements of physical functioning at baseline show modest positive correlations with circulating GABA ( $\rho=0.36$ ,  $P<0.05$ ) and TNF ( $\rho=0.31$ ,  $P<0.05$ ), while negatively correlating with circulating BDNF ( $\rho=-0.46$ ,  $P<0.05$ ). Furthermore, the SF-36 physical health summary score and measurements of bodily pain also negatively correlate with circulating BDNF at baseline ( $\rho=-0.37$ ,  $P<0.05$ , and  $\rho=-0.4$ ,  $P<0.05$ , respectively). In addition to the associations between baseline SF-36 measurements and concurrent analytes, serum serotonin at baseline was positively correlated with pre-treatment measurements of the emotional component of the CLDQ-HCV ( $\rho=0.32$ ,  $P<0.05$ ), and less fatigue as measured by the fatigue component of the FACIT-F ( $\rho=0.32$ ,  $P<0.05$ ).

Changes in the physical health scores of the SF-36, FACIT-F, and CLDQ-HCV from pre- to post-treatment are also correlated with the changes in several circulating analytes. For instance, BDNF negatively correlates with the SF-36 physical health summary score ( $\rho=-0.34$ ,  $P<0.05$ ), the SF-36 physical functioning score ( $\rho=-0.34$ ,  $P<0.05$ ), the bodily pain component of the SF-36 ( $\rho=-0.39$ ,  $P<0.05$ ), and the physical well-being component of the FACIT-F ( $\rho=-0.54$ ,  $P<0.001$ ). Not surprisingly, CCL3 also negatively correlated with SF-36 physical health summary score ( $\rho=-0.43$ ,  $P<0.01$ ), and the bodily pain component of the SF-36 ( $\rho=-0.46$ ,  $P<0.01$ ), as well as the general health component of the SF-36 ( $\rho=-0.42$ ,  $P=0.01$ ). By contrast, changes in circulating serotonin were positively correlated with the general health component of the SF-36 ( $\rho=0.36$ ,  $P<0.05$ ), the “role-physical” component of the SF-

36 ( $\rho=0.4$ ,  $P<0.05$ ), and the physical well-being component of the FACIT-F ( $\rho=0.34$ ,  $P<0.05$ ). Additional correlations between changes in circulating analytes and the physical health scores of the SF-36, FACIT-F, and CLDQ-HCV include a negative correlation between the change in circulating tryptophan and the FACIT-F physical well-being score ( $\rho=-0.34$ ,  $P<0.05$ ), a positive correlation between COMPT and the SF-36 bodily pain score ( $\rho=0.38$ ,  $P<0.05$ ), a positive correlation between TNF and the physical functioning score of the SF-36 ( $\rho=0.36$ ,  $P<0.05$ ), and negative correlations between COMT and IFNg and the systemic score from CLDQ-HCV ( $\rho=-0.36$ ,  $P<0.05$ , and  $\rho=-0.43$ ,  $P<0.01$ , respectively).

Although baseline correlations between circulating analytes and elements of the mental health domain are limited to a positive association between emotional well-being as measured by the CLDQ-HCV and circulating serotonin ( $\rho=0.32$ ,  $P<0.05$ ), changes in elements of the mental health domain are associated with changes in several of the analytes over the course of treatment. For instance, changes in emotional well-being as measured by FACIT-F are positively associated with changes in serotonin ( $\rho=0.34$ ,  $P<0.05$ ), but negatively associated with changes in GABA and BDNF ( $\rho=-0.4$ ,  $P=0.01$ , and  $\rho=-0.35$ ,  $P<0.05$ , respectively). Improvement in the FACIT-F social well-being score was associated with increasing circulating COMT and decreasing circulating TNF ( $\rho=0.42$ ,  $P=0.01$ , and  $\rho=-0.34$ ,  $P<0.05$ , respectively). Decreasing worry, as measured by the CLDQ-HCV, is associated with decreasing IDO and GABA ( $\rho=-0.34$ ,  $P<0.05$ , and  $\rho=-0.4$ ,  $P=0.01$ , respectively). Finally regarding SF-36 mental health domain measurements, improvement in role-emotional were associated with increasing COMT ( $\rho=0.34$ ,  $P<0.05$ ), and, surprisingly, changes in social functioning are associated with changes in circulating TNF ( $\rho=0.34$ ,  $P<0.05$ ).

All other significant associations with PROs at baseline or over treatment are with circulating serotonin. At baseline, higher circulating serotonin correlated with lower fatigue by FACIT-F ( $\rho=0.32$ ,  $P<0.05$ ). Over the course of treatment, increasing serotonin is linked to improvements in vitality and fatigue, as measured by the SF-36 and FACIT-F ( $\rho=0.51$ ,  $P=0.001$ , and  $\rho=0.41$ ,  $P=0.01$ , respectively). Additionally, increasing serotonin was associated with overall improvement in CLDQ-HCV score ( $\rho=0.34$ ,  $P<0.05$ ). These findings may offer insight into mechanisms of neurological complications to HCV, and could eventually lead to tools for screening and prediction.

### **Hepatic Sonic Hedgehog Protein Expression Measured by Computer Assisted Morphometry Significantly Correlates with Features of Non-Alcoholic Steatohepatitis**

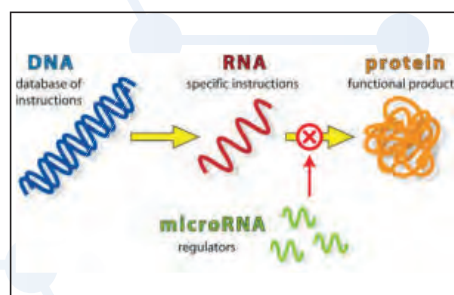
Hepatic expression of Sonic Hedgehog (SHH) is associated with non-alcoholic fatty liver disease (NAFLD) and development of non-alcoholic steatohepatitis (NASH). Hepatic SHH detection increases with the diagnosis of NASH. This pilot study was designed to confirm that staining for SHH is useful in NASH diagnosis and determine whether quantification of staining by computer assisted morphometry (CAM) can be used to assess severity of ballooning degeneration. SHH was detected by immunohistochemistry (IHC) on paraffin-embedded liver sections in subjects ( $N=69$ ) with biopsy proven NAFLD and no liver disease (control). Serum samples were also available for these subjects. Post-staining, a digitized image of the section was acquired and an area quantification algorithm was used to quantify the degree of SHH expression. Additionally, circulating M30, M65, and SHH were measured by ELISA. Notably, hepatic SHH expression correlated with histologic ballooning degeneration ( $\rho=0.62$ ,  $p<0.0001$ ), steatosis grade ( $\rho=0.554$ ,  $P<0.001$ ), Mallory-Denk bodies ( $\rho=0.54$ ,  $P<0.001$ ), pericellular fibrosis ( $\rho=0.527$ ,  $P<0.001$ ), and lymphocytic infiltration ( $\rho=0.435$ ,  $P<0.0002$ ). Additionally, hepatic SHH expression correlated with circulating M65 ( $\rho=0.588$ ,  $p<0.0001$ ), and circulating M30 ( $\rho=0.375$ ,  $p=0.001$ ), as well as AST and ALT ( $\rho=0.43$ ,  $p=0.0004$ , and  $\rho=0.27$ ,  $p=0.03$ , respectively). Further, serum M30 was almost twice as high in NASH patients compared to non-NASH ( $539.1\pm290.8$  U/L vs.  $287.6\pm190.5$  U/L;  $p=0.0002$ ), while M65 was almost three times higher in NASH patients compared to non-NASH ( $441.2\pm464.2$  U/L vs.  $162.8\pm353.1$  U/L;  $P=0.0006$ ). Logistic modeling indicates hepatic SHH expression and presence of type 2 diabetes as independent predictors of advanced fibrosis (defined as portal and pericellular fibrosis  $>2$ : OR=1.986,  $p=0.01$ , and OR= 3.280,  $p=0.03$ , respectively). Thus, our findings show quantitation of SHH expression by CAM can provide a tool for quantifying changes in hepatocyte injury and assist in unambiguous staging/grading of NASH. Our study showed minimal interobserver variability using CAM based quantification. Once validated, CAM assessment of hepatic SHH could benefit clinical trials or long term outcomes studies of NASH subjects.

## Azza Karrar, PhD

Projects on immune dysregulation of non-alcoholic fatty liver disease (NAFLD) is an area of research started in 2012 and is led by Azza Karrar, PhD. Dr. Karrar has several years of experience working on immunopathology of liver disease. The significance of these projects is that they may reveal new pathogenic pathways that may influence individualized patient response, which will ultimately improve personalized medicine. Some of the main projects we focused on in 2017 are as follows:

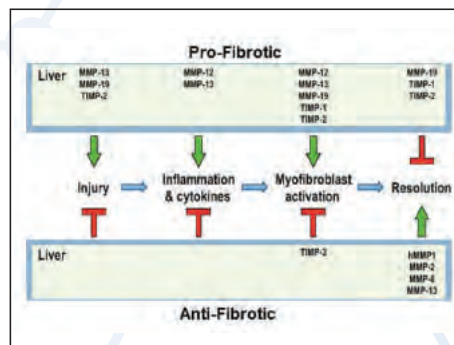
### Signature of microRNA (miR) in NAFLD Patients with Higher Percentage of Hepatic Collagen: A Potential Role for a Prognostic Biomarker and Regulators of Pathways Crucial of Hepatic Fibrosis

Liver biopsy is currently the only reliable tool for the staging of liver fibrosis; therefore there is an urgent need for non-invasive serum biomarkers for accurate assessment of fibrosis. Stage of hepatic fibrosis caused by collagen deposition is the only independent histologic predictor of mortality. miRs are gene regulators of inflammation and fibrosis. Emerging evidence suggests a role for miR dysregulation in the pathogenesis of NAFLD and specific miRs profiles are associated with NAFLD. Our aim was to assess miR signature expression in sera and liver tissue associated with percent collagen. Using next generation sequencing (HTG EdgeSeq), we have identified biologically relevant miR signature that can segregate NAFLD according to the presence of high and low hepatic collagen deposition. Furthermore, these miRNAs are the direct regulator pathways that are crucial in determining the outcomes of hepatic fibrosis. These results indicate involvement of miRs in the pathogenesis of NAFLD-related fibrosis and their potential role as biomarkers to predict high hepatic collagen deposition (significant fibrosis), the most important prognostic factor in NAFLD. Furthermore, we have revealed a unique hepatic miR signature that functions as a regulator for genes involved in cell survival and apoptosis, as well as, metabolic functions (lipid and glucose pathways). Overall, these data strongly suggest that alterations in miR-mediated post-transcriptional regulation could be a mechanism contributing to mRNA expression deregulation in non-alcoholic steatohepatitis (NASH)-related fibrosis indicating they are promising therapeutic targets of fibrosis in NASH.



### Hepatokines, Metalloproteases and Their Inhibitors Provide Predictive Assessment for Liver Fibrosis in NAFLD

Liver fibrosis is caused by major changes in the quantity and quality of the extracellular matrix (ECM) of the liver. As liver fibrosis increases, there is an expression of matrix metalloproteinases (MMPs) and their inhibitors (TIMPs), contributing to the back and forth progression and regression of fibrosis. Liver affects lipid and glucose metabolism by altered hepatokines production which may play a role in the pathogenesis of NAFLD. For many clinicians and diagnosticians, non-invasive serum biomarkers have provided an alternative diagnostic procedure for liver biopsy. Our aim was to evaluate for liver fibrosis using hepatokines and the ECM direct biomarkers (MMPs and TIMs). Using multiplex assays and ELISA, our results have shown MMP2, MMP7, MMP 9, and PCIII were associated with NASH. Feutin-A, RBP-4, MMP2, and MMP 9 were associated with hepatic fibrosis. In fact, MMP-2, RBP-4, and TIMP-2 remained associated with fibrosis with an area under the curve of (AUC) 0.875. MMP-2 is expressed during NAFLD-related fibrosis and cirrhosis and TIMP-2, which is known to inhibit MMPs, is also found in our study to be produced during fibrosis. This production of TIMP-2 may prevent liver remodeling and recovery from fibrosis. The interplay between MMPs and TIMP during NAFLD-related fibrosis may be detrimental factor for the hepatic fibrosis resolution / progression.





**Rohini Mehta, PhD**

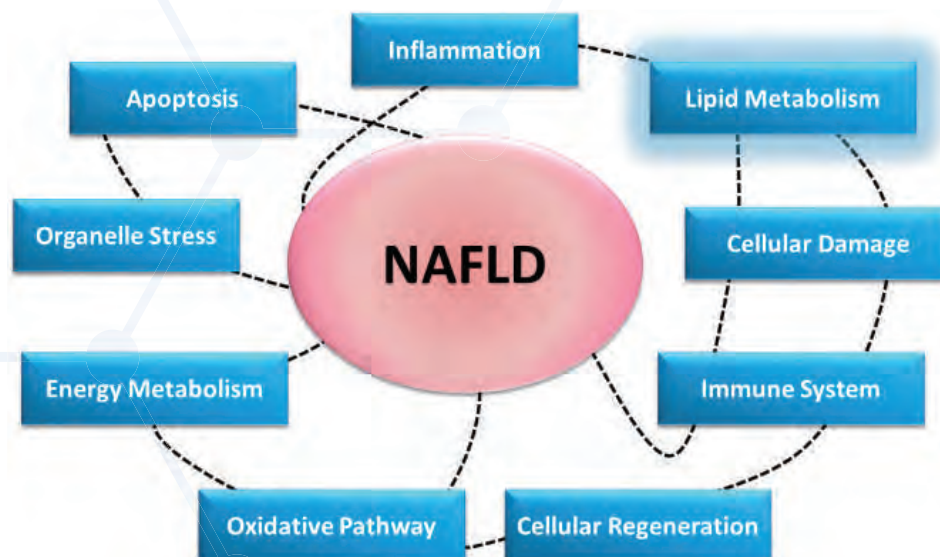
## **Mitochondria as a Predisposing Factor for Progressive Non-Alcoholic Fatty Liver Disease (NAFLD)**

Mitochondrial response to energy requirements is dynamic involving altered mitochondrial DNA mass and gene expression. Methylation of DNA often contributes to transcriptional silencing. Because changes in mtDNA affect the integrity, assembly, and operation of the mitochondrial respiratory chain, it is conceivable that methylation of mitochondrial DNA can dynamically regulate mitochondrial function. Further, mtDNA represents one of the most informative systems for inter- and intra-specific study of human genetic diversity. The existence of hypervariable sites (sites that evolve at a rate much faster than average) in the non-coding human mtDNA control region has been well documented in human mtDNA. Given the role of mitochondria in metabolic pathways, we are investigating the mitochondrial genetic variation as well as changes in mitochondrial function via DNA methylation and / or DNA amounts as a predisposing factor in metabolic diseases and fibrotic non-alcoholic steatohepatitis (NASH).

## **Detecting Chromosomal Number Abnormalities in Patients with Fibrotic NASH by In-Situ Hybridization (ISH)**

Polyploidy (containing more than two paired sets of chromosomes) in the liver is extensively described in many vertebrate species, including humans, rats, and mice. Since most hepatocytes become polyploid in the postnatal period when growth and regeneration are ongoing, the overall result is that most hepatocytes are aneuploidy (presence of an abnormal number of chromosomes in a cell). Aneuploidy in the liver is pervasive, affecting 60% of hepatocytes in mice and 30% - 90% of hepatocytes in humans. Does liver utilize polyploidy mechanisms to adapt to chronic injury? Could polyploidy afford resistance to cellular and tissue damage and thus be protective against fibrosis? Specific gains and losses of chromosomes harboring injury-resistance alleles in normal, non-transformed hepatocytes may render them differentially resistant to chronic insults, such as viral hepatitis as well as alcohol- and fat-induced hepatitis. New evidence suggests that random hepatic aneuploidy can promote adaptation to liver injury. For instance, in response to chronic liver damage, subsets of aneuploid hepatocytes that are differentially resistant to the injury remain healthy, regenerate the liver, and restore function. The hypothesis is, hepatotoxic insults (high lipid, high glucose, inflammation, etc.) selects for hepatocytes with aneuploidy, rendering them resistant to injury. Thus, aneuploidy may be a pro-adaptive and protective mechanism.

**Figure 1: Pathways in NAFLD.** There are several pathways with extensive crosstalk amongst them that are known to be involved in NAFLD.



## BEATTY LIVER & OBESITY RESEARCH PROGRAM – TEAMS

### CLINICAL TRANSLATIONAL RESEARCH TEAM

The collection of biological specimens and clinical data remains the most important part of the ongoing lab projects in clinical and translation research. In 2017, the team enrolled over 132 subjects across three active protocols and collected close to 3,600 biological samples. Specimens include serum, plasma, and whole blood. Since last year, research efforts have focused on subjects diagnosed with Non-Alcoholic Fatty Liver Disease (NAFLD) or Non-Alcoholic Steatohepatitis (NASH). Along with the collection of biological specimens, these subjects also undergo research ultrasounds to measure the amount of steatosis in their liver. These subjects are enrolled through the translational research protocol, which focuses on subjects with chronic diseases, along with healthy controls who are not diagnosed with a chronic disease. Along with subjects diagnosed with NAFLD or NASH, subjects also consist of obese patients undergoing bariatric surgery, individuals diagnosed with chronic kidney disease, or individuals diagnosed with another chronic liver disease such as hepatitis C virus (HCV) or hepatitis B virus (HBV).

A separate protocol in place assesses the molecular relationship between NAFLD and coronary artery disease. Subjects are enrolled prior to undergoing a cardiac catheterization and subsequently have biological samples collected during the procedure. Lastly, there is a protocol in place that examines response to treatment of hepatitis C as well as quality of life. Subjects have research visits throughout their treatment and follow-up.



We have currently enrolled 3,000 subjects across all of our protocols. This has resulted in over 60,000 samples collected which are stored in ten freezers located in our biorepository.

Members of the team include: Zahra Younoszai (Program Manager); Thomas Jeffers (Program Manager); and Sean Felix (Research Project Associate)



**James N. Cooper, MD**



**Nila Rafiq, MD**

### CLINICAL TRIALS RESEARCH TEAM

The clinical trials team is led by our investigators, James Cooper, MD and Nila Rafiq, MD. The team has successfully conducted numerous phase II and phase III clinical trials over the past year with our main focus being non-alcoholic steatohepatitis (NASH). Our studies are currently using medications that may improve fibrosis measures and potentially result in a resolution of NASH. Currently, there are no approved therapies for treating NASH so there is a great need for more research in this area.

Members of the team include: James Cooper, MD (Principal Investigator); Nila Rafiq, MD (Investigator); Rebecca Cable (Clinical Research Associate Lead); Huong Pham (Clinical Research Associate); and Mariam Afendy (Clinical Research Associate)

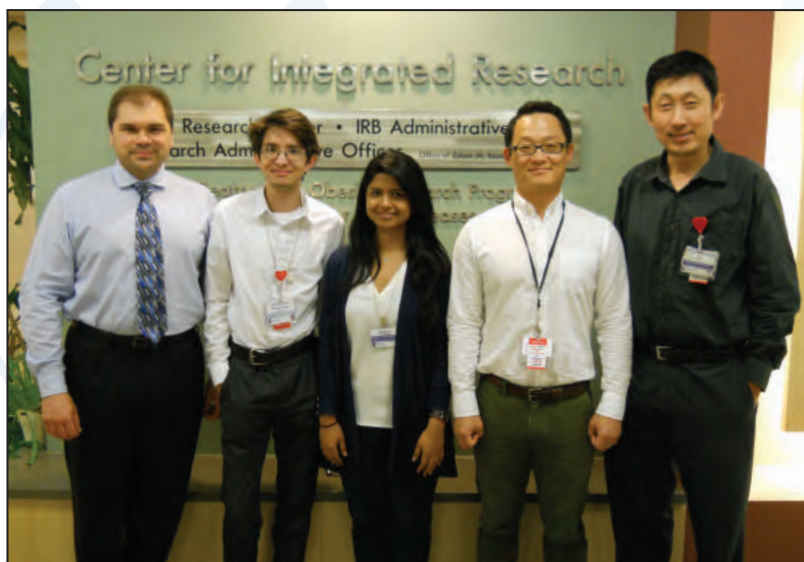


## BEATTY LIVER & OBESITY RESEARCH PROGRAM – TEAMS

### DATABASE AND DATA ANALYSIS TEAM

The database and data analysis team includes database administrators, statisticians, and research investigators who work to support the Beatty Liver & Obesity Research Program (BLORP) data initiatives, as well as, the Department of Medicine (DOM) research endeavors.

The database administrators have developed many new processes and databases providing new opportunities for improved data control and availability. In addition to the integrated clinical and genomics specimen data system that supports all liver and obesity research, the senior database administrator integrated new DNA laboratory testing results to enhance research data availability and compatibility. Finally, there is continuous collaboration with DOM on creating the DOM dashboard / database applications that the administrators, clinicians, and staff utilize for quality or research. Lastly, the database and data analysis team is further developing the post-database applications and data processes for all databases including the publications database that supports the tracking of all presentations and publications.



The database and data analysis team also includes the biostatistics specialists that are responsible for validating, processing, analyzing, and reporting against a wide range of biomedical datasets for both BLORP and the DOM. They also interface with the scientists to develop data analysis protocols, methodology, and apply data management and quality surveillance. They are responsible for the development of statistical analysis methods, bioinformatics algorithms, data mining techniques, data design implementation, annotation of programming code for data analysis, and provide interpretation and presentation of the results of analysis of biomedical data as needed. Furthermore, they each specialize

in epidemiological research using national health surveys or health care data such as the National Health and Nutrition Examination Survey (NHANES), Nationwide Inpatient Sample (NIS), and Medicare databases, as well as, the national cancer database, Surveillance, Epidemiology, and End Results (SEER). Their efforts have resulted in co-authorship in numerous published manuscripts and abstract presentations. In collaboration with the statisticians, our research investigator works with the physicians in designing research studies, analyzing the clinical data, describing the results, and writing the manuscripts. The team also supports large pharmaceutical Patient Reported Outcomes (PROs) investigations that have earned national and international recognition for these endeavors.

Members of the team include: Andrei Racila (Informatics Manager); James Paik (Biostatistician); Yun Fang (Database Administrator); Maria Stepanova, PhD (Consultant); Linda Henry, PhD (Consultant); Sharon Hunt (Consultant); Masoom Priyadarshini (Health Economics Research Associate); and Wisna'odom Keo (Consultant)



## BEATTY LIVER & OBESITY RESEARCH PROGRAM – TEAMS



### LIVER PATHOLOGY RESEARCH

**Zachary Goodman, MD, PhD**

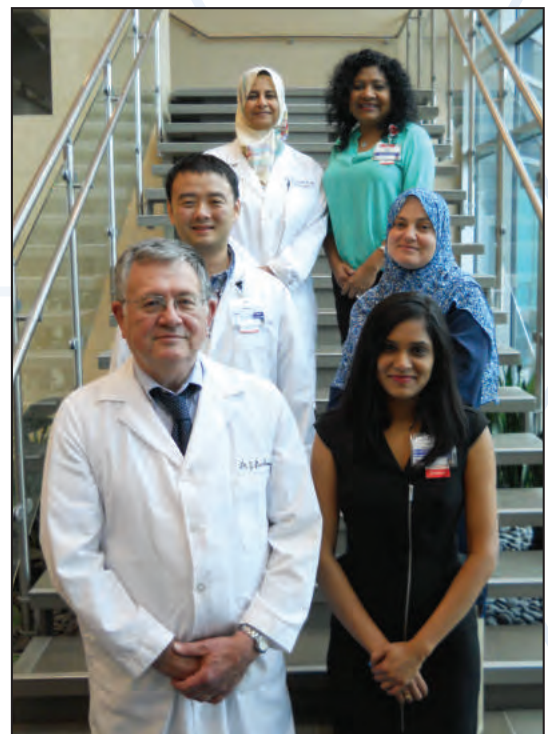
**Director of Liver Pathology Research**

The Liver Pathology Research Team conducts investigations into the pathogenesis of chronic liver diseases. The team supports the activities of the Beatty Liver & Obesity Research Program and other programs by providing an accurate assessment of patient material from participants in translational research and clinical trials. It collaborates with other academic institutions and industry as the central pathology site in multicenter clinical trials. Techniques employed include qualitative and quantitative histopathologic assessment of liver and adipose tissue, immunohistochemistry for identification of tissue components, and computer-assisted morphometry for quantification of targeted tissue components.

Members of the team include: Zachary Goodman, MD, PhD (Pathologist); Hala Abdul-AI, MD, PhD (Pathologist); Fanny Monge (Program Manager); Lakshmi Alaparthy (Image Analysis Scientist); Daisong (Albert) Tan (Research Project Associate); and Hala Abdelaal (Research Project Associate)

Current projects include:

- 1) Evaluation of hedgehog signaling as a marker of hepatocellular injury in nonalcoholic fatty liver disease
- 2) Identification of hepatic and adipose tissue inflammatory cells in nonalcoholic fatty liver disease
- 3) Quantitative criteria for liver biopsy adequacy in nonalcoholic fatty liver disease
- 4) Multicenter trial of selonsertib as treatment for nonalcoholic fatty liver disease
- 5) Multicenter trial of BMS-986263 as a potential antifibrotic agent in post-transplant patients with sustained virological response after recurrence of hepatitis C
- 6) Multicenter trial of BMS-986036 as treatment for nonalcoholic fatty liver disease
- 7) Multicenter trial of emricasan as treatment for nonalcoholic fatty liver disease
- 8) Multicenter trial of cenicriviroc as treatment for nonalcoholic fatty liver disease
- 9) Multicenter trial of seblipase alfa as treatment for congenital lysosomal acid lipase deficiency
- 10) Multicenter trial of obeticholic acid as treatment for nonalcoholic fatty liver disease
- 11) Multicenter trial of tropifexor as treatment for nonalcoholic fatty liver disease





## BEATTY LIVER & OBESITY RESEARCH PROGRAM – TEAMS

### OUTCOMES RESEARCH PROGRAM

The goals and objectives of the Outcomes Research Program of the Center for Integrated Research are to investigate contributors to functional outcomes important to patients with liver disease and obesity. These measures are utilized to determine an individual's performance, perception, and overall quality of life as they pertain to general human physical, social, and psychological activities.

Members of the Outcomes Research Program are performing clinical research in two major areas. The first area is to explore fatigue from the perspective of how the patient is doing, including their activities and their perception of how it impacts their lives. Active protocols permit recruitment of participants for study with several different chronic liver diseases (CLD) such as hepatitis C, B and non-alcoholic liver disease. Goals of these studies are to measure performance, patient experiences of daily routines and assessments of quality of life, and serum markers. We



measure these to learn whether there are metabolic or inflammatory problems associated with CLD. We have identified two types of fatigue. One is associated with physical activity (peripheral fatigue) and the other relates to motivation and the ability to concentrate (central fatigue). For patients with hepatitis C, there is evidence of both. Both improve with eradication of the virus, but there are some whose fatigue persists and we continue to study who is likely to have persistent fatigue and who does not. In patients with obesity and fatty liver, physical fatigue is more prevalent and seems to be related to how well people can metabolize glucose and convert it to energy.

The second area of investigation is trying to understand which approaches are successful in helping people achieve lifestyle changes. Behavioral change is one of the most significant challenges for the healthcare community. We have devised a clinical trial that uses a personalized method that incorporates a unique educational and problem solving approach to nutritional management and an activity-based approach to exercise that teaches patients to target heart rate in the moderate range. We are studying the health benefits of this approach, as well as, the efficacy of assuring long-term commitment to exercise.



In addition to the two major areas of clinical research, the team was awarded with a five year sub-award (2016 – 2021) from the American Institutes for Research (AIR), which is a part of the Department of Health and Human Services grant to study aspects of

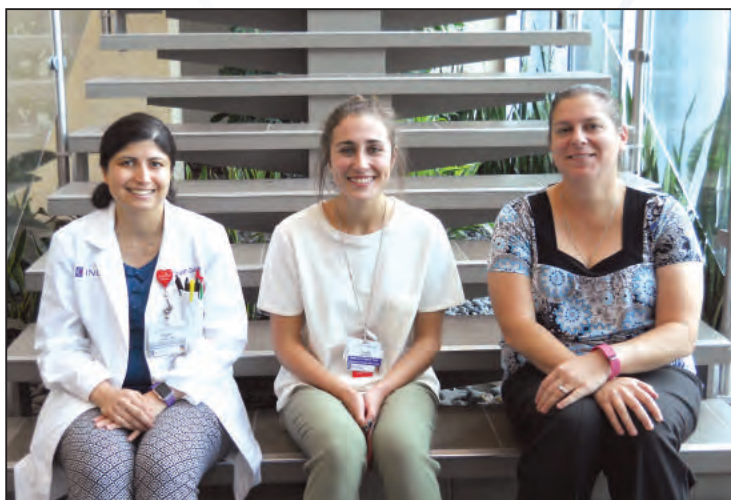
knowledge translation (KT) in the national Model Systems program. This program supports research and care delivery to patients with burn, traumatic brain, and spinal cord injuries. The research focus in this project is to determine how the research and care contributions promote their translation into clinical practice, and will the Model Systems program increase the publication of information relevant to the needs of stakeholders.

Members of the team include: Lynn Gerber, MD (Director of Research); Ali Weinstein, PhD (Research Medical Psychologist); Carey Escheik (Program Manager); Jillian Price (Program Manager); Patrick Austin (Clinical Research Associate); and Haley Bush (Research Consultant)

## BEATTY LIVER & OBESITY RESEARCH PROGRAM – TEAMS

### MENTAL / EMOTIONAL HEALTH PROGRAM

The Mental / Emotional Health Program (MEHP) is led by Ali Weinstein, PhD, and focuses on improving the quality of life, reducing morbidity, and increasing function in patients with chronic hepatitis C and non-alcoholic fatty liver disease (NAFLD). In September 2017, the team launched its first active clinical protocol investigating cognitive performance and quality of life in those with NAFLD. Since then, they have enrolled a total of 21 subjects, implemented 252 validated neurocognitive tests, and administered 100 patient-reported outcome (PRO) questionnaires. In addition to NAFLD, the protocol consists of subjects with type 2 diabetes mellitus (T2DM), those with both NAFLD and T2DM, and those without either diagnosis (healthy controls) for comparison. Cognitive domains of interest include attention, psychomotor speed, executive function, and learning and memory.



A separate protocol examines patient reported outcomes (PROs) and neurocognitive performance in patients with hepatitis C virus (HCV). Despite improvements in treatment with direct-acting antivirals (DAAs), psychiatric manifestations (i.e., fatigue, depression, anxiety) still persist in HCV patients that achieve sustained virologic response (SVR). In order to define the phenotypes of mental, emotional, and cognitive dysfunction (MECD), the MEHP is utilizing neurocognitive performance, clinical, PRO, and serum data from an anti-HCV clinical trial. Associations are measured pre- and post-virus clearance. With the help from our scientists and outcomes program, the team presented its preliminary findings at two

international liver conferences: the American Association for the Study of Liver Diseases (AASLD) and the European Association for the Study of Liver Disease (EASL).

Members of the team include: Ali Weinstein, PhD (Program Lead); Leyla de Avila (Program Manager & Research Project Associate); and Pegah Golabi, MD (Research Fellow)



## BEATTY LIVER & OBESITY RESEARCH PROGRAM – TEAMS

### ULTRASOUND AND ELASTOGRAPHY RESEARCH

The Department of Medicine team is supported by providing ultrasound and FibroScan exams.

These are non-invasive radiologic techniques to assess fatty liver disease and hepatic fibrosis.

This relies on the assessment of liver stiffness (fibrosis) by the velocity of transmission of a shear wave through the liver tissue.

Ultrasound elastography, commercially known as FibroScan® is a useful exam and can be performed on almost any patient in whom a clinician wishes to stage liver fibrosis. This is done by using a modified ultrasound probe to measure the velocity of a shear wave created by a vibratory source and that estimates the stiffness of the liver and correlation with fibrosis staging. FibroScan exams were performed with almost 100% accuracy.

Number of exams performed in 2017:

- 262 FibroScans
- 179 Ultrasounds

Members of the team include: Hussain Allawi, ARDMS (Clinical Research Associate); and Brian Lam, PA-C (Physician Assistant).





## BEATTY LIVER & OBESITY RESEARCH PROGRAM GROUP PHOTO





## ADVANCED LUNG RESEARCH PROGRAM



### THE INOVA ADVANCED LUNG DISEASE AND TRANSPLANT PROGRAM

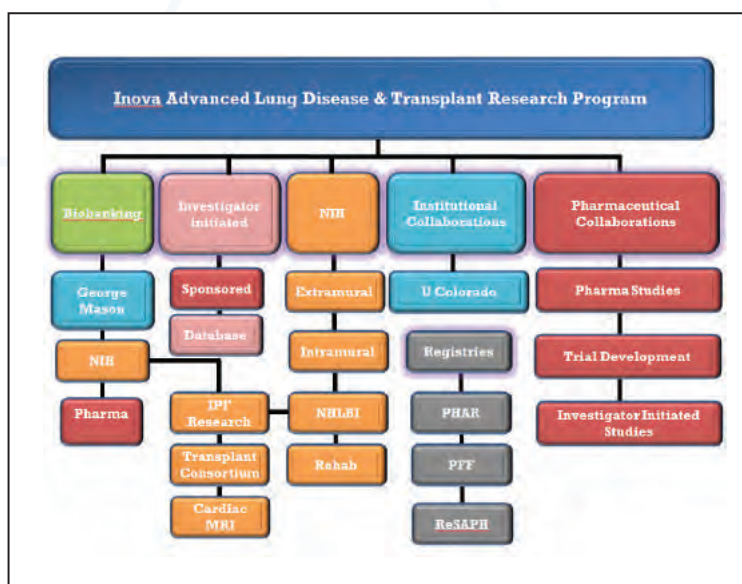
**Steven Nathan, MD**

**Medical Director of Transplant Lung**

The Inova Advanced Lung Disease and Transplant Program enjoyed another very successful and productive research year in 2017. Our academic productivity included the publication of 7 original research manuscripts, 12 review articles, 3 book chapters and 40 abstracts to international meetings. These included 5 presentations at the International Society for Heart and Lung Transplantation (San Diego, CA in April 2017), 27 presentations at the American Thoracic Society Meeting (Washington, DC in May 2017), 3 at the European Respiratory Society Meeting (Milan, Italy in September 2017), and 5 at the American College of Chest Physicians Meeting (Toronto, Canada in October 2017). Our team members also delivered 9 presentations at national and international conferences. Our research activities include: traditional pharmaceutical studies, collaborative efforts with other renowned academic institutions, blood and tissue banking, and National Institutes of Health (NIH)-sponsored research. All of this kept our investigators, 6 clinical research coordinators and research assistant very busy.

Our major areas of interest continue to be idiopathic pulmonary fibrosis (IPF), pulmonary hypertension (PH), PH related to interstitial lung disease, cystic fibrosis (CF), non-CF bronchiectasis, sarcoidosis, and lung transplantation. We participate in multiple registries and are one of the highest enrolling sites in the Pulmonary Fibrosis Foundation and ReSAPH (sarcoidosis-PH) registries.

We have residents and fellows rotate with us on our clinical service, many of whom also participate in our research. In addition, we have a competitive summer student program and accept both high schoolers and college students who are introduced to and engage in research projects. Many of these projects culminate in an abstract, and in some cases are developed into formal research manuscripts.



Members of the team include: Melissa Bowen (Pre-transplant and CF Coordinator); Jennifer Cumberland (Clinical Tech); Denise Lewis (PH and Lead Nurse Coordinator); Serina Zorilla (Research Coordinator); Priscilla Dauphin (Research Coordinator); Brenna Cannon (Research Assistant); Latoya Albergott-Barnes (Nurse Coordinator); Tina Thronson (Quality Manager); Jane Harrison (Lead Social Worker); Leah Papazian (Dietician); Astrid "Julieth" Munoz (Admin Assistant); Elizabeth Davies (Social Worker); Lori Hill (Financial Coordinator); Melany Llanos (PH Administrative Assistant); Karen Brown (PH Coordinator); Edwinia Battle (Research Manager); Angela Scully (ALD Coordinator); Merte Lemme (Research Coordinator); Andrea Grajeda (Patient Registration); Rodrick Likonko (Financial Coordinator); Adam Cochrane (Transplant Pharmacist); Sarah Scott (Office Manager); Michelle Schreffler (Nurse Coordinator); Lauren Marinak (Nurse Practitioner); Meg Fregoso (Nurse Practitioner); Oksana Shlobin, MD; Linda Bogar, MD; Steven Nathan, MD; Whitney Brown, MD; Shambhu Aryal, MD; and Kareem Ahmad, MD

## ADVANCED LUNG RESEARCH PROGRAM GROUP PHOTO



### Departmental Academic Productivity

One of the most important outcomes of an academically active department is the number of high-caliber publications and presentations that are generated by the members of the department. Authorship, especially first or senior authorship of articles published in peer-reviewed, high-impact journals, provide validity of the academic standing of the department and its members. Additionally, research presentations to national and international scientific meetings will bring immense recognition to the department, the faculty, and the institution. Finally, delivering faculty lectures during these international meetings is a great honor that recognizes our faculty as the top leaders in their fields. This productivity is not only invaluable to the department, but also brings great value to Inova Health System.

Members of the Department of Medicine enjoyed tremendous success and academic productivity by publishing articles in high-impact journals and presenting their research to a number of international meetings. Furthermore, a number of our faculty had opportunities to discuss their research findings in the media. Also, a number of members of our department were listed as top doctors in their fields by the U.S. News and World Report. Finally, our faculty served on the editorial board of several important journals. In fact, Zobair Younossi, MD is now a co-editor of Liver International which is the official journal of the International Association for the Study of the Liver (IASL).

## DEPARTMENTAL ACADEMIC PRODUCTIVITY

### BEATTY LIVER & OBESITY RESEARCH PROGRAM PUBLISHED MANUSCRIPTS

- 1) Zobair M Younossi, Maria Stepanova, Masao Omata, Masashi Mizokami, Mercedes Walters, Sharon Hunt. Health utilities using SF-6D scores in Japanese patients with chronic hepatitis C treated with sofosbuvir-based regimens in clinical trials., *Health and Quality of Life Outcomes*. *Health Qual Life Outcomes*. 2017 Jan 31;15(1):25. doi: 10.1186/s12955-017-0598-8.
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- 3) Zobair M Younossi, Maria Stepanova, Linda Henry, Andrei Racila, Brian P. Lam, Huong T. Pham, Sharon Hunt. A Disease-Specific Quality of Life Instrument for Non-alcoholic Fatty Liver Disease and Non-alcoholic Steatohepatitis: CLDQ-NAFLD, *Liver International*. *Liver Int*. 2017 Feb 17. doi: 10.1111/liv.13391. [Epub ahead of print].
- 4) Zobair M Younossi, Maria Stepanova, Rafael Esteban, Ira M. Jacobson, Stefan Zeuzem, Mark S. Sulkowski, Linda Henry, Fatema Nader, Rebecca Cable, Mariam Afendy, Sharon Hunt. Superiority of Interferon-Free Regimens for Chronic Hepatitis C: The Effect on Health-Related Quality of Life and Work Productivity, *Medicine*. *Medicine* (Baltimore). 2017 Feb;96(7):e5914. doi: 10.1097/MD.0000000000005914.
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### BEATTY LIVER & OBESITY RESEARCH PROGRAM ACCEPTED ABSTRACTS AND PRESENTATIONS

- 1) Michael P. Curry, Bruce R. Bacon, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. Utilization of sofosbuvir/velpatasvir in genotype 2-6 HCV: Real-world experience from the TRIO Network, European Association for the Study of the Liver.
- 2) Zobair M Younossi, Azza Karrar, Kira Tokarz, Anatoly Ulyanov, Maria Stepanova, Zahra Younoszai, Thomas Jeffers, Sean C. Felix, Daisong Tan, Ahmad Moin, Ramaswamy Iyer, John Deeken, Zachary Goodman. Signature of Circulating microRNA (miR) Detected by NextSeq Differentiates Non-alcoholic Fatty Liver Disease (NAFLD) Patients with Higher Percentage Hepatic Collagen: A Potential Role for A Prognostic Biomarker, American College Gastroenterology. Orlando, Florida October 10, 2017.
- 3) Zobair M Younossi, Maria Stepanova, Masao Omata, Masashi Mizokami, Henry Lik-Yuen Chan, Mei Hsuan Lee, Ming-Lung Yu, Yock Young Dan, Moon Seok Choi, Young-Suk Lim, Issah Younossi, Sharon Hunt. The Impact of all Oral Regimen Ledipasvir/Sofosbuvir (LDV/SOF) On Patient-reported Outcomes (PROs) of Asian Patients with Chronic Hepatitis C (CHC), Asian Pacific Association for the Study of Liver. Shanghai, February 18, 2017.
- 4) Zobair M Younossi, Maria Stepanova, Zachary Goodman, Eric Lawitz, Michael R. Charlton, Rohit Loomba, Sharon Hunt. Improvement of hepatic fibrosis in patients with non-alcoholic steatohepatitis treated with selonsertib is associated with improvement of patient-reported outcomes (PROs), European Association for the Study of the Liver. Amsterdam, Netherlands, April 21, 2017.
- 5) Michael P. Curry, Bruce R. Bacon, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. SOFOSBUVIR/VELPATASVIR IN GENOTYPE 2-6 HCV: REAL-WORLD EXPERIENCE FROM THE TRIO NETWORK, Digestive Disease Week.
- 6) Zobair M Younossi, Atsushi Tanaka, Yuichiro Eguchi, Linda Henry, Rachel Beckerman, Masashi Mizokami. Treatment of Hepatitis C Virus Leads to Economic Gain Related to Reduction in Cases of Hepatocellular Carcinoma (HCC) in Japan, American Association for the Study of Liver Diseases.
- 7) Zobair M Younossi, Maria Stepanova, Edward J. Gane, Ira M. Jacobson, David R. Nelson, Ashley S. Brown, Issah Younossi, Linda Henry. Significant and Sustained Improvement of Health-Related Quality of Life (HRQL) Scores in Patients with Hepatitis C (HCV) and Sustained Virologic Response (SVR), American Association for the Study of Liver Diseases.
- 8) A Shaw, Rohini Mehta, Munkhzul Otgonsuren, Aybike Bircerdinc, Vikas Chandhoke, Zobair M Younossi. Haplotype analysis of the RAGE gene: identification of a haplotype marker for non-alcoholic steatohepatitis (NASH)., Digestive Disease Week. McCormick Place, Chicago, IL, May 8, 2017.
- 9) Zobair M Younossi, Maria Stepanova, Ira M. Jacobson, Stefan Zeuzem, Marc Bourliere, Graham R. Foster, Stuart Roberts, Tarik Asselah, Alexander Thompson, Edward J. Gane, Bernard Willems, Eric Lawitz, Stuart C. Gordon, Michael Manns, K. Rajender Reddy, Curtis L. Cooper, Steven L. Flamm, Kris V. Kowdley, Sharon Hunt. Sofosbuvir/Velpatasvir (SOF/VEL) with or without Voxilaprevir (VOX) is Associated with Excellent Efficacy and Significant Improvements of Patient-Reported Outcomes (PROs) During Treatment and after Achieving Sustained Virologic Response (SVR), Digestive Disease Week. McCormick Place, Chicago, IL, May 8, 2017.



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- 10) Zobair M Younossi, Aybike Birerdinc, Azza Karrar, Mariaelena Pierobon, Zahra Younoszai, Thomas Jeffers, Sean C. Felix, Maria Stepanova, Jeiran Kianoush, Alex Hodge, Fanny Monge, Lakshmi Alaparthi, James M. Estep, Dinan Abdelatif, Vikas Chandhoke, Zachary Goodman, Emanuel F. Petricoin. Pathway Analysis of Serum Analytes and Phosphorylated Proteins and their Involvement in Regulatory Pathways in Patients with Non-alcoholic Steatohepatitis (NASH), Digestive Disease Week. McCormick Place, Chicago, IL, May 9, 2017.
- 11) Pegah Golabi, Omer Shahab, Maria Stepanova, Mehmet Sayiner, Stephen C. Clement, Zobair M Younossi. Long-Term Outcomes of Diabetic Patients with Non-alcoholic Fatty Liver Disease (NAFLD), American Association for the Study of Liver Diseases.
- 12) Stuart C. Gordon, Aijaz Ahmed, Sammy Saab, Douglas T. Dieterich, Robert John Wong, Marcelo Kugelmas, Kimberly Brown, Zobair M Younossi. Health Outcomes Associated with Sofosbuvir-based Single-Tablet Regimens for Initial and Re-treatment of Chronic Hepatitis C in the US, American Association for the Study of Liver Diseases.
- 13) Zobair M Younossi, Maria Stepanova, Thomas Saenz, Gayle Cooper, Christa Schmidt, Steve Petrucci. A National Survey of Physicians Regarding Non-alcoholic Fatty Liver Disease (NAFLD), Non-alcoholic Steatohepatitis (NASH): The Disease and Clinical Trial Awareness Program for NASH, American Association for the Study of Liver Diseases.
- 14) Zobair M Younossi, Maria Stepanova, Nila Rafiq, Pegah Golabi, Leyla de Avila, Fanny Monge, Zachary Goodman. Non-alcoholic steatofibrosis is independently associated with both overall mortality and liver-related mortality in patients with non-alcoholic fatty liver disease (NAFLD), European Association for the Study of the Liver.
- 15) Naoky Tsai, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Zobair M Younossi, Nezam H. Afdhal. UTILIZATION OF DAA THERAPIES LEDIPASVIR/SOFOSBUVIR AND SOFOSBUVIR/VELPATASVIR IN PATIENTS WITH GENOTYPE 1 HCV: REAL-WORLD EXPERIENCE FROM THE TRIO NETWORK, Digestive Disease Week.
- 16) Aybike Birerdinc, Azza Karrar, Elzafir Elsheikh Abdelrahman, Rohini Mehta, James M. Estep, Mariaelena Pierobon, Maria Stepanova, Leo Druker, Jeiran Kianoush, Alex Hodge, Fanny Monge, Lakshmi Alaparthi, Dinan Abdelatif, Zachary Goodman, Emanuel F. Petricoin, Zobair M Younossi. The Molecular Crosstalk Between Hepatic Tissue and Visceral Adipose Tissue in Patients with Obesity-related Non-Alcoholic Fatty Liver Disease (NAFLD): The Interactions Between Inflammation and Immune Activation, Digestive Disease Week. McCormick Place, Chicago, IL, May 8, 2017.
- 17) Cameron T. Locklear, Pegah Golabi, Natsu Fukui, Leyla de Avila, Munkhzul Otgonsuren, Mariam Afendy, Rebecca Cable, Zobair M Younossi. Psoriasis is Independently Associated with Non-alcoholic Fatty Liver Disease, Digestive Disease Week. McCormick Place, Chicago, IL, May 9, 2017.
- 18) Pegah Golabi, Munkhzul Otgonsuren, Daisong Tan, Leyla de Avila, Cameron T. Locklear, Natsu Fukui, Aimal Arsalla, Trevor Gogoll, Zobair M Younossi. Are there Different Predictors of Mortality in Lean and Obese/Overweight Patients with Non-alcoholic Fatty Liver Disease (NAFLD)?, Digestive Disease Week. McCormick Place in Chicago, IL, May 8, 2017.
- 19) Natsu Fukui, Pegah Golabi, Cameron T. Locklear, Alita Mishra, Munkhzul Otgonsuren, Puneetinder Mann, Chapy Venkatesan, Zobair M Younossi. Demographics, Resource Utilization and Outcomes of Patients with Chronic Liver Disease Receiving Hospice Care in the United States, Digestive Disease Week. McCormick Place, Chicago, IL, May 9, 2017.

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- 20) Naoky Tsai, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Zobair M Younossi, Nezam H. Afdhal. Utilization of DAA therapies ledipasvir/sofosbuvir and sofosbuvir/velpatasvir in patients with genotype 1 HCV: Realworld experience from the TRIO Network, European Association for the Study of the Liver.
- 21) Mitchell L. Shiffman, Mohammad S. Siddiqui, Tawfik Khoury, Stuart C. Gordon, Gadi Lalazar, Adrian Reuben, Arthur McCullough, K. Rajender Reddy, F Poordad, Zobair M Younossi, John M. Vierling, Alexander Fich, Eli Zuckerman, Yaron Ilan, Arun J. Sanyal. The point of care 13C-Methacetin Breath Test predicts risk of long-term liver-related death or transplantation in patients with chronic liver disease: A sensitive, noninvasive monitoring tool in clinical hepatology, European Association for the Study of the Liver.
- 22) Zobair M Younossi, Maria Stepanova, Harry Janssen, Kosh Agarwal, Mindie H. Nguyen, Edward J. Gane, Naoky Tsai, Issah Younossi, Sharon Hunt. The impact of treatment of chronic hepatitis B (CHB) on patient-reported outcomes (PROs), American Association for the Study of Liver Diseases.
- 23) Chizoba Nwankwo, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. Impact of treatment duration and ribavirin (RBV) addition on real-world effectiveness of elbasvir/grazoprevir (EBR/GZR) in select patient subgroups with Genotype 1 (GT1) Chronic Hepatitis C (HCV): Retrospective data analyses from the Trio Network., American Association for the Study of Liver Diseases.
- 24) Azza Karrar, Sara Kim, Matin Mohammad, Sreya Addanki, Dinan Abdelatif, Daisong Tan, Maha Hassan, Tasneem Shaikh, Sean C. Felix, Zahra Younoszai, Thomas Jeffers, Munkhzul Otgonsuren, Zachary Goodman, Zobair M Younossi. Lower Levels of Hepatokines Angiopoietin-Like 4 and RBP-4 are Independently Associated with Non-Alcoholic Steatohepatitis (NASH), Digestive Disease Week. McCormick Place in Chicago, IL, May 6, 2017.
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- 26) Steven L. Flamm, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. Real-world treatment utilization and results in the renaissance of HCV Care: Analyses of treatment for 7,550 Patients from the TRIO Network, European Association for the Study of the Liver.
- 27) Zobair M Younossi, Maria Stepanova, Fatema Nader, Andrei Racila. Primary Biliary Cholangitis (PBC) is Associated with Significant Mortality and Health Care Utilization (HCU) in Medicare Population, American College Gastroenterology. Orlando, Florida October 16, 2017.
- 28) Zobair M Younossi, Azza Karrar, Mariaelena Pierobon, Zahra Younoszai, Thomas Jeffers, Sean C. Felix, Maria Stepanova, Jeiran Kianoush, Alex Hodge, Dinan Abdelatif, Fanny Monge, Lakshmi Alaparathi, Aybike Bircerdinc, Vikas Chandhoke, Zachary Goodman, Emanuel F. Petricoin. Association of Serum and Liver Proteomic Profiling of Patients with Non-alcoholic Fatty Liver Disease (NAFLD) Reveals Common Pathways Linking Non-alcoholic Steatohepatitis (NASH) and Metabolic Abnormalities, Digestive Disease Week. McCormick Place in Chicago, IL, May 6, 2017.

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- 29) Zobair M Younossi, Maria Stepanova, Linda Henry, Issah Younossi, Atsushi Tanaka, Yuichiro, Eguchi, Norifumi Kawada, Andrei Racila, Sharon Hunt. The prevalence and costs associated with clinically overt extrahepatic manifestations of hepatitis C virus infection in Japan, Asian Pacific Association for the Study of Liver.
- 30) Zobair M Younossi, Maria Stepanova, Ira M. Jacobson, Stefan Zeuzem, Marc Bourliere, Graham R. Foster, Stuart Roberts, Tarik Asselah, Alexander Thompson, Edward J. Gane, Bernard Willems, Eric Lawitz, Stuart C. Gordon, Michael Manns, K. Rajender Reddy, Curtis L. Cooper, Steven L. Flamm, Kris V. Kowdley, Sharon Hunt. High Efficacy is Accompanied with Substantial Gains in Patient Reported Outcomes in Cirrhotic Patients with Chronic Hepatitis C Treated with Sofosbuvir (SOF), Velpatasvir with or without Voxilaprevir (VOX): Data from POLARIS 1, 2, 3 and 4, European Association for the Study of the Liver.
- 31) Zobair M Younossi, Maria Stepanova, Harry Janssen, Kosh Agarwal, Edward J. Gane, Naoky Tsai, Issah Younossi, Sharon Hunt. Virally suppressed patients with chronic HBV infection without cirrhosis have better patient-reported outcomes (PROS), European Association for the Study of the Liver.
- 32) Zobair M Younossi, Maria Stepanova, Andrew J. Muir, Maria Buti, K. Rajender Reddy, Steven L. Flamm, Issah Younossi, Sharon Hunt. The long-term impact of sustained virologic response (SVR) on patient-reported outcomes in cirrhotics with Hepatitis C infection, European Association for the Study of the Liver.
- 33) Zobair M Younossi, Maria Stepanova, Wirth Stefan, Kathleen B. Schwarz, Philip Rosenthal, Regino Gonzalez-Peralta, Karen Murray, Sharon Hunt. Health-Related Quality of Life in Children with Hepatitis C Viral Infection Treated with Sofosbuvir and Ribavirin, European Association for the Study of the Liver.
- 34) Zobair M Younossi, Maria Stepanova, Brian P. Lam, Jillian Kallman, Leyla de Avila, Andrei Racila. PATIENT-REPORTED OUTCOMES (PROs) IN PATIENTS WITH CHRONIC HEPATITIS B WITH OR WITHOUT VIREMIA, Asian Pacific Association for the Study of Liver.
- 35) Lisa M. Nyberg, Xia Li, Su-Jau Yang, Kevin M. Chiang, T. Craig Cheetham, Susan Caparosa, Zobair M Younossi, Anders H. Nyberg. Identification of Patient Groups Previously Not Candidates for Interferon Therapy for Chronic Hepatitis C and Implications for Planning and Budgeting for Treatment with Current Regimens (APASL), Asian Pacific Association for the Study of Liver.
- 36) Steven L. Flamm, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. REAL-WORLD RESULTS IN THE RENAISSANCE OF HCV CARE: ANALYSES OF TREATMENT FOR 7,550 PATIENTS FROM THE TRIO NETWORK, Digestive Disease Week.
- 37) Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Chizoba Nwankwo, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. Real-world use of elbasvir/grazoprevir and outcomes in patients with Chronic Hepatitis C: Retrospective data analyses from the TRIO Network, European Association for the Study of the Liver.
- 38) Shelby L. Corman, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Steven L. Flamm, Yiling Jiang, Kris V. Kowdley, Scott Milligan, Chizoba Nwankwo, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. Real-World Cost-Effectiveness Of Elbasvir/Grazoprevir (EBR/GZR) In Treatment-Naive (TN) Patients With Chronic Hepatitis C (CHC) Virus Genotype 1 (GT1) In The United States (US), American Association for the Study of Liver Diseases.

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- 39) Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Steven L. Flamm, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. HCV Treatment Failure in the era of direct-acting antivirals (DAAs): Analyses of real-world data from the TRIO Network., American Association for the Study of Liver Diseases.
- 40) Patrice Cacoub, Marc Bourliere, Tarik Asselah, Victor de Ledinghen, Philippe Mathurin, Christophe Hezode, Linda Henry, Maria Stepanova, Zobair M Younossi. French Hepatitis C (HCV) Patients Treated with Anti-viral Combinations Containing Pegylated Interferon (IFN), Ribavirin (RBV), Sofosbuvir (SOF), Ledipasvir (LDV), Velpatasvir (VEL) and/or Voxilaprevir (VOX): The Impact of Treatment on Patient-Reported Outcomes (PROs), American Association for the Study of Liver Diseases.
- 41) Steven L. Flamm, Bruce R. Bacon, Michael P. Curry, Douglas T. Dieterich, Kris V. Kowdley, Scott Milligan, Naoky Tsai, Zobair M Younossi, Nezam H. Afdhal. Real-world patterns of therapy utilization and outcomes in 7098 genotype 1-6 HCV patients: data from the TRIO network., American Association for the Study of Liver Diseases.
- 42) Zobair M Younossi, Maria Stepanova, Pegah Golabi, Huong T. Pham, Rebecca Cable, James Cooper, Nila Rafiq, Haley Bush, Puneetinder Mann, Trevor Gogoll. Presumed Non-alcoholic Steatofibrosis Can Independently Predict Mortality in Patients with Non-Alcoholic Fatty Liver Disease (NAFLD), American Association for the Study of Liver Diseases.
- 43) Pegah Golabi, Natsu Fukui, Leyla de Avila, James Minhui Paik, Manirath Srishord, Zobair M Younossi. The Global Epidemiology of Non-alcoholic Fatty Liver Disease in Patients with Type 2 Diabetes Mellitus: A Systematic Review and Meta-analysis, American Association for the Study of Liver Diseases.
- 44) Zobair M Younossi, Azza Karrar, Mariaelena Pierobon, Maria Stepanova, Jeiran Kianoush, Zahra Younoszai, Thomas Jeffers, Sean C. Felix, Alex Hodge, Dinan Abdelatif, Fanny Monge, Lakshmi Alaparathi, Aybike Bircerdinc, Zachary Goodman, Vikas Chandhoke, Emanuel F. Petricoin. Apoptosis Signal-regulating Kinase1-MAPKinase p38 (ASK1-p38) Pathway Associated with IL-10 is Independently Correlated to Higher Percent (%) Collagen in Patients with Non-alcoholic Steatohepatitis (NASH), American Association for the Study of Liver Diseases.
- 45) Maria Stepanova, Alexander Thompson, Joseph S. Doyle, Leyla de Avila, Issah Younossi, Linda Henry, Zobair M Younossi. Hepatitis C Virus (HCV)-Infected Patients Receiving Opioid Substitution Therapy (OST) Experience Significant Increases in Patient-Reported Outcomes (PROs) Following Treatment with Anti-Viral Regimens, American Association for the Study of Liver Diseases.
- 46) Zobair M Younossi, Maria Stepanova, Cameron T. Locklear, Ira M. Jacobson, Alita Mishra, Gregory Trimble, Madeline Erario, Chapy Venkatesan, Issah Younossi, Aimal Arsalla, Wisna'odom Keo, Zachary Goodman. Liver Transplantation (LT) for Cryptogenic Cirrhosis (CC) and Non-alcoholic Steatohepatitis (NASH) Cirrhosis: Twenty-Two Years Data from the Scientific Registry of Transplant Recipients (SRTR), American Association for the Study of Liver Diseases.
- 47) Leyla de Avila, Ali Weinstein, Michael P. Curry, Pegah Golabi, James M. Estep, Carey Escheik, Aybike Bircerdinc, Maria Stepanova, Lynn Gerber, Zobair M Younossi. Changes in Serum Neurotransmitters (NTs) and Patient-Reported Outcomes (PROs) and Neurocognitive Performance (NCP) After Viral Eradication of Hepatitis C Virus (HCV)-Genotype 1 (GT1), American Association for the Study of Liver Diseases.



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- 48) Zobair M Younossi, Maria Stepanova, Zachary Goodman, Eric Lawitz, Michael R. Charlton, Rohit Loomba, Robert P. Myers, Mani Subramanian, John McHutchison, Sharon Hunt. Improvements of Hepatic Fibrosis and Hepatic Collagen Deposition in Non-Alcoholic Steatohepatitis (Nash) Treated with Selonsertib are Associated with Improvement of Patient-Reported Outcomes (PROs), American Association for the Study of Liver Diseases.
- 49) Zobair M Younossi, Maria Stepanova, Stephen A. Harrison, Arun J. Sanyal, Vlad Ratziu, Bryan McColgan, Robert P. Myers, Mani Subramanian, John McHutchison, Nezam H. Afdhal, Manal F. Abdelmalek, Jaime Bosch, Zachary Goodman. Subjects with Non-alcoholic Fatty Liver Disease and Severe Fibrosis Face a Significant Number of Adverse Events: Cryptogenic Cirrhosis and Severe Steatofibrosis, American Association for the Study of Liver Diseases.
- 50) James M. Estep, Rohini Mehta, Sean C. Felix, Aybike Bircerdinc, Elzafir Elsheikh Abdelrahman, Zachary Goodman, Zobair M Younossi. Single Nucleotide Polymorphism (SNPs) Related to Stellate Cell Activation: Is there an Association with Lower Risk of Pericellular Fibrosis in Diabetics with Non-alcoholic Fatty Liver Disease (NAFLD)?, American Association for the Study of Liver Diseases.
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- 119) Dr. Anly Tsang, PGY 3 – Poster Presentation at the American Thoracic Society Meeting, May, 2017. Do Lung Function Tests Predict Response to Therapy in Connective Tissue Disease – Associated Pulmonary Hypertension? Authors: AK Tsang, OA Shlobin, N Weir, C King, SD Nathan.
- 120) Dr. Amita Rajani, PGY 2 – Poster Presentation at the American Thoracic Society Meeting, May 2017. A Case of Pulmonary Actinomyces Meyeri in a Young Immunocompetent Firefighter. Authors: A Rajani, E Libre, RH Halabi.
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- 122) Dr. Cameron Trevor Locklear, PGY 4 (chief resident) and Dr. Natsu Fukui, PGY 3 – Poster Presentation at Digestive Diseases Week, May 2017. Psoriasis in Independently Associated with Non-alcoholic fatty liver disease. Authors: CT Lockear, P Golabi, N Fukui, L deAvila, M Otgonsuren, M Afendy, R Cable, ZM Younossi.
- 123) Dr. Natsu Fukui, PGY 3 – Poster Presentation at Digestive Diseases Week, May 2017. Demographics, Resource Utilization and Outcomes of Patients with Chronic Liver Disease Receiving Hospice Care in the United States. Authors: N Fukui, P Golabi, M Otogonsuren, A Mishra, C Venkatesan, ZM Younossi.
- 124) Dr. Daniel Song, PGY 3 – Poster Presentation at the Alliance for Academic Internal Medicine Conference, October 2017. Improving Interdisciplinary Communication to Minimize Workflow Disruptions. Authors: N Fukui, D. Song, C Wang, D Hester, A Tsang,
- 125) Dr. Yamini Sterrett, PGY 1 – Case Presentation at Greater Washington Infectious Disease Society Meeting, October 2017. An interesting case of knee swelling. Authors: Y Sterrett, D Poretz.
- 126) Dr. Min Kim, PGY 2 and Dr. Ansha Goel, PGY 2 – Poster Presentation at Institute for Healthcare Improvement National Forum, December 2017. The Infectious Diseases Transition Team: A Private Practice and Hospital Quality Improvement Partnership Model. Authors: M Kim, A Goel, C Venkatesan, D Wheeler, M Delman, T Gogoll, J Smith.

## ADVANCED LUNG RESEARCH PROGRAM ACCEPTED ABSTRACTS AND PRESENTATIONS

- 1) Nayyar M, Shlobin OA, King C, Fregoso MF, Verster A, Cochrane A, Nathan SD, Brown AW. Outcomes of Recipients on Dual compared to Triple Immunosuppression after Lung Transplantation. ISHLT 2017
- 2) Cho AH, Alhalabi L, Bernens M, Shlobin OA, King CS, Bogar L, Nathan SD, Brown AW. Incidence and Impact of Gastroparesis Following Lung Transplantation. ISHLT 2017
- 3) Franco-Palacios DJ, Brown AW, King C, Nunes FS, Mahajan A, Khandhar S, Venbrux A, Shlobin OA. Post Lung Transplant Chylothorax Effectively Treated with Thoracic Duct Embolization. ISHLT 2017



## DEPARTMENTAL ACADEMIC PRODUCTIVITY

- 4) S. M. Pham, S. Agbor-Enoh, I. Timofte, P. Shah, J. Orens, S. Gorham, K. Bhatti, A. Marishta, M. Yang, Y. Yang, U. Fideli, I. Tunc, J. Zhu, S. Nathan, A. Brown, A. Iacono, H. Valantine. Relationship Of Early Lung Allograft Injury As Measured By Cell Free DNA With Donor And Recipient Characteristics. ISHLT 2017 (12/21/2016)
- 5) Timofte I, Agbor-Enoh S, Iacono A, Orens J, Shah P, Gorham S, Bhatti K, Marishta A, Jang M, Yang Y, Fideli U, Tunc I, Zhu J, Nathan SD, Brown AW, Pham S, Valantine H. Severe Primary Graft Failure In a Lung Transplant Recipients That Required ECMO Had High Level Of Donor-Derived Cell-Free DNA. ISHLT 2017
- 6) Tsang AK, Shlobin OA, Weir N, King C, Brown AW, Nathan SD. Do Lung function tests predict response to therapy in Connective Tissue Disease (CTD)-Associated Pulmonary Hypertension (PH)?
- 7) Weir N, Brown AW, Della Santina J, King C, Lewis D, Nathan SD, Shlobin OA. Transition from PDE-5 Inhibitors to Riociguat in Pulmonary Hypertension.
- 8) S.R. Devarajan, B. Cannon, S. Cousins, J. Maniaci, C. Roberts, C. Spaulding, P. Vaidya, S.D. Nathan. The Impact of Right Ventricular Diastolic Pressure on Mortality in Patients with Idiopathic Pulmonary Fibrosis.
- 9) FS Nunes, AW Brown, OA Shlobin, E Battle, C. King, SD Nathan. Mid-flow rates do not predict mortality in IPF patients.
- 10) Alhalabi L, Cho AH, Shlobin OA, King C, Garofalo S, Lamberti J, Nathan SD, Brown AW. Outcomes of Patients Requiring High Humidity High Flow Nasal Oxygen Cannula in a Tertiary Care Hospital.
- 11) Kaur R, King CS, Brown AW, Ahmad S, Shlobin O, Weir N, Nathan SD. Factors Affecting Selection of Anti-fibrotic Therapy in Idiopathic Pulmonary Fibrosis.
- 12) Kaur R, King CS, Brown AW, Ahmad S, Shlobin O, Weir N, Nathan SD. Real-World Tolerability of Anti-fibrotic Therapy for Idiopathic Pulmonary Fibrosis.
- 13) Jose A, King C, Nathan SD. The Left and Right Ventricular End Diastolic Pressure Ratio As a Novel Marker of Disease Severity in a Cohort of Patients with Pulmonary Arterial Hypertension.
- 14) Jose A, King C, Nathan SD. The Impact of Right Ventricular Diastolic Pressure on Mortality in Patients with Idiopathic Pulmonary Fibrosis
- 15) Welt E, Shlobin OA, King C, Weir N, Brown AW, Cossa N, Kiernan J, Nathan SD. The role of exercise right heart catheterization in discerning heart failure with preserved ejection fraction.
- 16) Libre M, King CS, Brown AW; Ahmad S, Shlobin O, Weir N, Nathan SD. Prevalence of Pulmonary Hypertension in Idiopathic NSIP and Effect of Pulmonary Vasodilator Therapy on Outcomes. Submitted to ATS 2017.
- 17) Siddiqui FM, King C, Bowen M, Fregoso M, Nathan SD, Brown AW. Similar Outcomes of Lung Transplantation Using Increased Risk And Conventional Donor Lungs. Submitted to ATS 2017.

## DEPARTMENTAL ACADEMIC PRODUCTIVITY

- 18) Nathan SD, Costabel U, Albera C, Kirchgaessler KU, Chou W, Noble PW. Effect of Pirfenidone on All-Cause Mortality (ACM) and Forced Vital Capacity (FVC) in Idiopathic Pulmonary Fibrosis (IPF) Patients With Low FVC and/or Low DLCO: Analysis of Pooled Data From ASCEND and CAPACITY. Nathan SD, Macaula D, Garcia Horton V, Terasawa E, Yu YF. Patient characteristics, clinical outcomes and healthcare resource utilization among IPF patients stratified by lung function at diagnosis. Bui S, Tran L, Rodriguez L, Aljebur B, Nathan SD, Grant GM. Survival mechanisms for Idiopathic Pulmonary Fibrosis fibroblasts and the Unfolded Protein Response (UPR). Submitted to ATS 2017
- 19) Gochuico BR, O'Brien KJ, Nathan SD, Goldberg HJ, Connors JM, Cui Y, Astor TL, Camp PC, Rosas IO, Lemma WoldeHanna M, Speransky V, Weinhouse GL, El-Chemaly S. Clinical Issues Associated With Lung Transplantation In Hermansky-Pudlak Syndrome Pulmonary Fibrosis. Submitted to ATS 2017
- 20) Kaler M, Barochia AV, Weir NA, Cuento RA, Stylianou M, Roth MJ, Filie AC, Vaughey EC, Nathan SD, Levine SJ. A Randomized, Placebo-controlled, Double-blinded, Crossover Trial of the PPAR- Agonist, Pioglitazone, for Severe Asthma. Submitted to ATS 2017
- 21) A.M. Taveira-DaSilva, A. Jones, P. Julien-Williams, OA Shlobin, SD Nathan, J Moss. Recurrence of Lymphangioleiomyomatosis After Double Lung Transplantation in a Patient With LAM. Submitted to ATS 2017
- 22) Figueroa D, Bui S, Rodriguez L, Grant G, Nathan SD, Levine SJ. Apolipoprotein A-I and Apolipoprotein E Differentially Modulate the Expression of Extracellular Matrix Proteins by IPF Lung Fibroblasts. Submitted to ATS 2017
- 23) Maher TM, Swigris JJ, Kreuter M, Wijsenbeek M, Axmann J, Ireland L, Nathan SD. Differences in Patient and Physician Viewpoints of the Management of Idiopathic Pulmonary Fibrosis (IPF). Submitted to ATS 2017
- 24) Mason WR, Nathan SD, Zibrak JD, Padilla ML, Gilberg F, Petzinger U, Kirchgaessler KU, Lancaster LH. Time-to-Event Analysis of Common Adverse Events of Pirfenidone in Patients With IPF—a Pooled Analysis of Three Phase III Clinical Trials.
- 25) Rodriguez L, Aljebur B, Bui S, Tran L, Nathan SD, Grant G. Identification of a Subset of Rapidly Dividing and High Collagen Expressing Fibroblasts within a Heterozygous Cohort of Pulmonary Fibroblasts in Idiopathic Pulmonary Fibrosis. Submitted to ATS 2017
- 26) S Braman, B Make, J Lamberti, SD Nathan, N MacIntyre, P Porte, G Criner. Acute Respiratory Failure That Develops During Hospitalization: A Comparison of Medical vs. Surgical Medicare Patients. Submitted to ATS 2017
- 27) J Lamberti, SD Nathan, N MacIntyre, S Braman, B Make, P Porte, GJ Criner. Medicare Patients Who Develop Respiratory Failure During Hospitalization have Higher Mortality Compared to Medicare Patients Admitted with Respiratory Failure. Submitted to ATS 2017
- 28) Flaherty KR, de Andrade J, Chou W, Lancaster L, Lindell K, Nathan SD, Raghu G, Spino C, Staszak S, Stauffer JL, Tuomey P, Wolters PJ, Cosgrove GP. Baseline Characteristics of the initial 200 participants in the Pulmonary Fibrosis Foundation Registry.

## DEPARTMENTAL ACADEMIC PRODUCTIVITY

- 29) EH Alhamad, MB Scholand, DA Culver, SD. Nathan, E Carmona, V Kouranos, F Cordova, J Barney, M Wijsenbeek, RP Baughman. Determinants Of Six Minute Walk Distance In Sarcoidosis Associated Pulmonary Hypertension. Submitted to ATS 2017
- 30) Determinants of Health Related Quality of Life in PAH: Data from The Pulmonary Hypertension Association Registry. Roham Zamanian, David Badesch, Todd Bull, Teresa De Marco, Jeremy Feldman, Jeff Fineman, James Ford, Michael Grey, Dan Grinnan, James Klinger, John McConnell, Erika Berman Rosenzweig, Linda Santos, Oksana Shlobin, Jeff Sager on behalf of PHAR
- 31) Characterization of Hispanics with pulmonary hypertension in the US: The Pulmonary Hypertension Association Registry V. De Jesus Perez, D. Badesch, R.T. Zamanian, J. Fineman, J.R. Klinger, J. Ford, J.W. McConnell, J. Sager, J. Feldman, O. Shlobin, D. Grinnan, T.M. Bull, E. Rosenzweig, L. Santos, T. DeMarco on behalf of PHAR
- 32) TD Walker, J Powers, A Walts, JA de Andrade, E Bendstrup, TS Blackwell, R Borie, KK Brown, JD Christie, HR Collard, PJ Wolters, TJ Corte, B Crestanil, G Laurent, CM Prele, RM du Bois, T Maher, O Eickelberg, KF Gibson, D Kass, Y Zhang, M Henry, M Kennedy, G Gudmundsson, N Hirani, Y Inoue<sup>1</sup>, R Braybrooke, RG Jenkins, M Keane, DS Kim, DJ Lederer, JE Loyd, N Mogulkoc, S. Nathan, I Noth, J Christie, M Porteous, K. Ohta, H Parfrey, C Ryerson, M Selman, JW Song, M. Sterclova, S Tomassetti, V Poletti, Martina Vasakova, MD Tobin, MI Schwarz, DA Schwartz. The global IPF Collaborative Network: A Platform for IPF Genetics. ATS 2017.
- 33) Costabel U, Albera C, Wijsenbeek MS, de Andrade JA, Mason WR, Nathan SD, Zibrak JD, Padilla ML, Gilberg F, Petzinger U, Kirchgaessler K, Lancaster LH. Characterization of fatigue in patients with idiopathic pulmonary fibrosis (IPF) from the pooled Phase III trials. ERS 2017
- 34) Nathan SD, Costabel U, Glaspole I, Glassberg MK, Lancaster LH, Lederer DJ, Pereira CA, Trzaskoma B, Limb S, Wells AU. Incidence of multiple progression events in patients with IPF in the pooled CAPACITY and ASCEND Phase III trials. ERS 2017
- 35) Nathan SD, Behr J, Collard HR, Cottin V, Hoeper MH, Martinez F, Corte T, Keogh A, Leuchte H, Moğolkoc N, Ulrich-Somaini S, Wuyts W, Malcolm S, DiCasoli C, Yao M, Athol Wells AU. RISE-IIP: Riociguat for the treatment of pulmonary hypertension associated with idiopathic interstitial pneumonia. Submitted to ERS 2017
- 36) Cho AH, Alhalabi L, Bernens M, Shlobin OA, King CS, Bogar L, Nathan SD, Brown AW. Incidence and Impact of Gastroparesis Following Lung Transplantation. To be submitted to Chest 2017
- 37) Warren WA, Franco-Palacios D, King CS, Shlobin OA, Nathan SD, Katugaha S, Mani H, Brown AW. Opportunistic Infection by a Very Unusual Fungus in a Cystic Fibrosis Patient. To be submitted to Chest 2017.
- 38) Ratwani A, King CS, Brown AW, Shlobin OA, Weir N, Nathan SD. Tracheobronchial tree size as a predictor of disease severity and outcomes in Idiopathic Pulmonary Fibrosis. To be submitted to Chest.
- 39) Nunes FS, Alhalabi L, Brown AW, Shlobin OA, King C, Nathan SD. Does 1-minute walk test predict results of 6-minute walk test in patients with idiopathic pulmonary fibrosis? Submitted to Chest 2017.
- 40) Patrick Kicker D.J. Franco-Palacios, O.A. Shlobin, Q. Zhao, M. Gomberg-Maitland, Sildenafil for this HFpEF?: Diastolic dysfunction and Gerbode defect induced combined pre and post-capillary pulmonary hypertension.

## DEPARTMENTAL ACADEMIC PRODUCTIVITY

### ZOBAIR YOUNOSI, MD NATIONAL AND INTERNATIONAL MEETINGS AND LECTURES

- 1) New Horizon in Pharmacotherapy of NAFLD (State of the Art Lecture), ISGCON meeting New Dehli, India, December 2017.
- 2) Incidentally detected fatty liver, ISGCON meeting New Dehli, India, December 2017.
- 3) Fatty Liver Disease.... We Are Progressing. Philadelphia, PA March 2017.
- 4) Global Epidemic of NAFLD and NASH and their Clinical Implications. Amman, Jordan. April 2017.
- 5) 2017 Update on Treatment strategies for NASH. Amman, Jordan. April 2017.
- 6) NAFLD 2017 Update. Antalya, Turkey. May 2017.
- 7) NAFLD 2017 Update. Alberta, Canada. May 2017.
- 8) Economic Burden and Treatment Strategies of NASH. Dubai, UAE. October 2017.
- 9) Improvement of Patients' Quality of Life and Other Patient-Reported Outcomes with Daa Therapy. Dubai, UAE. October 2017.
- 10) Enhanced Understanding of the Progression From NAFLD to NASH and Beyond. American Association for the Study of Liver Diseases. October 2017.
- 11) HCV Treatment Update. McLean, VA. January 2017.
- 12) International Hepatitis C Exchange. Shanghai, China. February 2017.
- 13) One Drug for All: Are we there For Hepatitis C? Manila, Philippines. March 2017.
- 14) Generic Patient-reported Outcomes Instruments vs Disease-Oriented Ones: Which Pro and Contra in Systemic Diseases like HCV and HIV? Rome, Italy. March 2017.
- 15) Current State of HCV in the U.S. Havana, Cuba. April 2017.
- 16) Hepatitis C Treatment: Do we Have Pangenotypic Regimens for All Patients? Amman, Jordan. April 2017.
- 17) Hepatitis C: Do we really have difficult to treat patients? Philadelphia, PA. March 2017.
- 18) Emerging Trends in HCV: Clinical, Epidemiologic, Patient-Reported And Economic Burden of NAFLD. Washington, D.C. March 2017.
- 19) Best Practices towards Creening, Linkage to Care and HCV Elimination. Dubai, UAE. October 2017.
- 20) Refining Treatment and Outcomes in HCV Therapy. American Association for the Study of Liver Diseases. Washington, D.C. October 2017.



## DEPARTMENTAL ACADEMIC PRODUCTIVITY

- 21) Fatty liver we are progressing. Philadelphia, PA. March 2017.
- 22) Improvement of Hepatic Fibrosis in Patients with NASH Treated with Selonsertib is Associated with Improvement of PROs. European Association for the Study of Liver Disease. Amsterdam, Netherland. April 2017.
- 23) Real world database analysis for PBC. New York, NY. May 2017.
- 24) State of the Art Lecture: NASH Does My Liver Look Fat? Digestive Disease Week. Chicago, IL. May 2017.
- 25) Delivering care and Determining Cost-Effectiveness. American Association for the Study of Liver Disease. Washington, D.C. October 2017.
- 26) Global Forum NAFLD Burden of Liver Disease: Epidemiology and Public Health Control Measures. American Association for the Study of Liver Disease. Washington, D.C. October 2017.
- 27) Advances in non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH). The Gastrointestinal and Liver Association of the Americas (GALA) Washington DC, December 2017.
- 28) Meeting Co-Chair. The Gastrointestinal and Liver Association of the Americas (GALA) Washington DC, December 2017.

### ZACHARY GOODMAN, MD, PHD NATIONAL AND INTERNATIONAL MEETINGS AND LECTURES

- 1) “Role of Histopathology in the Clinical Research and Clinical Management of Patients with NAFLD”, presented at AASLD Emerging Trends Conference: Emerging Trends in Non-alcoholic Fatty Liver Disease, Washington, DC. March 18, 2017.
- 2) “Vascular Diseases of the Liver”, presented at annual meeting of International Liver Study Group, Groningen, The Netherlands. May 11, 2017.
- 3) “The Liver Society of Cells: Response to Injury”, The Ninth Annual M. Sambasiva Rao Lecture, Northwestern University School of Medicine, Chicago, IL. June 6, 2017.
- 4) “Liver Biopsy Assessment: Advances in Clinical Trials”, presented at annual meeting of the American Association for the Study of Liver Diseases, Washington, DC. October 20, 2017.

### LYNN GERBER, MD NATIONAL AND INTERNATIONAL MEETINGS AND LECTURES

- 1) American Association for the Study of Liver Disease (AASLD), Washington, DC, October 20 – 24, 2017.
- 2) International Society of Physical and Rehabilitation and Medicine, Buenos Aires, Argentina, April 30 – May 4, 2017.
- 3) Foundations of Clinical Research (Inova Residents, February 15, July 26, August 2017).
- 4) International Society of Physical and Rehabilitation Medicine, April 30 – May 4, 2017, Buenos Aires, Argentina. Scientific Director and Speaker (3 presentations).

## DEPARTMENTAL ACADEMIC PRODUCTIVITY

- 5) Model Systems Directors' Meeting, Arlington, VA. Speaker (SCI and TBI, June 2017).
- 6) Evidence-Based Health Care International Conference (EBHC) poster presentation and podium (October 2017).

### ADVANCED LUNG RESEARCH PROGRAM NATIONAL AND INTERNATIONAL MEETINGS AND LECTURES

- 1) Keynote presentation: Advances in interstitial lung disease and IPF. VCU Health Advances in Pulmonary Disease conference. Richmond, VA 4/29/2017. (Steven Nathan, MD)
- 2) Pulmonary Hypertension in the setting of Lung Disease: Incidence, pathogenesis and Assessment. Annual Yale Pulmonary Hypertension conference. June 2nd, 2017 (Steven Nathan, MD)
- 3) Pulmonary Hypertension in Lung Disease: To tweet or not to tweet? Annual Yale Pulmonary Hypertension conference. June 2nd, 2017 (Steven Nathan, MD)
- 4) Uncommon Causes of Dyspnea: horses and zebras. Louisiana Academy of Family Physicians Annual meeting New Orleans, August 4th, 2017. (Steven Nathan, MD)
- 5) Riociguat for the treatment of pulmonary hypertension associated with idiopathic interstitial pneumonia. Podium presentation European Respiratory Society September 11th, 2017 Milan, Italy (Steven Nathan, MD)
- 6) Incidence of multiple progression events in patients with IPF in the pooled CAPACITY and ASCEND Phase III trials. Podium presentation European Respiratory Society September 12th, 2017 Milan, Italy (Steven Nathan, MD)
- 7) Treatment of Pulmonary Fibrosis. 1st Fellow Symposium on Advanced Lung Disease. American College of Chest Physicians meeting. Toronto Canada October 28th, 2017. (Steven Nathan, MD)
- 8) Treatment of IPF in the era of antifibrotics. 2nd Annual Portuguese IPF meeting. Averoio, Portugal December 16th, 2017. (Steven Nathan, MD)







