Division of

INFECTIOUS DISEASES

2019

ANNUAL REPORT

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Division of

INFECTIOUS DISEASES

John W. Mellors, MD
Chief, Division of Infectious Diseases
Distinguished Professor of Medicine
Endowed Chair for Global Elimination of HIV and AIDS

Lisa Gundel, MPPM
Division Administrator, Infectious Diseases

The Division of Infectious Diseases develops and performs cutting-edge basic and clinical research that translates progress into clinical practice and improves the standard-of-care for diagnosis, treatment, and prevention of infectious diseases.

2019 Overview

The continuing goals of the division of Infectious Diseases (ID) are to:

- Provide state-of-the-art care that is easily accessible and responsive to the needs of patients and colleagues
- Mentor fellows in our training program to become the next generation of researchers, clinicians, and educators in the field of ID
- Rigorously train medical students and residents in the disciplines of ID
- Develop and perform "cutting-edge" basic and clinical research that translates progress into clinical practice and improves the standard-of-care for diagnosis, treatment, and prevention of infectious diseases

- Protect the public health from natural and man-made epidemics of infectious diseases.

In FY 2019, the division continued to be successful in achieving its goals through the concerted efforts of its faculty, staff, and trainees. Overall, the division increased patient volumes by 8% in FY 2019 compared with FY 2018 (6% increase in inpatient volume and 13% increase in outpatient volume). Regarding research operations, total research expenditures remained strong in FY 2019 compared with FY 2018 at approximately $14.5 million.

In 2016 the **Center for Infectious Disease Outreach (CIDO)** was established to increase the visibility of our Infectious Diseases division both to other medical providers and the general public, as well as highlight our division's multiple academic and research accomplishments. Using a variety of social media platforms, we post information on various topics and current events related to the topic of infectious disease, as well as alert followers about recent publications and accomplishments, educational activities, and events pertaining specifically to the Division of Infectious Diseases. Over the past year, we have seen tremendous growth in our online presence with over **810** Twitter followers, over **125** Facebook followers, and over **185** Instagram followers. Additionally, we have established an Infectious Diseases blog, https://idpittstop.wordpress.com, to provide commentary and analysis on various infectious disease-related current events, publications and topics, as well as to provide updates in the field of infectious disease from a host of experts in the field. Bloggers include our Infectious Diseases division faculty, fellows, pharmacists, and laboratory staff. CIDO has also worked to improve the Division's website. These modifications have allowed for better navigation through our website, as well as easier access to information regarding our fellowship program (leadership, curriculum, mentorship, research opportunities, etc.) and other activities. With these modifications, our website is the third most viewed amongst the subspecialties in the Department of Medicine, behind only Pulmonary and Cardiology.

INFECTIOUS DISEASES *Fast Facts*

58
academic faculty members

810+
followers on Twitter in just *three years*

$17mil
in research funding

FACULTY

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Director of Education, Division of Infectious Diseases
Director of Travel Health, Division of Infectious Diseases

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Mohamed H. Yassin, MD, PhD
Associate Professor of Medicine
Director of Infection Control, UPMC Mercy

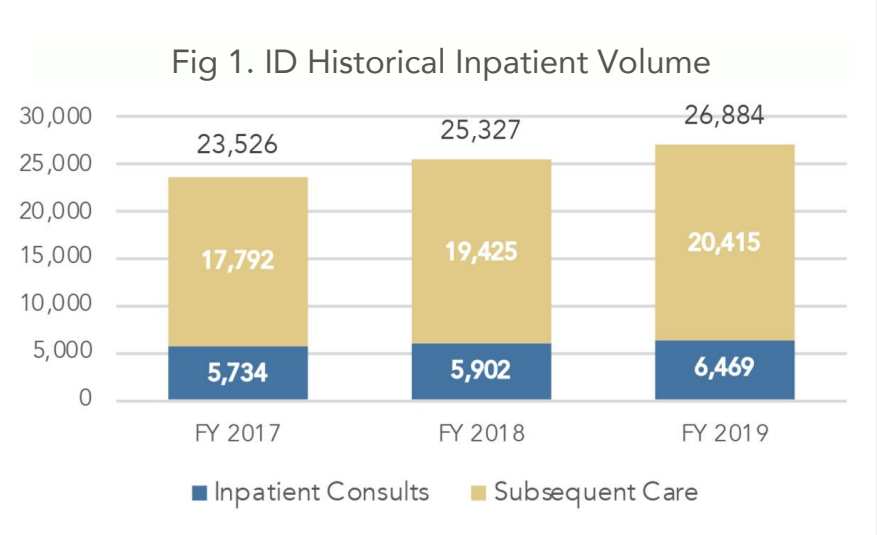
CLINICAL ACTIVITIES

The Division of Infectious Diseases provides a wide range of services in infectious diseases, including telemedicine and medical directorship of Infection Prevention at UPMC Presbyterian and UPMC Mercy Hospital. In FY 2019, the division's inpatient clinical activity increased in volume comparable to the prior year for all seven services: General ID, Transplant ID, Surgical ID, HIV-AIDS, Magee-Women's Hospital of UPMC ID Service, UPMC Mercy Hospital ID Service, and telemedicine services at UPMC Northwest and UPMC Jameson/Horizon (Figure 1). Three full-time faculty were recruited to support the General ID Teaching Service, UPMC Mercy service, and the ID Telemedicine service. Compared to the prior year, FY 2019 saw a 10% increase in inpatient consults while subsequent visits were up 5%, resulting in a net total increase in volume of 6% in FY 2019 vs. 2018.

ID's **Outpatient Parenteral Antibiotic Therapy** Program has **reduced** 30-day readmission rates of patients receiving intravenous antibiotics from **32%** to **14%**

Inpatient Clinical Services

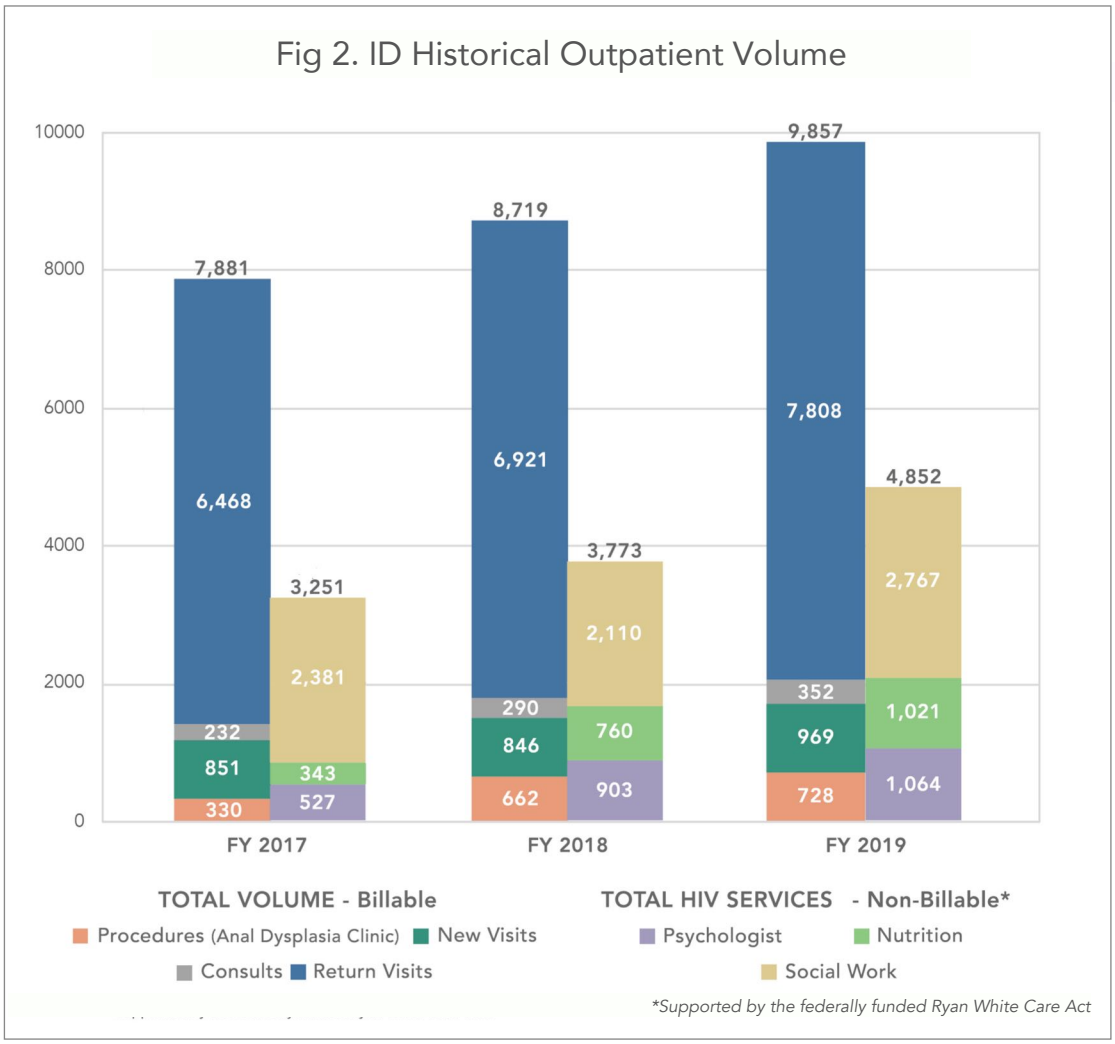
Consult teams round at UPMC Presbyterian University Hospital, Magee-Women's Hospital of UPMC, UPMC Mercy Hospital, Select Specialty Hospital, Western Psychiatric Institute and Clinic, and the VA Pittsburgh Healthcare System (VAPHS). There are dedicated rounding teams for General ID, Surgical ID, HIV-AIDS, and Transplant ID (TID). In July 2018, TID implemented a new consultation service for hematopoietic stem cell transplant patients, patients with hematologic malignancies, and patients undergoing chimeric antigen receptor T cells therapy (CAR-T) at Shadyside. At UPMC Northwest, UPMC Horizon, and UPMC Jameson, inpatient consults are provided through telemedicine. The telemedicine service also provides curbside, e-consults



and live video consults at Penn Highlands Health System, a non-UPMC facility. Our telemedicine service also provides curbside consultations to UPMC Susquehanna. In March 2019, UPMC Enterprises invested funding to establish a start-up company, Infectious Disease Connect (ID Connect). This company will now manage all inpatient telemedicine services for the Division.

Outpatient Clinical Services

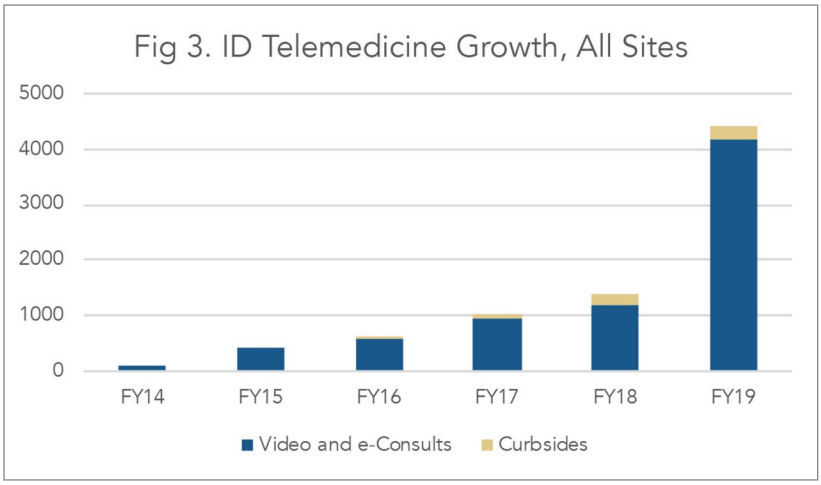
Outpatients are seen in the **Center for Care of Infectious Diseases** (CCID) on the 7th floor of the Falk Medical Building, and at UPMC Mercy Health Center. The CCID offers consultations and longitudinal care for general and surgical infectious diseases, HIV/AIDS, HIV prevention through pre-exposure prophylaxis (PrEP), recurrent *Clostridium difficle* infections, transplant infectious diseases (TID), Anal Dysplasia Clinic (ADC), and Travel Health. An expanding Outpatient Parenteral Antibiotic Therapy (OPAT) program is also a key component of the CCID and serves patients who require intravenous antimicrobial therapy after hospital discharge. Patients with recurrent *Clostridium difficile* infections are evaluated for fecal microbiota transplantation (FMT). The HIV/AIDS program provides primary care to approximately 1,851 persons living with HIV in the tri-state area, many of whom receive care at CCID (PACT, n=1699) and also at a newly-affiliated site, Latterman Family Health Center in McKeesport, PA. The TID clinic performs pre-transplant evaluations and follow-up for solid organ recipients, outpatient consultations and hospital follow-ups for stem cell transplant recipients, patients with hematologic malignancies, and patients who received CAR-T therapy with infections. The ADC provides preventive care for individuals at risk for anal cancer. The division continues to provide clinical services at Allies for Health and Well-Being (AHW). These services include medical directorship and outpatient clinic examinations at their facility in East Liberty. **Sarah McBeth, MD**, serves as the Medical Director at AHW and provides two outpatient clinic sessions per week for patients with HIV/AIDS along with PrEP consultations. Outpatient telemedicine ID services are provided at UPMC Northwest, Bedford, and Jameson hospitals.



CLINICAL QUALITY IMPROVEMENT INITIATIVES

Telemedicine

In FY 2018, the division continued to build its telemedicine service under the direction of **Rima Abdel-Massih, MD**, Director of ID Telemedicine; **Karin Byers, MD**, Clinical Director; and infectious diseases specialists **Carolyn Fernandes, MD**; **Christiane Hadi, MD**; **Sui Kwong Li, MD**; **Sowmya Nanjappa, MD**; **Christian Perez, MD**; **Neel Shah, MD**; **Kathleen Sheridan, DO**; and **J. Alex Viehman, MD**. The Tele-ID activity has been steadily growing, and a second Tele-ID service started in July 2018 servicing additional locations.



Outpatient ID telemedicine consults have also grown, and clinics were added at UPMC Northwest, as well as UPMC Jameson, to the pre-existing clinics at UPMC Northwest and UPMC Bedford. The ID telemedicine consult services also provide telephonic advice to the physicians at the Penn Highlands Hospital System. In November of 2016, the inpatient ID consult service implemented e-consults and live video consultations. This service continues to steadily grow (Figure 3).

In November 2017, the ID division expanded telephonic general ID curbside consultations service and backfill support for the local ID provider at UPMC Horizon campuses and UPMC Jameson. In July 2018, a full inpatient service with e-consults and live video consultation was started at UPMC Jameson and UPMC Horizon (Greenville and Horizon campuses), as well as an outpatient clinic at Jameson.
Curbside ID consultation service started at UPMC Chautauqua, NY, in January 2018, and in March 2018 curbside services were also implemented at UPMC Susquehanna Muncy. These telephonic consultations were further expanded to UPMC Susquehanna Sunbury and Lockhaven.

Transplant ID telemedicine services have been available as needed for inpatient consults and outpatient services at UPMC Hamot since the fall of 2015. This service has been relatively inactive and will build as the transplant program at Hamot becomes more active.

ID Connect leaders, Rima Abdel-Massih and David Zynn

Infectious Diseases Connect (ID Connect)

The tele-ID program at UPMC has been nationally recognized as a pioneer and leader of Tele-ID care. Given the success of this program, the high demand for Tele-Infectious Diseases services and the need to hire additional providers, **Drs. Rima Abdel-Massih** and **John Mellors** co-founded "Infectious Diseases Connect" (ID Connect), a corporate entity funded and owned by UPMC-Enterprises. ID Connect was formed on March 1, 2019. David Zynn was hired as president and CEO, and Dr. Abdel-Massih as Chief Medical Officer. Tele-ID physicians in the division of ID will continue

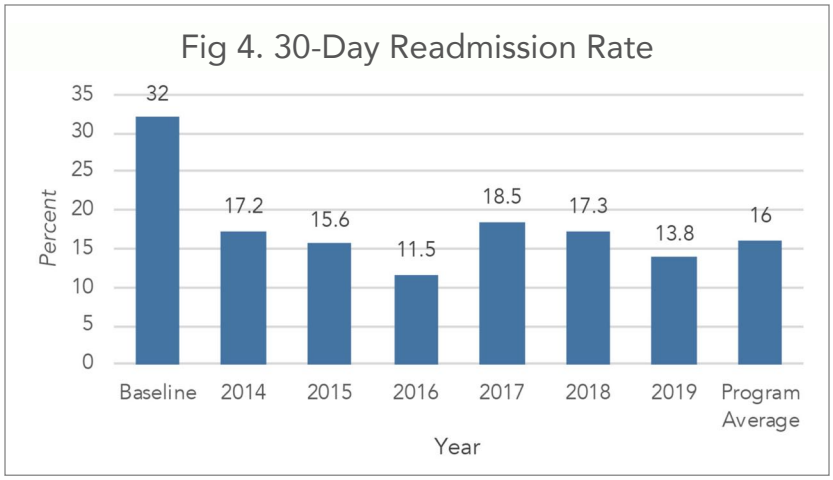
to provide services through ID Connect. Since the formation of ID Connect, 2 faculty were hired to further expand the Tele-ID services starting August 1, 2019. Additionally, ID Connect partnered with 3 new sites for tele-ID services: UPMC Susquehanna Soldiers and Sailors, J Blair Hospital, and UPMC Somerset. We also provide backfill support for the UPMC Altoona site.

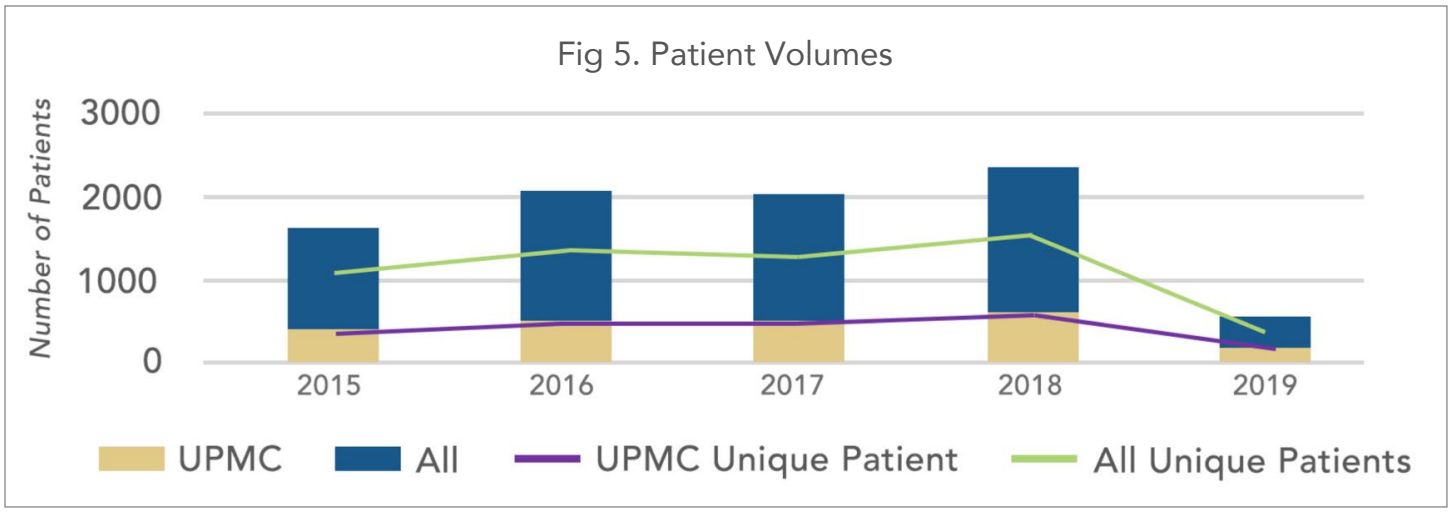
Fecal Microbiota Transplantation

A new outpatient service began in FY 2015 to treat recurrent *Clostridium difficile* (C. diff) infections with fecal microbiota transplantation (FMT). **Tatiana Bogdanovich, MD, PhD,** is the medical director for this program and is working in collaboration with physicians in Gastroenterology (GI). FMTs via recipient-directed donation have been in operation since December 2014, completing 19 outpatient FMT procedures through June 2017. In July 2017, a volunteer stool bank was established with specially prepared treatment doses stored at -80°C for the treatment of patients with recurrent *Clostridium difficile*. Additionally, a new protocol for administration of FMT via freeze-dried capsules was developed so that FMTs are now offered via naso-duodenal tube (NDT) enteroscopy/colonoscopy and via room temperature freeze-dried capsules intake. A total of 66 FMT procedures were performed utilizing volunteer stool donors over FY17-FY19 including 41 FMTs via capsules, 23 FMTs via colonoscopy, and 2 FMTs via enteroscopy with 81% success rate. FMT recipients and donors are being evaluated in a dedicated C.diff/FMT clinic that is a part of the CCID. In addition to providing clinical service, we established a repository of pre- and post-FMT stool samples and clinical registry of both recipients and donors for basic and translational research purposes. The FMT Laboratory is also involved in FMT-based research with three internally funded projects focusing on both standardizing FMT for *C. difficile* infections and on utilizing FMT for non-*C.difficile* indications.

Outpatient Parenteral Antibiotic Therapy (OPAT)

The OPAT program began in December 2013. The program is designed to monitor patients discharged from the hospital on intravenous antibiotics to prevent 30-day readmission rates and adverse events. **Kathleen Sheridan, DO**, is the medical director and, under her direction, the readmission rate for these patients has decreased from 32% to 14%. Patients are monitored by the OPAT team, including an ID-trained pharmacist, a pharmacy coordinator, two nurse coordinators, a nurse care manager, and two physician extenders. The volume of outpatients monitored each month has increased over time while the readmission rate remains around 14%. Patients that are evaluated in the outpatient clinic after hospital discharge have the lowest readmission rates. We have added an additional APP clinic every other week to increase access to the clinic. As of April 2018, we have introduced remote monitoring using the Vivify platform to health plan patients. We are also now able to offer home video visits for UPMC Healthplan patients that are enrolled in MyUPMC. Approximately 40% of patients monitored are UPMC Health Plan patients. Based upon HP financial analytics, this program prevents one $20,000 hospital admission per month and saves $417 per discharge.





Note: Patient Volume reported in 2019 represents calendar year (CY) activity from January-June 27, 2019.

HIV/AIDS

The Quality Management (QM) Committee oversees quality activities for the HIV-AIDS Program's primary care clinic (PACT) and the outpatient General Infectious Disease Clinic. The QM Committee is an interdisciplinary team that meets at least 10 times per year, with specific project teams that meet more frequently. The QM Committee is co-chaired by the HIV-AIDS Program's medical director, **Deborah McMahon, MD**, and CCID Administrative Director (Paula Ziemski, CPC, PHR, SHRM-CP) and guided by a full-time QM coordinator (Linda Despines, RN, BA). Other ID physicians and staff attend on a scheduled basis. Key quality indicators used to assess performance are reviewed at QM Committee meetings and HIV Provider meetings. The Program reports on key HIV-related indicators to the Health Resources Services Administration's (HRSA) HIV/AIDS Bureau (HAB) on a regular basis for benchmarking purposes.

Continuous Quality Improvement Initiatives

When opportunities for improvement are identified in any aspect of the program, such as medical care, fiscal, or administrative practices, a Continuous Quality Improvement (CQI) initiative is developed, appropriately constituted teams are assembled (often including providers and staff), and a team leader is identified. ID fellows are integrated within the QM Committee structure by working with program leadership and their mentors to develop their own QM projects in the second year of fellowship. The QM Coordinator educates fellows regarding CQI methods. The fellows develop projects, collect data, and present findings at QM Committee meetings.

Four ID QI projects were submitted to the 2018/2019 Quality and Safety Fair, and are described below:

Improving Carbenpenamase Reporting by the Microbiology Lab

Team: Alina Ioleva, MD; Jennifer Yoest, MD; Yohei Doi, MD; William Pasculle, PhD; Lloyd Clarke; Linda Despines, RN, BSN.
Problem/Opportunity: BAT test used in the lab only detects the presence of one type of carbenpenamase (KPC) and is only validated for use in Klebsiella spp. 10% FN rate. No standard way to report in EMR.
Steps, Strategies and Implementation Plan: Carbepenem inactivation test introduced to UPMC Microbiology Lab in 2017. Special field for result reporting added to Sunquest.
Lessons Learned and Barriers Encountered: Physician understanding of the test.

Outcomes and Opportunities for Spread: Improved detection of the carbenpenamase enzymes. Improved reporting of test results. Future directions – how it affects therapy selection, patient outcomes, infection control practices.

Organ Donor Registration in Persons Living with HIV

Team Members: Divya Bhamidipati, MD; Ghady Haidar, MD; Peter Veldkamp, MD; Kate Codd-Palmer, CRNP; Linda Despines, RN, BSN; Colleen Sullivan (CORE); Susan Stuart (CORE)
Problem/Opportunity: As a result of the HOPE Act, it is now possible for people living with HIV (PLWH) to be considered as organ donors. Data from other centers currently indicate that donor registration rates among PLWH are still low. Allowing patients to register while at their clinic appointment may be one way to increase registration rates.
Steps, Strategies and Implementation of Plan: Study population identified which included PLWH at an HIV primary care clinic. Baseline data was estimated to be 0% registered to be organ donors. Patients were provided with a donor card at time of check-in along with their annual Behavioral Health Asssessment. Donor card asked if they were interested in hearing about organ donation (Yes/No). If interested, patients were directed to fill out the rest of the card and return to the nurse to submit their registration. Cards were sent to CORE for completion of registration into the national database. Demographic and other data was tracked to monitor how many patients registered through this intervention.
Lessons Learned and Barriers Encountered: Barriers included misperceptions and preconceived notions surrounding organ donation, including medical mistrust and the need for more extensive conversations with family members. Some patients also noted that they did not think they could donate organs due to their HIV status, a misconception that will be addressed going forward.
Outcomes and Opportunities for Spread: Our intervention increased donor registration by 38.2%. While our goal of 50% was not met, we did see a substantial increase in the number of donors and number of patients offered the opportunity to register. Next steps include expanding this initiative to other primary care clinics and increasing patient education and awareness.
Dissemination of Results: Dr. Bhamidipati presented this CQI initiative, not only at the American Transplant Congress in June 2019 (Bhamidipati D, Veldkamp P, Despines L, Sullivan C, Stuart S, McMahon DK, and Haidar G. HOPE for PACT: A Pilot Study of Organ Registration among People Living with HIV. American Transplant Congress. June 1-5, 2019. Boston, MA), but also at the Department of Medicine Research Day, where it received an award in the quality category.

Incorporating Advance Care Planning into HIV Primary Care: A Quality Improvement Initiative

Team: Michelle Fleshner, MD; Peter Veldkamp, MD; Julie Childers, MD, MS; Linda Despines, RN, BSN
Problem/Opportunity: Advance care planning (ACP) conversations among persons living with HIV (PLWH) may now be similar to comparable primary care settings given the changing landscape of HIV infection. Issues unique to PLWH include social structures different from conventional norms and increased morbidity/mortality due to not strictly HIV-associated comorbidities, such as violence, substance abuse, and mental health.
Steps, Strategies and Implementation of Plan: Study population identified, which included patients with HIV infection seen at an HIV primary care clinic in Pittsburgh by a physician. Pre-intervention meeting was held with clinic providers to explore barriers and engage interest. Barriers identified included provider and patient discomfort with topic, difficulty with EMR, time, and difficulty prioritizing this issue among multiple other issues. Baseline documentation was found to be 0.9%, 1.1%, and 0.6% for surrogate decision maker, advance directive conversation, and follow-up plan, respectively. Intervention performed was a one-hour training led

by a palliative care physician with detailed summary sent to all providers. Providers emailed monthly with progress and reminder of progress. Post-intervention showed a sustained increase over 6 months to >20% for each month for all three quality indicators.
Lessons Learned and Barriers Encountered: Barriers included difficulty entering and accessing information in the EMR, variability of ACP documentation between providers, time limitations, and patients who were unable to identify surrogates due to difficult social situations. Involvement of fellows and residents was crucial to the success of this project. For further sustainability, it will be necessary to involve multiple disciplines including nursing, social work and administrative staff to incorporate ACP into patient care.
Outcomes and Opportunities for Spread: Identification of a surrogate, documentation of ACP conversation, and follow-up documentation improved among patients seen at an HIV primary clinic from 0.9% to 23-36%, 1.1% to 24-33%, and 0.6% to 9-27% each month, respectively. The goal of 20% was met each month. This study provides a framework for a sustainable incorporation of ACP into HIV primary care. Next steps include involvement of non-physician providers, incorporating identification of surrogate into check-in process, and expanding this program to other high-risk clinics.
Dissemination of Results: This project received First Place in the Quality Category at the UPMC Presbyterian Shadyside Quality & Safety Fair 2018/2019 (recognizes projects that demonstrate quality initiatives using the PDSA process and resulting in improved outcomes), and the Ladies Hospital Aide Society Quality Award.

Expansion of Outpatient Parenteral Antibiotic Therapy Program with Addition of Advanced Practice Providers can Lead to Reduced Readmission Rates, a Quality Improvement Project

Team: Katie Sheridan, DO; Josh Wingfied, CRNP; Meg Anderson, CRNP; Lauren McKibben, PharmD; Lindsay Coughenour, RN; Jennie Astolos, RN; Jessica Palumbo; Sarah Cullens, RN; Linda Despines, RN, BSN
Problem/Opportunity: The OPAT Program began in 2013. Prior to program implementation, the 30-day readmission rate was 32%, which was higher than the general population readmission rate.
Steps, Strategies and Implementation of Plan: The addition of 2 APPs to our program created an additional 48 visits per week for post-discharge visits.
Outcome results and Opportunities for Spread: The 30-day readmission rate decreased from 14.7% to 9.6%. The percentage of patients who were seen for follow-up increased after expansion of the program from 29.5% to 39.3%. Our model of care can easily be replicated by other clinics caring for high-risk patients.
Impact of Change and Further Implementation: Expansion of the OPAT program within the Division of Infectious Diseases at UPMC with the addition of two APPs has significantly increased access to care and significantly decreased 30-day readmissions when the patient was seen for follow-up by an ID provider (MD or APP). To further improve access, we are developing a remote monitoring and home telemedicine program. We believe this will lead to a further reduction in the 30-day readmission rate for our patients. Reduction of the readmission rate leads to savings of health care dollars.

Transplant Infectious Diseases (TID)

Over the past year, the TID service has engaged in several quality improvement and research projects. For instance, Transplant ID has received funding from Gilead Sciences, Inc., to lead a pilot study of transplanting organs (heart, lungs, kidney and liver) from donors with HCV serology positive and either HCV NAT positive or negative to organ candidates with HCV serology negative. This study increases the availability of organs for our candidates. Since IRB approval in the first quarter of 2019, 1 heart transplant, 1 lung transplant, and 4 kidney transplants have been performed under this protocol.

In July 2018, TID began providing ID consultation service to hematopoietic stem transplant (HSCT) patients

and recipients of CAR-T cells at UPMC Shadyside (SHY) and Hillman Cancer Center. In January 2019, ID has further extended its service to the hematologic malignancy and lymphoma patients at SHY. In addition to patient care, the TID team also updated antibiotic prophylactic and treatment protocols for HSCT and neutropenic fever, and incorporated clinical trial protocols to HSCT and hematologic malignancy patients.

The TID service has also improved the hygienic cleanliness of health care linen provided to our patients. Baseline healthcare linen data at PUH showed that up to 37% of linen was contaminated with Mucorales, classes of organism that caused fatal diseases among our solid organ transplant patients in 2015 and 2016. Systemic investigation of linen at PUH and at Paris Linen agency identified the 2 sources of linen contamination (environment at Paris and dryers). These data were shared with the laundry, which enacted environmental remediation between February and May 2017. Lint control measures were major steps undertaken. Healthcare linen has maintained sustained hygienically clean for *Mucorales* status on all post-remediation dates of microbiologic testing since June 2017. In 2019, there has not been any *Mucorales* recovered from Paris Linen, and the rate of Aspergillus contaminated linen was ≤2%.

Since the introduction of bioburden-reduced linen (gamma-irradiated linen) in November 2016, there have not been any hospital-acquired mucormycosis cases at PUH. Stepwise de-escalation of isavuconazole prophylaxis was started in September 2018, beginning with liver and small bowel transplant, followed by lung transplant in November 2018 and heart transplant in 2018. This has led to a save of ~$700,000 in the past year. We have not observed any new cases of hospital-acquired mucormycosis.

TID was funded by UPMC to perform genetic and multicenter epidemiologic analysis of mold clusters. The multicenter epidemiologic study is finished and published, the genetic study is being analyzed, and the final manuscript will be circulated for internal review in September 2019.

Antibiotic Management Program (AMP)

In August 2018, the AMP service at UPMC-PUH campus received the designation of Antimicrobial Stewardship Center of Excellence by the Infectious Diseases Society of America. PUH was recognized for having a high quality AMP service that has achieved standards established by the Centers for Disease Control and Prevention (CDC).

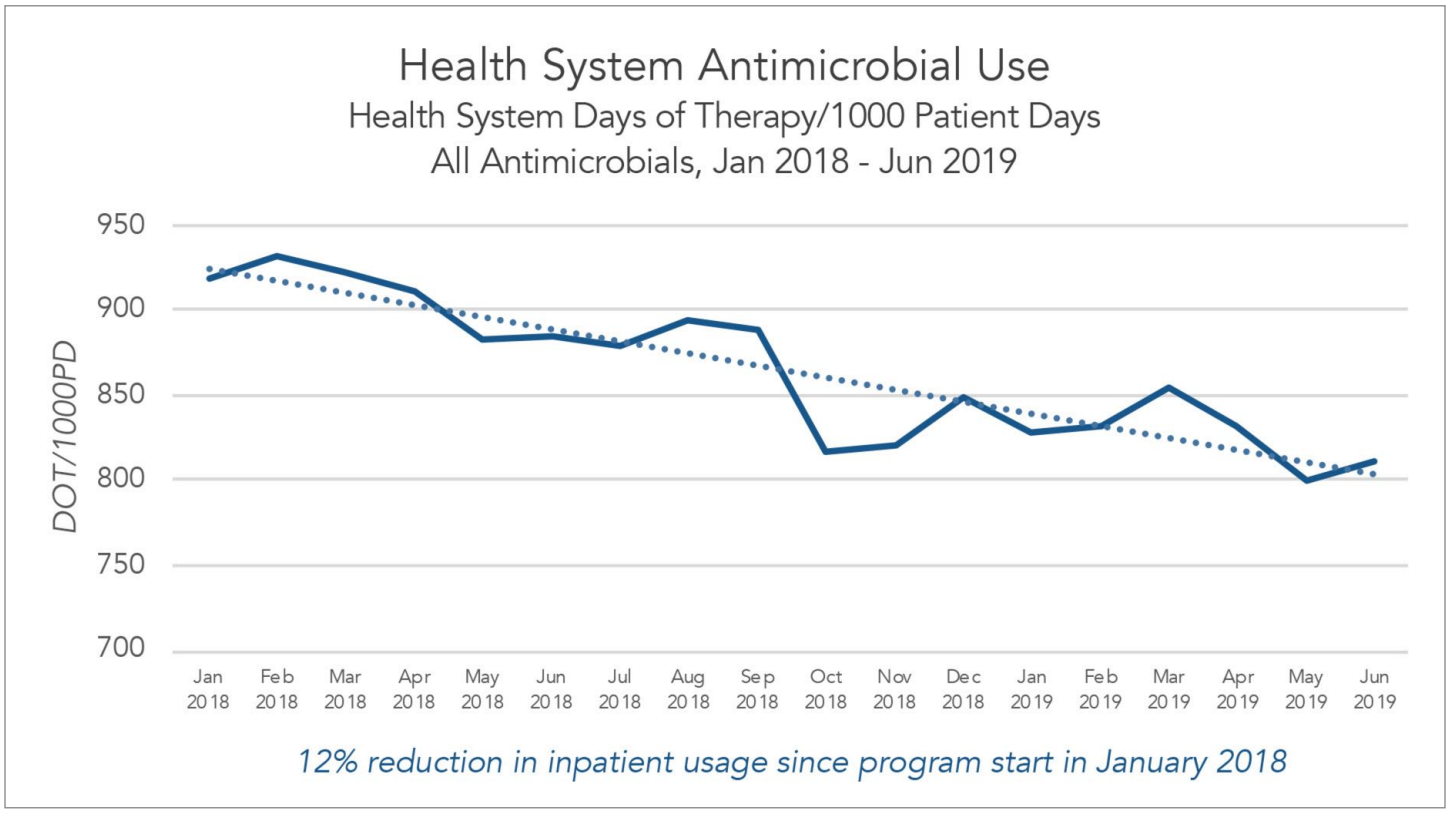
AMP service members

Over the past year, the AMP service has engaged in several quality improvement and research projects:

- A multidisciplinary AMP project that involved ID physicians and pharmacists demonstrated that 1) early intervention by ID pharmacist to assure early effective therapy for bloodstream infections (BSI) coupled with 2) review and identification of patients with low-risk and uncomplicated BSI and 3) intervention with primary service by an ID physician significantly reduced the duration of antimicrobial therapy (from median of 15 days prior to intervention to 8 days after intervention) without increased rates of recurrence, readmission, or mortality at 30 days.
- AMP in collaboration with the Clinical Microbiology laboratory established a diagnostic protocol whereby patients in the ICU fulfilling pre-specified criteria for septic shock (medical ICU (MICU)), sepsis after abdominal surgery (trauma ICU), or sepsis with mechanical circulatory support

(cardiothoracic ICU) had their whole blood tested for Candida DNA using T2Candida. The AMP team used the results to guide antifungal therapy. Targeted utilization of T2Candida in select ICU patients with sepsis reduced antifungal usage by 41%.

- The XDR Pathogen lab was cleared by CLIA in March 2019 and is now able to perform patient's sample without any restriction. The lab performs real-time molecular identification of resistance determinants for b-lactam antibiotics and antifungal, the results of which are shared with ID physicians for optimization of antimicrobial therapy. These results are also shared with the Infection Control team for isolation purpose. The lab also evaluates novel diagnostic tests for QI or research study.



Community Hospital Antimicrobial Stewardship Efforts (CHASE) Program

UPMC supports and funds an AMP Outreach program, CHASE, to curtail the use of inappropriate antibiotics. Over 1.5 year period (Jan 2018-June 2019), we have observed a 12% reduction in inpatient usage across the health system. CHASE now has the ability to monitor and report inpatient antibiotic usage at individual hospitals on a monthly basis. This information is shared with individual hospitals and is used to identify areas for improvement at each hospital.

CHASE interacts, to varying degrees, with all UPMC hospitals that are integrated into the health system EMR, and it is working to standardize antibiotic usage across the health system where possible and to assist with individualization of antibiotic usage at hospitals with specific patient populations or unique resistance patterns. In addition, CHASE is providing general education and support to clinical pharmacists at individual UPMC community hospitals, as well as assisting with specific interventions at individual hospitals based on their local usage patterns. Often in conjunction with the Wolff Center and the health system Infection

Prevention program, CHASE assists with various system-wide initiatives that overlap with antimicrobial stewardship.

Infection Prevention Program

The UPMC Infection Prevention (IP) program continues to be recognized as one of the nation's most innovative in identifying and preventing healthcare-associated infections (HAI). Led by **Graham Snyder, MD**, Director, and **Elise Martin, MD**, Associate Director, interventions have targeted multi-drug resistant organism transmission interruption and reduction of HAI due to pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE), and multidrug-resistant *Acinetobacter* (MDR ACAT). HAI reduction bundles have targeted *Clostridium difficile* (CD) and device-related HAIs, including central-line associated blood-stream infections (CLABSI), catheter-associated urinary tract infection (CAUTI), and ventilator-associated events (VAE). HAI rate reductions achieved by type appear in the table below. Additionally, multiple interventions have improved hand hygiene adherence from 53% (2008) to 92.0% (2019).

UPMC's IP program uses the highest scientific standards, insightful methodology and appropriate statistical analysis to monitor and maintain reductions in HAIs. The program has not only been successful at reducing UPMC's HAI rates, it has influenced practices at many other health organizations across the country.

Healthcare-Associated Infection (HAI) Rate Reductions

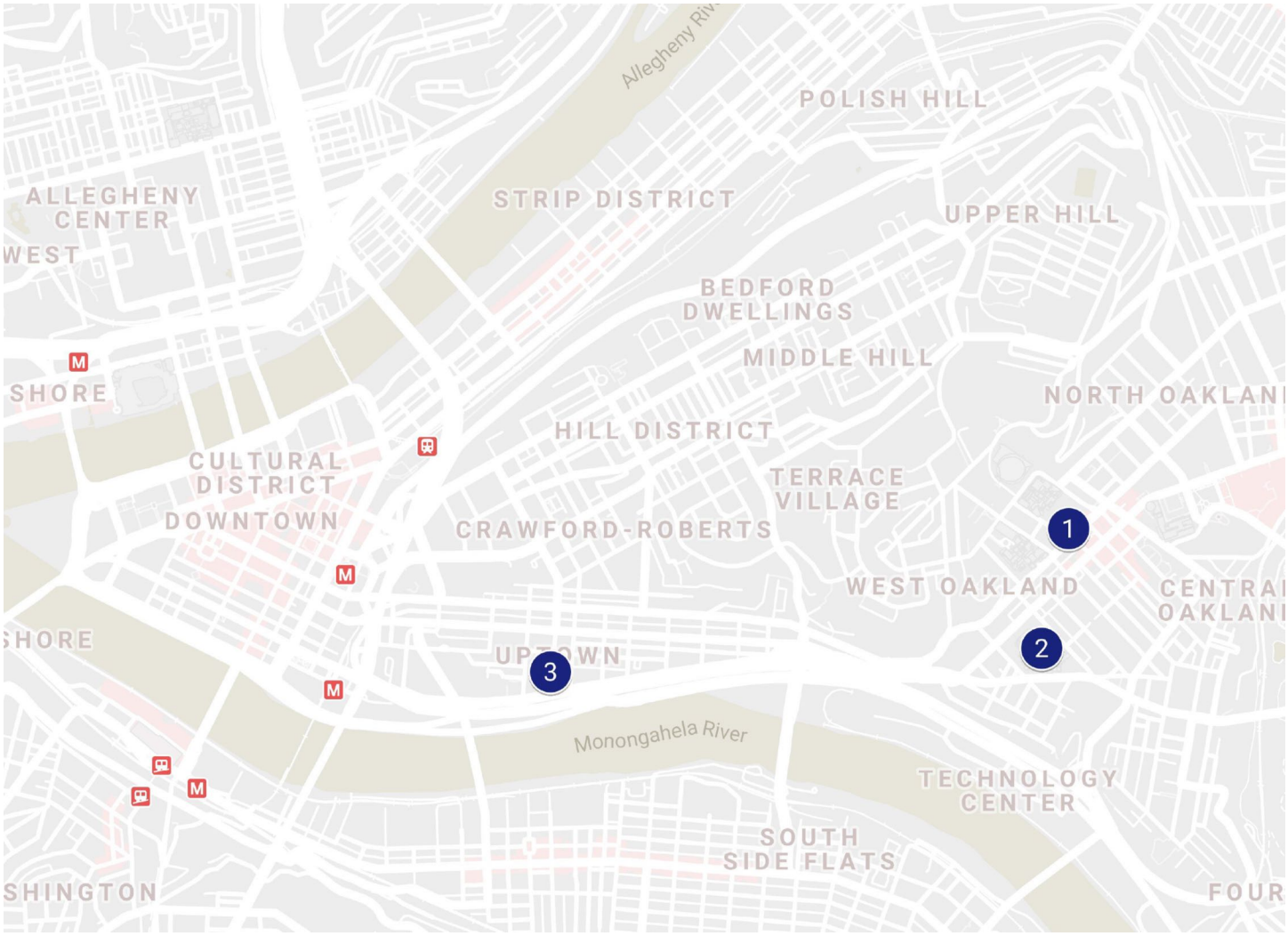
HAI Type	Initiative Onset	Baseline Rate	FY19	% Rate Reduction (Baseline vs. FY19 Rate)
VRE	2000	0.57	0.27	-53%
C. difficile	2000	11.7	9.1	-22%
MRSA	2001	0.88	0.34	-61%
CLABSI	2002	5.2	1.05	-80%
CAUTI	2002	7.4	1.46	-80%
MDR ACAT	2010	1.82	0.01	-99%
VAE	2014	14.3	6.32	-56%

**No baseline data is available for VAP as the definition change occurred in 2014*

VA Pittsburgh Healthcare System (VAPHS)

ID services provided by our faculty at the VA Pittsburgh Healthcare System (VAPHS) include general and solid organ transplant in-patient consultations (>150 consults per month) and outpatient General ID and HIV-AIDS clinics (>35 patients per week). The volume of in-patient consults has more than doubled in the past three years. General ID consultations are also provided at the H. J. Heinz Progressive Care Center (~20 consults per month). In addition to consultations on cases requested by specific services, the ID service provides real-time surveillance and guidance on all positive blood cultures and cases of pneumonia. The ID division administers a home IV antibiotic program that services veterans in a 4-state catchment area and an Antimicrobial Stewardship Program. The Infection Prevention Program is administered by the ID division and is directed by **Dr. Brooke Decker**. Dr. Decker and her Infection Prevention team have reduced rates of *Clostridium difficile* infection, and maintained comprehensive water management and pathogen remediation protocols. She and her team were awarded a poster of distinction award at the 2019 Society for Hospital Epidemiology of America's (SHEA) annual meeting. The ID division initiated a telemedicine consultation service in the past year, which provides services to VA clinics in the VISN outside of Pittsburgh and in the homes of patients.

CLINICAL LOCATIONS



1

Center for Care of Infectious Diseases (CCID)

Falk Medical Building
3601 Fifth Avenue, Suite 700
Pittsburgh (Oakland), PA 15213

2

Division of Infectious Diseases—Magee-Womens Hospital of UPMC

300 Halket Street, Tan Unit
Pittsburgh (Oakland), PA 15213

3

Division of Infectious Diseases—UPMC Mercy

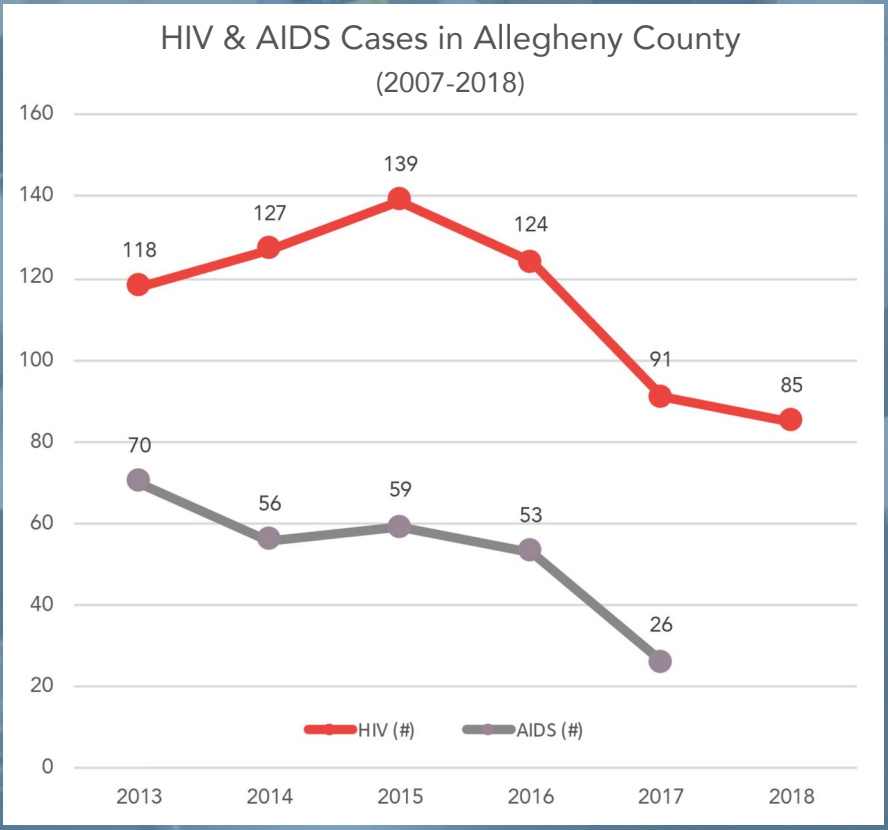
1515 Locust Street, Suite 236
Pittsburgh, PA 15219

RESEARCH AND OTHER SCHOLARLY ACTIVITIES

Basic, translational, and clinical research is a major priority for the division. In FY 2019, the division's research expenditures remain strong, with only a slight 2% decrease as compared to FY 2018 levels. The total direct and indirect cost expenditures were over $14 million, and ID continues to rank third in the Department of Medicine in research expenditures.

The division's research portfolio includes awards from the National Institutes of Health (NIH), Centers for Disease Control and Prevention (CDC), Health Resources and Services Administration (HRSA), United States Agency for International Development (USAID), foundations, and industry sponsors. The division also conducts numerous UPMC clinical trials. Strong research themes in the division include HIV-AIDS, epidemiology and molecular epidemiology of bacterial pathogens, antimicrobial resistance of gram-negative bacteria, pathogenesis of fungal infections, and biosecurity planning. The Division's research activities are concentrated in three world-class **Centers of Excellence in Research**:

The Center for AIDS Elimination, in conjunction with AIDS Free Pittsburgh, is working to eliminate new AIDS diagnoses in Allegheny County by 2020



Center for AIDS Elimination (CAE)
Our **Center for AIDS Elimination (CAE)** provides clinical, educational, and scientific research for the purposes of prevention, treatment, and cure of HIV/AIDS. Through the combined efforts of innovative laboratory methods, cutting-edge translational research, patient care, public health programs, and community outreach, the CAE is diligently working toward the goal of finding better HIV therapeutics and treatment, a functional cure for HIV, and ending the HIV-AIDS epidemic.

As an example, AIDS Free Pittsburgh was launched in 2016 as a local collaborative effort among health care providers and community organizations to reduce new cases of HIV infection by

75%, and eliminate AIDS diagnoses by 2020 in Allegheny County (http://www.aidsfreepittsburgh.org/index.php). As shown in the graphic to the left, the incidence of HIV infection and AIDS diagnoses has declined steadily toward the 2020 goals of AIDS Free Pittsburgh.

Center for Antibody Therapeutics (CAT)

Our **Center for Antibody Therapeutics (CAT)** identifies, characterizes and engineers novel human monoclonal antibodies (mABs) as candidate therapeutics, as well as develops novel strategies to increase their safety and efficacy against viruses, cancer, and other diseases, as well as aging. Its overall mission is to develop safe and effective therapeutics for unmet medical needs. CAT also develops new methodologies to improve safety and efficacy of candidate therapeutics as full size antibodies (mostly IgG1), antibody domains, Chimeric Antigen Receptors (CARs), antibody-drug conjugates (ADCs), bispecific and multispecific antibodies including bispecific T cell engagers (BiTEs) and bispecific killer cell engagers (BiKEs), as well as trispecific variants (TriKEs).

Between July 1, 2018, and June 30, 2019, CAT generated 5 antibody phage-displayed libraries in three different formats—VH, scFv and Fab—from which binders to six cancer-related protein targets were identified. CAT published 8 articles, filed 10 invention disclosures, and submitted three grant proposals to the NIH, two of which were funded and the third will be resubmitted. More than 10 oral presentations were given at the University of Pittsburgh, national, and international meetings. One spinoff company was formed which will begin to function in 2020.

Center for Antibody Therapeutics

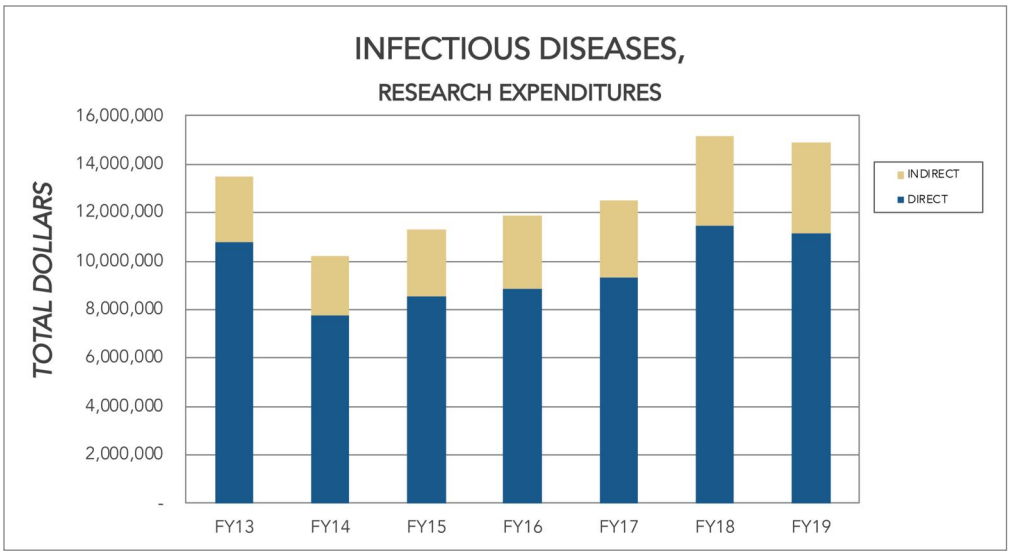
Center for Innovative Antimicrobial Therapy (CIAT)

Our **Center for Innovative Antimicrobial Therapy (CIAT)** investigates novel approaches to combat the growing problem of antimicrobial resistance. CIAT's areas of research include genetic and molecular basis of emerging antimicrobial resistance mechanisms; the rapid diagnosis of resistance utilizing phenotypic, genetic and lipidomic approaches; discovery of therapeutics using peptides, small-molecule inhibitors and bacteriophages; and implementation of pharmacokinetic and clinical studies to directly improve patient care.

FY19 Highlights

New research initiatives and ongoing and planned collaborations in the Division include:

- **Cornelius Clancy, MD**, received a 20-month Centre Hospitalier Universitaire Vaudois contract for "T2MR study in SICU patients at high risk for intra-abdominal candidiasis," for $20,000 for the period December 14, 2018, through August 31, 2020.
- **Cornelius Clancy, MD**, received a two-year NIH R21 award, "Mechanisms of ceftazidime-avibactam susceptibility and resistance among Enterobacteriaceae expressing variant KPCs," with



total costs of $411,866 for the period December 1, 2018, through November 30, 2020.

- **Cornelius Clancy, MD**, received a two-year NIH R21 award, "*Candida albicans* regulatory pathways contributing to intra-abdominal candidiasis" in the amount of $426,676 for the period February 22, 2019, through January 31, 2021.
- **Cornelius Clancy, MD**, received a one-year T2 Biosystems, Inc. award for "Impact of protocol-driven T2Bacteria testing on antimicrobial usage and outcomes of liver and kidney transplant recipients," with total costs of $51,250 for the period April 5, 2019 through April 4, 2020.
- **Yohei Doi, MD, PhD**, received a three-year NIH subaccount in collaboration with Dr. Berthony Deslouches in the Graduate School of Public Health for "Determinants and Mechanisms of Efficacy of Peptide Antibiotics as Novel Sepsis Therapy," with total costs of $45,409 for the period August 1, 2018, through July 31, 2021.
- **Yohei Doi, MD, PhD**, and **Ryan Shields, PharmD**, received a one-year NIH subcontract with Duke University for "ARGL-FOCUS," with total costs of $100,492 for the period December 1, 2018, through November 30, 2019.
- **Yohei Doi, MD, PhD**, received a five-year NIH subaccount in collaboration with Dr. Nader Shaikh in the Department of Pediatrics for "Biomarkers for Urinary Tract Infections and Pyelonephritis" with total costs of $130,599.
- **Ghady Haidar, MD**, received a two-year NIH subcontract with Johns Hopkins University for "Prospective observational study of HIV+ deceased donor liver transplant for HIV+ recipients," with total costs of $27,906 for the period January 1, 2019, through July 31, 2019.
- **Ghady Haidar, MD**, received a five-year NIH subcontract with The Washington University in St. Louis for "Metagenomic shotgun microbial sequencing in post-transplant lymphoproliferative disorders (PTLD-MSMS)," with total costs of $78,350 for the period June 10, 2019, through May 31, 2024.
- **Lee Harrison, MD,** and **Nicolas Sluis-Cremer, PhD**, received a five-year NIH T32 award, "University of Pittsburgh Training Program in Antimicrobial Resistance," with total costs of $988,818 for the period May 16, 2019, through April 30, 2024.
- **Ken Ho, MD**, received a seven-year NIH U01 subaccount for his role as Clinical Director for "University of Pittsburgh MACS/WIHS CCS" with PI Charles Rinaldo, PhD, Professor and Chair of Infectious Diseases and Microbiology in the Graduate School of Public Health. The total costs of this project are $24,450,000 with project dates of April 1, 2019, through March 31, 2026.
- **Ken Ho, MD**, received a one-year NIH R01 subaccount from Magee Womens Research Institute and Foundation for "Development of a Urine-based point-of-care test for adherence to

antiretroviral drugs," a project under PI Rhonda Brand, PhD. Funding in the amount of $204,539 was awarded for the period of December 1, 2018 through November 30, 2019.

- **Bernard Macatangay, MD**, was awarded a four-year NIH R01 in collaboration with Dr. Sanjay Patel in the Division of Pulmonary, Allergy and Critical Care Medicine for "Impact of Poor Sleep on Inflammation and the Adenosine Signaling Pathway in HIV Infection" with total costs of $2,078,217 from August 1, 2018, through April 30, 2022.
- **Bernard Macatangay, MD**, received a seven-year NIH U01 subaccount for his role as Co-Investigator on "University of Pittsburgh MACS/WIHS CCS" with PI Charles Rinaldo, PhD, Professor and Chair of Infectious Diseases and Microbiology in the Graduate School of Public Health. The total costs of this project are $24,450,000 with project dates of April 1, 2019 through March 31, 2026.
- **Jane Marsh, PhD**, was awarded a one-year CDC sub-contract in collaboration with Johns Hopkins University for "Maryland Emerging Infectious Program (ABC Training)" with total costs of $214,316 from January 1, 2019, through December 31, 2019.
- **Hong Nguyen, MD**, and **Rachel Marini, PharmD**, received a two-year grant from Merck Sharp & Dohme, Corp. for the project "CMV infections among organ transplant patients: Efficacy and adverse events of valganciclovir prophylaxis, and risk factors for ganciclovir-resistant virus," with total costs of $48,050 for the period September 13, 2018, through August 31, 2020.
- **Hong Nguyen, MD**, received a one-year grant from Scynexis, Inc. for "In vitro activity of Ibrexafungerp (SCY-078) alone and in combination with anti-mould azole against clinical isolates of Aspergillus species recovered from lung transplant patients with prior exposure to azole therapy," with total costs of $24,375 for the period April 10, 2019, through April 9, 2020.
- **Ryan Shields, PharmD**, received a one-year grant from Shionogi & Co. Ltd. for "*In vitro* activity of cefiderocol against multiply- (MDR) and extensively- (XDR) drug resistant Pseudomonas aeruginosa clinical isolates," with total costs of $19,255 for the period November 22, 2018 through December 31, 2019.
- **Ryan Shields, PharmD**, received a one-year grant from Tetraphase Pharma for "*In vitro* activity of eravacycline against carbapenem-resistant Enterobacteriaceae (CRE) isolates demonstrating resistance to ceftazidime-avibactam" with total costs of $50,635 for the period January 1, 2019, through December 31, 2019.
- **Ryan Shields, PharmD**, was awarded a two-year NIH R03 grant, "Characterization and suppression of resistance to new CRE agents," with total costs of $156,500 for the period March 4, 2019 through February 28, 2021.
- **Nicolas Sluis-Cremer, PhD**, received a one-year NIH R56 award, "The HIV Reservoir in Naïve CD4+ T Cells," with total costs of $559,118 for the period August 1, 2018, through July 31, 2019.
- **Nicolas Sluis-Cremer, PhD**, received a seven-year NIH U01 subaccount in collaboration with Dr. Charles Rinaldo in the Department of Infectious Diseases and Microbiology in the Graduate School of Public Health for "University of Pittsburgh MACS-WIHS CCS," with total costs of $200,961 for the period April 1, 2019, through March 31, 2026.
- **Daria Van Tyne, PhD**, received a three-year NIH R00 award, "Bacterial Evasion of Innate Defenses at the Ocular Surface," with total costs of $746,976 for the period September 1, 2019, through August 31, 2021.

Faculty Research Interests and Activities

John W. Mellors, MD *Division Chief*

Dr. Mellors led several studies with samples from the multicenter AIDS cohort study (MACS) that established the critical relationship between plasma viremia (HIV-1 RNA) and HIV disease progression to AIDS and death in both acute and chronic HIV-1 infection. This work led to the universal use of plasma HIV-1 RNA and CD4+T-cell counts to estimate prognosis in HIV-1 infection and the optimal time to initiate antiretroviral therapy (ART). Dr. Mellors also contributed to the development and testing of the first antiretroviral combinations that produced sustained suppression of viremia and recovery of CD4+T-cells that launched the current era of highly-effective ART.

Presently, Dr. Mellors's laboratory focuses on resistance to antiretroviral drugs used for treatment and HIV prevention and on mechanisms of HIV persistence and strategies to deplete the reservoirs that are the barrier to curing HIV infection. His work on HIV reservoirs showed that low-level viremia persists in most individuals on long-term suppressive ART, and that the level of residual viremia is predicted by the level of viremia before ART. Current work focuses on identifying agents to reverse HIV latency and to eliminate HIV infected cells. The impact of innovative therapies on HIV reservoirs is being studied in Phase I/II trials of histone deacetylase inhibitors, monoclonal antibodies to immune checkpoint ligands, monoclonal antibodies to HIV envelope glycoproteins, and TLR agonists.

Advisory Committee Memberships and Leadership Positions

- Member, Scientific Committee, Conference on Retroviruses and Opportunistic Infections, 1994-present
- Member, Organizing Committee, International Workshop on HIV Drug Resistance and Combination Therapies, 1996-present
- Co-Chair, International Workshop on HIV Drug Resistance and Combination Therapies, 1996-present
- Consultant, Center for Biologics Evaluation and Research, Food and Drug Administration, 1997-present
- Organizer, Symposium on Antiviral Drug Resistance, 2000-present
- Member, Executive Committee and Central Laboratory Committee, NIH-sponsored Microbicide Trials Network (MTN), and MTN Director of Virology, 2006-present
- Member, H1N1 Influenza Task Force, 2009-present
- Member, Past Chair, AIDS Clinical Trials Group Network's HIV Reservoirs and Viral Eradication Transformative Science Group, 2011-present
- Member, Scientific Committee, International AIDS Society Towards a Cure, 2011-present
- Member, Scientific Program Committee, International Microbicides Conference, 2012-present
- Member, Scientific Committee, HIV Persistence Workshop, 2014-Present
- CTU PI/CRS Leader At-Large, Executive Committee, AIDS Clinical Trials Group, 2017-present
- External Review Group Member for HIV Drug Resistance (HIVDR), World Health Organization, 2017-Present
- Steering Group Member for Clinical and Research Global Action Plan for HIVDR, World Health Organization, 2019-present

Editorships

- Editor, HIV Database, Los Alamos National Laboratory, 1995-present

Honors and Awards

- Top 1% Highly Cited Researchers, Clarivate Analytics, Philadelphia, PA, November 2018

Rima Abdel-Massih, MD

Dr. Abdel-Massih's research interests include infectious complications in transplant recipients, cytomegalorius, fungal infections, and bacterial resistance. A co-investigator on multiple clinical trials, she also has a special interest in telehealth models of care applied in the infectious diseases specialty.

Advisory Committee Memberships and Leadership Positions

- Member, Antimicrobial Management Program, UPMC, 2009-present
- Member, Internal Medicine Residency Application Interviewing Committee, University of Pittsburgh Medical Center, 2010-present
- Member, ID Educational Initiative Workgroup, American Society of Transplantation, 2011-present
- Member, Program Directors Community, Infectious Diseases Society of America, 2016-present
- Director, Infectious Diseases Fellowship Program, 2016-present
- Member, Telehealth and Telemedicine Workgroup, IDSA, 2017-present

Professional Affiliations and Society Memberships

- Member, Association of Program Directors of Internal Medicine, 2016-present
- Member, Infectious Diseases Society of America (IDSA), 2007-present
- Member, American Society of Transplantation, 2008-present
- Member, International Immunocompromised Host Society, 2018-present

Editorships

- Ad hoc Reviewer, *Transplant Infectious Diseases*, 2009-present

Ricardo D. Arbulu, MD

Dr. Arbulu is currently evaluating the impact of an institutionally structured intervention to stratify patients previously labeled as penicillin allergic with respect to their safety to receive beta-lactam antibiotics. The outcome measures include the appropriateness of antibiotics prescribed, drug-related adverse events, and cost savings. Dr. Arbulu is also investigating the historical incidence of carbapenem-resistant organisms at UPMC Mercy.

Professional Affiliations and Society Memberships

- Member, American College of Physicians (ACP), 2006-Present
- Member, Infectious Diseases Society of America (IDSA), 2009-present
- Member, Society for Healthcare Epidemiology of America (SHEA), 2017-Present

Hassan Badrane, PhD

Dr. Badrane is investigating opportunistic infections caused by Candida species of yeasts, particularly *C. albicans*. He is characterizing genes where expression has been found to be induced in vivo and their encoded protein have an immunogenic property. Presumably, these genes will be important during infection. Among them, he characterized IRS4 to encode for an Eps15 homology (EH) domain protein, which regulates the levels of phosphatidylinositol (4,5)-bisphosphate (PI(4,5)P2). This regulation is exerted by activating Inp51p, a 5-phosphatase enzyme that converts PI(4,5)P2 to PI4P. Indeed, mutant strains in which either IRS4 or INP51 has been knocked-out had higher levels of PI(4,5)P2, which in turn affected the cell wall integrity pathway and hyphal growth, and attenuated virulence to mice in a disseminated candidiasis model. In addition, these mutant strains exhibited abnormal intracellular patches of PI(4,5)P2 that colocalized with septins. Currently, he is deciphering the upstream regulation that controls the function of Irs4p/Inp51p as

well as setpins.

J. Ryan Bariola, MD

Dr. Bariola's interests include improved use of antimicrobials for hospitalized patients, as well as the use of rapid diagnostics to improve the detection and timely management of infections. He also has interests in the area of endemic fungal infections, particularly blastomycosis.

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America, 2005-present
- Member, Society for Healthcare Epidemiology of America, 2015-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Tatiana Bogdanovich, MD, PhD, MSc

Dr. Bogdanovich's research interests are focused on the prevention and treatment of infections in solid organ transplant recipients as well as stem cell transplant recipients. Her other main area of research interest is clinical and microbiologic efficacy of the fecal microbiota transplantation (FMT) for recurrent *Clostridioides difficile* infections (rCDI). She is leading the FMT laboratory and has been enrolling patients in the registry of FMT for rCDI. She is also involved in the clinical trials of experimental treatments for rCDI (Ser-109 and ridinilazole).

Advisory Committee Memberships and Leadership Positions

- Member, Antimicrobial Management Program, UPMC, 2012-present
- Member, *C. Difficile* Reduction Committee, 2016-present

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America (IDSA), 2009-present
- Member, Center for Innovative Antimicrobial Therapy, 2016-present

Malak B. Bokhari, MD, MPH

Dr. Bokhari's research interests center on the prevalence of anal dysplasia in pre-transplant population, anal cancer screening post-transplant, and image recognition of dysplasia using an artificial intelligence algorithm.

Professional Affiliations and Society Memberships

- Member, International Society of Anal Dysplasia, 2013-present

Honors and Awards

- Fellow, American Society of Colon and Rectal Surgery, 1996-present
- Fellow, American College of Surgeons, 2011-present

Karin E. Byers, MD, MS

Dr. Byers's major areas of interest are orthopedic and neurosurgical infections. She is also interested in preventing adverse outcomes from antibiotics.

Advisory Committee Memberships and Leadership Positions

- Member, Antibiotic Approval Committee, UPMC, 2002-present
- Member, Clinical Directors' Council, UPMC, 2012-present
- Member, Clinical Competence Committee (Infectious Diseases), University of Pittsburgh School of Medicine, 2013-present
- Member, Pharmacy and Therapeutics Subcommittee, UPMC, 2014-present

Professional Affiliations and Society Memberships

- Member, American Medical Association, 1991-present
- Associate Member, American College of Physicians, 1991-present
- Member, Infectious Diseases Society of America (IDSA), 1997-present
- Member, American Society of Microbiology (ASM), 1997-present
- Member, Musculoskeletal Infections Society, 1997-present

Honors and Awards

- Fellow, Society for Healthcare Epidemiology of America, 1997-present
- Honoree, Best Doctors, *Pittsburgh Magazine*, 2016-2019

Shaoji Cheng, MD, PhD

Dr. Cheng's research interests are the pathogenesis of Candida infection and the Enterobacter infection, as well as the mechanisms of antifungal drug resistance.

Madhu Choudhary, MD

Dr. Choudhary is most interested in HIV/AIDS treatment and HIV prevention. She is also engaged in clinical trials of new agents for the treatment of hepatitis B and C and in clinical trials for HIV co-infected.

Cornelius J. Clancy, MD

Dr. Clancy's laboratories are interested in the molecular pathogenesis of invasive infections caused by the fungus *Candida albicans* and multi-drug resistant Gram-negative bacteria. Dr. Clancy's labs have implicated several novel *Candida albicans* and *Klebsiella pneumoniae* genes that contribute to the pathogenesis of invasive infections. Biological processes related to these genes that are studied in the lab include histone methylation and transcriptional regulation, DNA damage responses, and phosphoinositide regulation. In addition, he and Dr. Nguyen collaborate on research about mechanisms of antimicrobial resistance in bacteria and fungi and their clinical relevance.

Study Sections

- Member, NIH ZRG1 IDM S (81) Study Section AREA (R15): Infectious Diseases, Microbiology and Drug Discovery, 2014-present

Advisory Committee Memberships and Leadership Positions

- Member, Academic Committee, Infectious Diseases Division Fellowship Program, University of Pittsburgh, 2007-present
- Member, Interviewing Committee, Internal Medicine Residency and Infectious Diseases Fellowship Program, University of Pittsburgh, 2007-present
- Member, Research and Development Committee, VA Pittsburgh Healthcare System, 2008-present
- Member, Pneumonia Committee, VA Pittsburgh Healthcare System, 2014-present
- Director, Antimicrobial Stewardship Program, VA Pittsburgh Healthcare System, 2014-present
- Director, Infection Control and Prevention, VA Pittsburgh Healthcare System, 2014-present
- Member, Water Safety Committee, VA Pittsburgh Healthcare System, 2014-present

Editorships

- Ad hoc reviewer, *Antimicrobial Agents and Chemotherapy*, 2004-present
- Ad hoc reviewer, *PLoS Pathogens*, 2004-present
- Ad hoc reviewer, *Clinical Infectious Diseases*, 2004-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Matthew Culyba, MD, PhD

Dr. Culyba's laboratory fuses molecular and biochemical methodologies with experimental microbial evolution to study mutational phenomena and bacterial adaptation. Mutation and gene transfer events are the source of heritable variation for evolution. These genome diversifying processes can range from being relatively site-specific in the genome to being nearly random. Furthermore, beyond the mutations themselves, the DNA damage and DNA repair events associated with mutagenesis can also be deleterious to the host and are subject to multiple levels of active regulation by cells. Understanding how microorganisms respond to their environments and control the rate and specificity of mutagenesis is the focus of the laboratory. Ongoing studies are aimed at elucidating the (i) molecular mechanisms which regulate mutational phenomena in bacteria during transitions to new environments, (ii) molecular specificity determinants of enzymes involved in mutational phenomena, and (iii) new methods for tracking and detecting mutations in populations of cells. Research projects in the lab are designed to inform a variety of pressing scientific challenges, including combating the crisis of antimicrobial resistance, improving the specificity and safety of cutting-edge gene editing technologies, and building a comprehensive model of molecular evolution.

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America (IDSA), 2013-present

Joshua C. Cyktor, PhD

Dr. Cyktor is an immunovirologist who specializes in the interface of intracellular pathogens, like HIV-1 and *Mycobacterium tuberculosis*, within the human immune system. Specifically, he is interested in understanding the mechanisms of HIV-1 persistence in patients despite years of suppressive treatment. He is a protocol virologist for several AIDS Clinical Trials Group studies that are at the forefront of translational HIV-1 clinical research and is the Associate Director of the Pitt Virology Specialty Laboratory.

Advisory Committee Memberships and Leadership Positions

- Member, Inflammation and End-Organ Disease Transformative Science Group, AIDS Clinical Trials Group (ACTG), 2017-present
- Leader, A5321 Virology Working Group, AIDS Clinical Trials Group (ACTG), 2018-present

Brooke K. Decker, MD

As Director of Infection Prevention at VA Pittsburgh Healthcare System, Dr. Decker is most interested in the epidemiology of hospitalassociated infections, transmission of resistant organisms, and prevention of hospital waterborne infections, including Legionnaire's Disease.

Honors and Awards

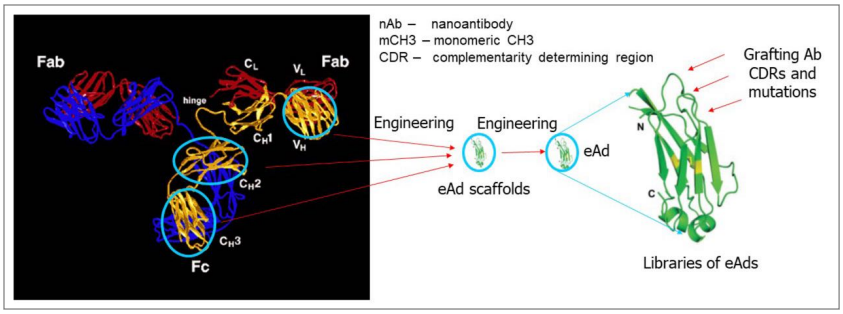
- Recipient, Chief of Staff Clinical Excellence Award, July 2018

Dimiter S. Dimitrov, PhD

Dr. Dimitrov focuses his research on identifying, engineering, and characterizing human monoclonal antibodies as candidate therapeutics against cancer, viruses, and aging. He is developing new methodologies to improve safety and efficacy of candidate therapeutics as full-size antibodies (mostly IgG1), antibody domains, Chimeric Antigen Receptors (CARs), antibody-drug conjugates (ADCs), bispecific and multispecific antibodies including bispecific T cell engagers (BiTEs), and bispecific killer cell engagers (BiKEs), as well as trispecific variants (TtiKEs).

Advisory Committee Memberships and Leadership Positions

- Member, Board of Distinguished Advisors, The Antibody Society, 2010-present
- Member, Advisory Committee, Antibody Interest Group, NIH, 2010-present
- Member, Scientific Advisory Board, Fred Hutchinson Program on AIDS Vaccine, 2013-2019
- Member, International Scientific Advisory Board, Institute of Medical Microbiology, Fudan University, 2013-present



As Director of the Center for Antibody Therapeutics, Dr. Dimitrov is researching and developing human monoclonal antibodies to help treat individuals with cancer and viral infections.

Editorships

- Editorial Board, *Journal of Virology*, 2007-present
- Founding Member and Editorial Board, *mAbs*, 2008-present
- Editorial Board, *The Open Virology*, 2008-present
- Editorial Board, *Journal of Bionanoscience*, 2009-present
- Editorial Board, *Antibodies*, 2011-present
- Editor, *PLOS One*, 2012-present
- Editorial Board, *Journal of Cancer Research and Therapeutic Oncology*, 2013-present
- Associate Editor, *Virologica Sinica*, 2013-present
- Editorial Board, *Expert Review of Precision Medicine and Drug Development*, 2017-present

Yohei Doi, MD, PhD

The mission of Dr. Doi's laboratory is to identify and investigate antimicrobial resistance of clinical concern among gram-negative bacterial pathogens. The areas of research include the genetic and molecular basis of emerging antimicrobial resistance mechanisms; the rapid diagnosis of resistance using phenotypic, genetic, and lipidomic approaches; and inhibitor-based drug discovery. Current efforts are focused on colistin resistance in *Acinetobacter baumannii*, a problematic healthcare-associated pathogen, and fosfomycin resistance in Escherichia coli, the predominant cause of urinary tract infection in both healthcare and community settings. The latter work has expanded into drug discovery effort aimed at reversing resistance using an inhibitor-based approach.

Advisory Committee Memberships and Leadership Positions

- Member, Institutional Review Board, University of Pittsburgh, 2010-present
- Member, DSMB, Clinical and Translational Science Institute, University of Pittsburgh, 2014-present
- Chair, Gram-Negative Subcommittee, Antimicrobial Resistance Leadership Group, National Institute of Allergy and Infectious Diseases, 2015-present

Editorships

- Editorial Board, *Diagnostic Microbiology and Infectious Disease*, 2012-present
- Associate Editor, *Journal of Infection and Chemotherapy*, 2012-present
- Ad hoc Reviewer, Multiple journals (*Critical Care Medicine, International Journal of Antimicrobial Agents, Infection Control and Hospital Epidemiology, PLoS One,*
- *Journal of Antimicrobial Chemotherapy, Antimicrobial Agents and Chemotherapy, Critical Care Medicine, International Journal of Antimicrobial Agents)*, 2012-present

- Editor, *Antimicrobial Agents and Chemotherapy*, 2014-2019
- Ad hoc Reviewer, *Journal of Microbiology, Immunology and Infection,* 2014-present
- Editorial Board, *Journal of Clinical Microbiology*, 2015-present

Bonnie A. Falcione, PharmD

Dr. Falcione aims to identify strategies to prevent and treat infectious diseases in critically ill patients, as well as those at risk for critical illness due to the onset of infection or a complication of treating the infection, particularly those due to antimicrobial resistant organisms. She places particular emphasis on the use of available resources to improve empiric drug selection, dosing, and monitoring strategies for agents with high toxicity potential (vancomycin, colistin, aminoglycosides). She also seeks to identify concurrent drug therapies that may increase the risk of interfering with antimicrobial regimens in these critically ill patients or increasing the risk of critically ill patients developing an infection.

Dr. Falcione's research also centers on the prevention of infectious diseases and inappropriate antimicrobial use by increasing awareness of vaccine strategies, the best use of tools to identify the presence or absence of infections, and antimicrobial-use principles relevant to the individual patient.

Finally, she focuses on the development of teaching methods and strategies to educate pharmacy students and other healthcare professional trainees on optimal prevention and treatment strategies, including awareness of principles and strategies of antimicrobial stewardship.

Professional Affiliations and Society Memberships

- Member, Society of Infectious Diseases Pharmacists, 2004-present
- Member, American Association of Colleges of Pharmacy, 2005-present
- Member, Society of Critical Care Medicine, 2011-present
- Member, Pennsylvania Pharmacists Association, 2013-present
- Member, Allegheny County Pharmacists Association, 2013-present

Carolyn R. Fernandes, MD

Dr. Fernandes's research involves travel-related infections, tuberculosis, and infections due to *Staphylococcus aureus*.

Advisory Committee Memberships and Leadership Positions

- Member, ED/ICU/Medicine Committee, Magee-Womens Hospital of UPMC, 2013-current
- Member, Clinical Competency Committee, University of Pittsburgh School of Medicine, 2014-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019
- Recipient, Best Doctors in America List, 2019-2020

Christiane M. Hadi, MD, MPH, MSc

Dr. Hadi is a clinician-educator with an interest in both General ID and HIV medicine. She plays an important role in our travel medicine clinic and, as a member of the North American Society of Refugee Health Providers, continues providing care for local refugees.

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America (IDSA), 2003-present

- Member, North American Society of Refugee Health Providers, 2014-present

Ghady Haidar, MD

Dr. Haidar's research focuses on transplant recipients. He has studied the clinical outcomes of extensively drug-resistant Gram-negative bacteria in the transplant setting, specifically novel beta-lactam/beta-lactamase-inhibitor combinations and mechanisms of microbial resistance to these agents. Dr. Haidar is also involved in clinical research in solid organ transplantation (SOT) recipients, via the American Society of Transplantation ID Community of Practice. He oversees HIV-to-HIV organ transplantation at UPMC as part of the multicenter HOPE trial, which seeks to determine the safety and efficacy of transplanting an HIV-infected organ into an HIV-infected recipient. Dr. Haidar has a special interest in immunotherapy and fecal microbiota transplantation for the management of infectious diseases.

Elias K. Halvas, PhD

Dr. Halvas' researches the human immunodeficiency virus type 1 (HIV-1). Specifically, he focuses on the development, validation, and testing of new technologies to detect and quantify major- and low-frequency drug-resistant HIV-1 variants. He monitors HIV-1 drug-resistance and evolution by standard genotyping of patient samples, and he investigates the role of low-frequency HIV-1 drug-resistance variants on clinical outcomes. Dr. Halvas also dissects the mechanisms of HIV-1 pathogenesis, carcinogenesis, and persistence as related to HIV cure strategies.

Early in his career, Dr. Halvas's research dissected the structural determinants important for reverse transcriptase fidelity, as well as the development and validation of novel genotypic assays used on clinical samples from HIV-1 infected patients enrolled in either the AIDS Clinical Trial Group or Microbicides Trials Network. This work was related to the detection/and quantification of major and minor drug-resistance variants employing standard genotyping, single genome sequencing (SGS), and allele-specific PCR in the context of ART efficacy and mother-to- child transmission. This research was instrumental in determining the predictive value that these major and minor HIV-1 drug-resistant variants have on clinical outcomes.

Currently, Dr. Halvas's research involves investigating the role that clonal expansions of HIV-1 infected cells play in HIV-1 persistence and carcinogenesis. This research is being conducted through the application of SGS to detect cellassociated viral DNA and RNA, virus-associated RNA, and full length viral genomes, as well as the recovery of infectious virus, and the capture of integration sites in these HIV-1 infected cells.

Professional Affiliations and Society Memberships

- Member, American Society of Microbiology (ASM), 2001-Present

Lee H. Harrison, MD

Dr. Harrison is a Professor of Medicine and heads the Infectious Diseases Epidemiology Research Unit. His research has focused on the epidemiology and molecular epidemiology of important bacterial pathogens, including *Haemophilus influenzae*, *Streptococcus pneumoniae*, group B *Streptococcus*, *Neisseria meningitidis*, methicillin-resistant *Staphylococcus aureus*, and *Clostridium difficile*. A major focus of his research is methods for enhanced detection of hospital-acquired transmission of bacterial pathogens. Dr. Harrison is also the Director of an NIH Fogarty International Center training grant on the epidemiology and prevention of HIV in Mozambique and on public health genomics in South Africa, as well as ID's recently funded T32 training grant focused on antimicrobial resistance.

Study Sections

- Member, Infectious, Reproductive, Asthma and Pulmonary Conditions (IRAP) Study Section, 2017-Present

Advisory Committee Memberships and Leadership Positions

- Member, Active Bacterial Core Surveillance Steering Committee, CDC, 2000-present
- Member, Emerging Infectious Diseases Network Steering Committee, CDC, 2000-present
- Chairman, Allegheny County Board of Health, 2013-present

Professional Affiliations and Society Memberships

- Member, American Epidemiological Society, 2006-present

Editorships

- Editorial Advisory Board Member, *Journal of Infectious Diseases*, 2006-present

Honors and Awards

- Member, Alpha Omega Alpha, Honor Medical Society, 1982-present
- Member, American Society for Clinical Investigation, 2000-present
- Fellow, Infectious Diseases Society of America (IDSA), 2017-Present

Ken S. Ho, MD, MPH

Dr. Ho's primary research focuses on biomedical strategies for HIV prevention and, in particular, HIV pre-exposure prophylaxis (PrEP) and microbicide development. He conducts multiple clinical trials of PrEP and microbicides at the University of Pittsburgh Clinical Trial Unit. He was the investigator of record for the Next-PrEP Study (HPTN-069), a safety and tolerability study of maraviroc based regimens for PrEP. He is also the protocol chair for MTN-033: An Open Label Randomized Phase 1 Pharmacokinetic Study of Dapivirine Gel Administered Rectally to HIV-1 Seronegative Adults. Additionally, Dr. Ho is the investigator of record of several other microbicide studies, such as DREAM-01 (evaluation of a tenofovir enema), MTN-026 (Dapivirine gel), MTN-035 (behavioral study of rectal microbicide placebo products), and PREVENT (phase 1 trial of rectal griffisthin gel). Dr. Ho is also the Medical Director of the Pitt Mens Study, the Pittsburgh branch of the Multicenter AIDS Cohort Study.

Advisory Committee Memberships and Leadership Positions

- Member, Education Committee, Gay Lesbian Medical Association, 2010-present
- Member, Pharmacovigilance Safety Officer, Microbicide Trials Network, 2011-present
- Member, Committee G, University of Pittsburgh Institutional Review Board, 2013-present
- Board Member, Pittsburgh AIDS Task Force, 2014-present
- Chair, AIDS Free Pittsburgh PrEP Subc, 2015-present
- Board Member, Shepherd Wellness Center, 2018-Present

Honors and Awards

- Partners of Distinction Award, AIDS Free Pittsburgh, Pittsburgh, PA, March 2019

Jae Ho Hong, MD

Dr. Hong researches multidrug resistant bacterial infection.

Jana L. Jacobs, PhD

Dr. Jacobs's research is focused on the persistent reservoir that precludes HIV-1- infected patients on antiretroviral therapy from achieving cure. In particular, she focuses on the development of molecular-based

assays to characterize the reservoir and assess clinical strategies aimed at perturbing or eliminating this reservoir.

Dontcho V. Jelev, PhD

Dr. Jelev's research focuses on constructing phage display libraries for antibody discovery. He is discovering human antibodies and/or humanization of non-human antibodies targeting validated epitopes of cancer-specific antigens. Dr. Jelev is developing site-specific antibody-drug conjugates or bi-specific antibodies for use as cancer therapeutics.

Eun Jeong Kwak, MD

Dr. Kwak's research interests include outcomes and therapeutics in viral infections in solid organ transplant recipients, as well as cytomegalovirus and respiratory viral infections in lung transplant recipients, management and prophylaxis for fungal infections in lung transplant recipients, and outcomes and management of infections by multidrug resistant (MDR} pathogens in solid organ transplant recipients. Additionally, Dr. Kwak is interested in the management of nontuberculous mycobacterial infections in transplant recipients and candidates; post operative surgical site infections in liver transplant recipients; and antibiotic stewardship in the era of MDR infections.

Advisory Committee Memberships and Leadership Positions

- Member, Quarterly Pharmacy and Therapeutics Committee, System-wide Committee, University of Pittsburgh Medical Center, 2012-present

Professional Affiliations and Society Memberships

- Member, American Society of Transplantation, 2005-present
- Member, American Society of Microbiology, 2009-present
- Member, Infectious Diseases Society of America, 2010-present

Editorships

- Reviewer, *Liver Transplantation Journal*, 2008-present
- Reviewer, *Transplant Infectious Diseases*, 2008-present
- Reviewer, *American Journal of Transplantation*, 2008-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Sui Kwong Li, MD

Dr. Li is interested in quality improvement as it applies to antimicrobial stewardship and telemedicine.

Professional Affiliations and Society Memberships

- Member, American Medical Association, 2013-present
- Member, American College of Physicians, 2013-present
- Member, Infecitous Diseases Society of America (IDSA), 2016-present
- Member, Society for Healthcare Epidemiology in America (SHEA), 2016-present

Wei Li, PhD

Dr. Li's lab focuses on the development of monoclonal antibodies/domains against cancer-related antigens and infectious diseases through phage and yeast display technology. During this year, the Li lab has constructed several phage display antibody libraries with different formats, such as single domain antibodies (VH) and Fab (antigen binding fragment), from which he has retrieved sets of binders against cancer antigens,

such as CD22 (leukemia), CD276 (pan-cancers), FLT3 (leukemia), and IL1RAP (Ewing sarcoma). These promising binders are now undergoing in vitro bio-physical characterization for developability and functional characterization.

Shihui Liu, MD, PhD

Dr. Liu investigates bacterial protein toxins, including anthrax toxins in pathogenesis, and develops therapeutics for the related diseases. In addition, he studies the signal transduction pathways, with special emphasis on the RAS-RAF-MEK-ERK pathway in cancer, and he is working to develop therapeutics for targeting these pathways for cancer therapy.

Editorships

- Academic Editor, *Journal of Toxins*, 2013-present
- Ad hoc reviewer, *Oncotarget*, 2017-present
- Ad hoc reviewer, *Proceedings of the National Academy of Science of the USA*, 2019-present

Ilya G. Lyakhov, PhD

Dr. Lyakov has research interests in the development of new approaches for CAR T-cell multitargeting, as well as the generation of novel mAb- and ADC-related molecules for infectious diseases, cancer, and aging treatment. His clinical interest focuses on the evaluation of antibody therapeutics in clinical trials.

Bernard J. C. Macatangay, MD

Dr. Macatangay is involved in research focusing on HIV-associated inflammation and on immunotherapeutic strategies for achieving sustained HIV remission off antiretroviral therapy. Specifically, the overall goal of his research is to further define the role of immunoregulatory pathways in HIV-associated inflammation and HIV persistence in order to design successful immunotherapeutic strategies to decrease chronic inflammation and address important knowledge gaps in HIV cure research.

Advisory Committee Memberships and Leadership Positions

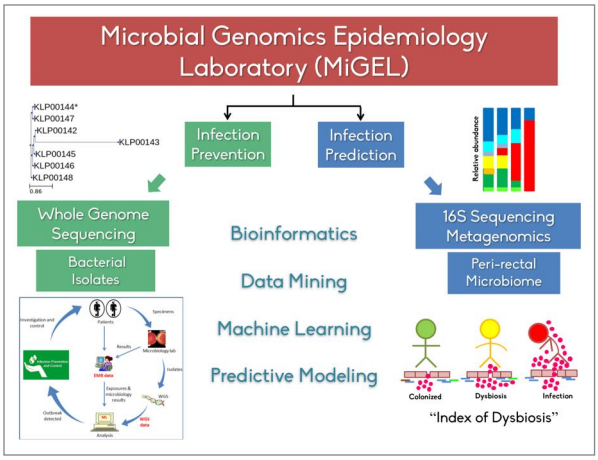
- Member, Admissions Interview Committee, University of Pittsburgh School of Medicine, 2010-present
- Member, Medicine Residency and Infectious Diseases Fellowship Interview Committee, University of Pittsburgh School of Medicine, 2010-present
- Member, Clinical Working Group, Multicenter AIDS Cohort Study, 2011-present
- Protocol Immunologist ACTG Studies, A5321/A5341s, A5325/A5330s, A5342, A5370, 2013-present
- Member, Immune Activation Focus Group, ACTG, 2014-present
- Elected Member, End-Organ and Inflammation Transformative Science Group, AIDS Clinical Trials Group (ACTG), 2014-present
- Chair, Viral Immune Pathogenesis Working Group, Multicenter AIDS Cohort Study, 2015-present
- Elected Member, HIV Reservoirs and Viral Eradication Transformative Science Group, ACTG, 2016-present
- Co-Chair, Viral Immune Pathogenesis Working Group, Multicenter AIDS Cohort Study - WIHS Combined Cohort Study, 2018-present

Editorships

- Editorial Advisory Board, *Open-Forum Infectious Diseases Journal*, 2014-present
- Reviewer, *AIDS*, 2017-present

Jane W. Marsh, PhD

Dr. Marsh is the Director of the Microbial Genomics Epidemiology Laboratory (MiGEL) and works closely with MiGEL Principal Investigator, Dr. Lee H. Harrison, to investigate genomic epidemiology of hospital-acquired infections. Current research is focused on integration of whole genome sequences of multi-drug resistant bacteria from hospitalized patients with the electronic health record to enhance detection of hospital-associated transmission. Dr. Marsh oversees the timely reporting of sequencing results to UPMC Infection Prevention to enable rapid implementation of appropriate interventions to prevent further transmission and outbreaks.



Drs. Jane Marsh and Lee Harrison are researching how to integrate whole genome sequencing of bacteria to help detect HAIs.

Professional Affiliations and Society Memberships

- Member, American Society for the Advancement of Science, 1999-present
- Member, American Society of Microbiology, 2003-present

Elise M. Martin, MD, MS

Dr. Martin's primary research focuses on assessing the impact of removing routine contact precautions for methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococci* (VRE) on hospital-acquired infections (HAIs) with these organisms, as well as other hospital outcomes, including costs, hospital patient flow, and adverse events. She is also working to assess optimal gram-negative contact precaution strategies necessary to prevent multidrug resistant gram-negative HAIs.

Advisory Committee Memberships and Leadership Positions

- Publication Committee Member, Society for Healthcare Epidemiology of America, 2019

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America, 2017-present
- Member, Society for Healthcare Epidemiology of America, 2017-present

Honors and Awards

- Top Abstract Award, Oral Presentation, Society for Healthcare Epidemiology of America (SHEA) Spring Conference 2019, Boston, MA, April 2019

Sarah McBeth, MD, MPH

Dr. McBeth's research focuses on identifying barriers to Hepatitis C treatment and monitoring treatment outcomes in the HIV/Hepatitis C co-infected population. She also conducts ongoing projects on retention in care and NAFLD among people living with HIV.

Advisory Committee Memberships and Leadership Positions

- Advisor, Pennsylvania Office of Medical Assistance Programs Hepatitis C Direct Acting Antiviral Guidelines, 2017-present

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America, 2013-present

Kevin D. McCormick, PhD, MS

Dr. McCormick's research is focused on the development and implementation of high-throughput Next Generation Sequencing assays that will be used for the surveillance of HIV drug resistance in Low-Middle Income Countries (LMICs).

Deborah K. McMahon, MD

Dr. McMahon's research focuses on the HIV reservoir and eradication strategies. She currently serves as co-chair of two NIH-funded AIDS Clinical Trials Group studies. The first study examines the decay of the HIV reservoir in HIV infected patients receiving long-term antiretroviral therapy; its substudy intensively examines the reservoir in anatomic sites, such as the blood, gut-associated lymphatic tissue, and CSF. The second study evaluates the impact of a histone deactelyase inhibitor, romidepsin, on immune activation and HIV expression in HIV-infected patients suppressed on antiretroviral therapy. She also leads a HRSA-funded Special Project of National Significance focused on HIV workforce capacity building. She has over 25 years of HIV clinical research experience.

Advisory Committee Memberships and Leadership Positions

- Member, Institutional Biosafety Committee, University of Pittsburgh, 2005-present
- Member, Clinical Advisory Committee, National HIVQUAL Project, 2008-present
- Chair, Drug Utilization and Review Committee, Special Pharmaceutical Benefits Program, Pennsylvania Department of Health, 2010-present
- Member, Special Pharmaceutical Benefits Program, PA DPW, 2010-present
- Medical Director, Member, Executive Committee, Brother's Brother Foundation, 2010-present
- Member, HIV Reservoirs and Viral Eradication Transformative Science Group, ACTG, 2013-present
- Member, Antiretroviral Therapy Strategies Transformative Science Group, ACTG, 2017-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Mustapha M. Mustapha, MBBS, PhD, MPH

Dr. Mustapha is affiliated with the Microbial Genomic Epidemiology Laboratory and Center for Innovative Antimicrobial therapy. Dr. Mustapha's research focuses on the epidemiology and genomic epidemiology of important vaccine-preventable and drug-resistant bacterial pathogens with emphasis on global epidemiology of Neisseria meningitidis. Dr. Mustapha also applies bacterial whole genome sequencing analyses for the enhanced detection of hospital outbreaks and to the study of mechanisms of drug resistance among extensively drug-resistant pathogens in the hospital.

Professional Affiliations and Society Memberships

- Member, American Society for Tropical Medicine and Hygiene (ASTMH), 2012-present
- Member, Consortium of Universities for Global Health (CUGH), 2013-present
- Member, American Society for Microbiology (ASM), 2015-present
- Member, Delta Omega Honorary Public Health Society, 2016-present

Sowmya Nanjappa, MBBS, MD

Dr. Nanjappa's research is focused on the optimal use of antibiotics in clinical infectious disease, as well as histoplasmosis endemic fungal infection.

Minh-Hong Nguyen, MD

Dr. Nguyen's multiple research interests are medical mycology research, including projects on the mechanisms and clinical impact of antifungal drug resistance, and molecular pathogenesis of invasive Candida infections. Since 2016, she has expanded her interests to include Zygomycetes genetics and epidemiology. In addition, her research focuses on XDR bacterial and antimicrobial stewardship research, including projects on evolution and tolerance/resistance and pathogenic mechanisms of carbapenem-resistant *Enterobacteriaceae* (CRE) and other Gram-negative bacteria; the development of novel antibiotic treatment strategies based on bacterial genetics and pharmacokinetic-pharmacodynamic (PK-PD) principles; the clinical and economic impact of XDR infections and antimicrobial stewardship interventions; and clinical trials of new antimicrobials and diagnostic tests. Dr. Nguyen's Transplant Infectious Diseases research includes projects on the role of the microbiome in infections and outcomes among transplant recipients, the impact of rectal CRE carriage on transplant patients' outcome, and clinical studies and trials on a wide range of opportunistic fungal, bacterial, and viral infections.

Study Sections

- Ad hoc Reviewer, NIAID T32, K awards, and P01 Awards, SBIR/STTR award study sections, NIH, 2011-present

Advisory Committee Memberships and Leadership Positions

- Chair, Molecular Diagnostics Section, Aspergillosis in Solid Organ Transplant Section and Airway Aspergillosis Section of Aspergillosis Management Guidelines, Infectious Diseases Society of America, 2014-present

Editorships

- Reviewer, *Antimicrobial Agents & Chemotherapy*, 1994-present
- Reviewer, *Clinical Infectious Diseases*, 1995-present
- Reviewer, *Journal of Infectious Diseases*, 1995-present
- Reviewer, *Transplant Infectious Diseases*, 2008-present
- Reviewer, *Transplantation*, 2008-present
- Reviewer, *American Journal of Transplantation*, 2009-present
- Scientific Editor, *PLoS ONE*, 2014-present

Urvi M. Parikh, PhD

Dr. Parikh's translational research laboratory uses novel technical approaches to solve public health problems in the research areas of HIV prevention and drug resistance. Dr. Parikh leads the USAID/PEPFAR-funded Global Evaluation of Microbicide Sensitivity (GEMS) Project, which seeks to: characterize resistance risk from pre-exposure prophylaxis (PrEP) trials and demonstration projects; identify the most effective and efficient HIV testing and resistance monitoring strategies; generate evidence-based policy recommendations for HIV diagnostic testing frequency and ARV resistance monitoring; and monitor seroconverters from PrEP roll-out programs for ARV resistance in selected clinics in South Africa, Zimbabwe, and Kenya. The GEMS project brings together a diverse team of laboratory scientists, mathematical modelers, policy experts, health economists, in-country stakeholders, demonstration project teams, and others working toward the common public health goal of minimizing resistance risk during PrEP roll-out. Her laboratory also serves as the Virology Core for the MTN, with the aim of confirming virologic endpoints for all MTN studies; assessing population and low-frequency resistance in seroconverters from HIV prevention trials; developing new assays and addressing research questions relevant to the field of HIV prevention; and providing virology support to MTN protocols, international clinical research sites, and community working groups. In addition to these

major projects, Dr. Parikh's lab is investigating the detection of Y chromosome DNA in genital tract specimens using quantitative real-time PCR as a biomarker for unprotected sex and evaluating new HIV diagnostic algorithms using antigen-based rapid tests for identifying seroconverters.

Advisory Committee Memberships and Leadership Positions

- Member, MTN-016 Protocol Team, 2008-present
- Member, MTN SCHARP/Laboratory Core Group, 2008-present
- Member, MTN Laboratory Core, 2008-present
- Member, MTN Bioscience Working Group, 2008-present
- Member, MTN-015 Management Team, 2008-present
- Member, MTN-003 Protocol and Publications Committee Member, 2008–present
- Active Voting Member, Virology Quality Assurance Advisory Board, 2010-present
- Member, MTN-025 Management Team Member, 2014-present
- Member, MTN Community Working Group, 2014-present
- Advisor, World Health Organization, Geneva, Switzerland, 2016-present

Christian O. Perez, MD

Dr. Perez investigates endemic fungal infections, specifically examining diagnostics and clinical presentations in immunocompromised populations. He has also investigated the utility of Outpatient Parenteral Antibiotic Therapy (OPAT) progams as well.

Professional Affiliations and Society Memberships

- Member, American Medical Association, 2007-Present
- Member, Infectious Diseases Society of America (IDSA), 2014-Present

Brian Potoski, PharmD

Dr. Potoski's research interests center on antimicrobial stewardship. Additionally, he is interested in how Monte Carlo simulations of antibiotic exposures may inform dosing strategies for problematic pathogens. Dr. Potoski is also interested in how risk-factor studies may assist antibiotic management teams and the impact of antibiotic management teams on drug use and clinical outcomes.

Sharon A. Riddler, MD

Dr. Riddler has more than 20 years of experience in clinical research funded by the NIH and industry. She is interested in all aspects of the clinical research process, including protocol development, implementation, and analysis of results. She is the Co-PI of the NIH/DAIDS-funded Pitt-OSU HIV/AIDS Clinical Trials Unit and Site Leader for the University of Pittsburgh Clinical Research Site (affiliated with both the AIDS Clinical Trials Group and the Microbicide Trials Network). Dr. Riddler is a Protocol Physician for the Microbicide Trials Network. She has been Chair or Co-Chair for several network studies in the ACTG (A5115, A5142, A5276s, and A5342) and MTN (MTN-015 and MTN-0038). Local clinical trials have focused on immune-based therapies for chronic HIV infection. She is currently the Co-PI for a recently completed U01-funded Phase I study of dipyridamole for immune activation in HIV-infected participants and is Co-PI for a U01 funded clinical trial of dendritic-cell immunotherapy for HIV. Dr. Riddler's group collaborates widely across the University of Pittsburgh to accomplish state-of-the-art clinical trials.

Study Sections

- Member, NIAID Clinical Trial Implementation Cooperative Agreement (U01) Review Committee (ZAI1 UKS-A (M3)), 2014-present

- Reviewer (Temporary Member), NIH, AIDS Clinical Studies and Epidemiology Study Section, 2018

Editorships

- Reviewer, *AIDS*, 2000-present
- Reviewer, *Journal of Acquired Immunodeficiency Syndrome*, 2003-present
- Reviewer, *Journal of Infectious Diseases*, 2004-present
- Reviewer, *European Journal of Clinical Investigation*, 2004-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Palash Samanta, MBBS, MD

Dr. Samanta's research interests include antifungal prophylaxis in lung transplant recipients. He is interested in comparing the efficacy and tolerability of voriconazole and isavuconazole as antifungal prophylaxis in lung transplant recipients. Dr. Samanta is also interested in the epidemiology of fungal infection in patients undergoing stem cell transplant and Chimeric Antigen Receptor (CAR) T cell therapy.

Major Lectureships and Seminars

- Invited Lecturer, 3rd Annual UPMC Lung Transplant Symposium, Pittsburgh, PA, September 2018

Neel B. Shah, MD

Dr. Shah's research interests include better understanding how to diagnose, manage, and treat prosthetic joint infections. He is currently working on determining what factors determine clinical outcomes associated with patients who undergo debridement and retention of their infected prosthetic joint, and how modifying these factors could help in improving patient outcomes.

Advisory Committee Memberships and Leadership Positions

- Member, Antibiotic Stewardship Committee, UPMC Magee-Women's Hospital, 2016-present
- Member, Infection Control Committee, UPMC Magee-Women's Hospital, 2016-present
- Co-Director, Division of Infectious Diseases Marketing and Communications Management, 2016-present
- Associate Program Director, Infectious Diseases Fellowship, 2017-present

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America, 2010-present

Kathleen R. Sheridan, DO

Dr. Sheridan's research focuses on the delivery of quality care to patients discharged from the hospital on IV antibiotics through the Outpatient Parenteral Antibiotic Therapy (OPAT) program, which seeks to prevent hospital readmissions and antibiotic-associated adverse events.

Advisory Committee Memberships and Leadership Positions

- Member, Infectious Diseases Society of America Quality Committee, 2016-present

Honors and Awards

- Honoree, Award for Commitment and Excellence in Service (ACES), UPMC, Pittsburgh, PA, August 2018

In relation to her OPAT work, Kathleen Sheridan received UPMC's ACES honor.

Ryan K. Shields, PharmD, MS

Dr. Shields is a translational researcher who is interested in antimicrobial drug resistance in gram-negative bacteria and yeast. His research focuses on the use of molecular markers of resistance to predict patient responses to treatment; the use of pharmacokinetic-pharmacodynamic models to suppress and overcome antimicrobial resistance; antimicrobial susceptibility testing methods; and the clinical impact of infections due to extensively-drug resistant pathogens. Using these approaches, Dr. Shields has developed treatment paradigms for difficult-to-treat pathogens, including *Candida glabrata*, *Acinetobacter baumannii*, and carbapenem-resistant *Klebsiella pneumoniae*, leading to improved patient outcomes. Dr. Shields's laboratory is also interested in elucidating new mechanisms of antimicrobial drug resistance against recently FDA-approved antimicrobial agents.

Advisory Committee Memberships and Leadership Positions

- Adviser, CLSI Antifungal Subcommittee, 2017-present

Professional Affiliations and Society Memberships

- Member, Society of Infectious Diseases Pharmacists, 2008-present
- Member, American Society for Microbiology, 2009-present
- Member, Amercian College of Clinical Pharmacy, 2012-present
- Member, Infectious Diseases Society of America (IDSA), 2018-present

Editorships

- Reviewer, *Transplant Infectious Diseases*, 2012-present
- Reviewer, *Medical Mycology*, 2012-present
- Reviewer, *Antimicrobial Agents and Chemotherapy*, 2013-present
- Reviewer, *American Journal of Infection Control*, 2013-present
- Reviewer, *Journal of Antimicrobial Chemotherapy*, 2013-present
- Ad-hoc Scientific Peer Reviewer, *PLoS ONE*, 2014-present
- Ad-hoc Scientific Peer Reviewer, *International Journal of Antimicrobial Agents*, 2014-present
- Ad-hoc Scientific Peer Reviewer, *BMC Research Notes*, 2015-present
- Ad-hoc Reviewer, *Diagnostic Microbiology and Infectious Diseases*, 2015-present
- Reviewer, *Lancet Infectious Diseases*, 2017-present
- Section Editor, *Multidrug Resistant Infections*, 2018-present
- Editorial Board, *Contagion*, 2018-present
- Reviewer, *Clinical Infectious Diseases*, 2018-present
- Editorial Board, *Antimicrobial Agents and Chemotherapy*, 2018-present

Honors and Awards

- Excellence in Education Award, Best Lecturer, Awarded by the Class of 2021, University of Pittsburgh, School of Medicine, Office of Medical Education, 24th Curriculum Colloqium, Pittsburgh, PA, January 2019

Fernanda P. Silveira, MD, MS

Dr. Silveira is interested in clinical research that promotes the health of the patients in her care. As such, some of her projects include the study of influenza vaccine effectiveness in preventing hospital admissions; clinical trials of new agents to treat respiratory viral infections in lung transplant recipients and CMV; epidemiological description and assessment of risk factors for common infections after transplantation; and improvement management of infections due to multi-drug resistant organisms.

Advisory Committee Memberships and Leadership Positions

- Participant, ID Educational Initiative, American Society of Transplantation, 2007-present
- Member, Writing Committee, Practice Consensus Document for Strategies to Prevent and Manage Infections Related to Mechanical Circulatory Devices, International Society for Heart and Lung Transplantation, 2015-present
- Past Chair, Infectious Diseases Council, International Society for Heart and Lung Transplantation, 2015-present
- Member, Patient Safety and Quality Initiative for Transplant Infectious Diseases Workgroup, Infectious Diseases Council, American Society of Transplantation, 2017-present
- Member at large (elected), ID Community of Practice, American Society of Transplantation, 2018-present
- Member, Program Committee, 40th Annual Meeting and Scientific Sessions, International Society for Heart and Lung Transplantation, 2019

Professional Affiliations and Society Memberships

- Member, Infectious Diseases Society of America, 2003-present
- Member, American Society of Transplantation, 2005-present

Editorships

- Reviewer, *International Society for Heart and Lung Transplantation*, 2013-present
- Reviewer, *Transplantation*, 2013-present
- Associate Editor, *Clinical and Biomedical Research*, 2014-present
- Section Editor, Fungal Infections, *Current Treatment Options in Infectious Diseases*, 2018-present
- Reviewer, *Clinical Infectious Diseases,* 2018-present
- Reviewer, *Journal of Heart and Lung Transplantation,* 2018-present
- Reviewer, *Clinical Transplantation*, 2018-present

Major Lectureships and Seminars

- Invited Speaker, 3rd Annual UPMC Lung Transplant Symposium, Pittsburgh, PA, 2018
- Invited Speaker, Annual Meeting of the American Transplant Congress, Seattle, WA, 2018

Honors and Awards

- Fellow, Infectious Diseases Society of American, 2018-present
- Honoree, Best Doctors in America, 2018-present
- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Nina Singh, MD

Nina Singh's area of research interest is opportunistic viral and fungal infections in organ transplant recipients. Her specific interests include herpes virus infections (cytomegalovirus and human herpesvirus-6) in transplant recipients. Her work in this area pertains to clinical trials to optimize antiviral prophylaxis and assess CMV-specific immune responses after transplantation. The knowledge gained from these studies has implications for elucidating the mechanistic basis for CMV disease despite current prophylactic practices and for designing immune-based therapies in the future as adjuncts to antivirals for the prevention of CMV. A key area of her research interest is invasive cryptococcosis in transplant recipients. Dr. Singh has conducted pivotal studies to assess risks, disease associations, outcomes, and immunopathogenesis as it relates to this yeast in transplant recipients. These studies have made a major contribution toward the scientific rationale for the Infectious Diseases Society of America (IDSA) and American Society of Transplantation (AST) guidelines for *Cryptococcus* in transplantation. More recently, Dr. Singh's work has focused on characterizing immune reconstitution syndrome in organ transplant recipients with opportunistic infections and on

understanding how manipulation of iatrogenic immunosuppressants has the ability to alter the host immunologic milieu, posing a risk for this poorly understood entity.

Advisory Committee Memberships and Leadership Positions

- Member, Joint Research Awards Committee, Infectious Diseases Society of America, 2011-present
- Member, International Consensus Panel, Development of Guidelines for the Prevention of CMV in Solid Organ Transplant Recipients, 2013-present
- Chair, Panel for Development of Guidelines for Donor-Derived Fungal Infections in Organ Transplant Recipients, 2013-present
- Member, INSIGHT Post-Transplant Infections Scientific Interest Group, 2013-present
- Member, External Advisory Committee, T32 Training Program in Infectious Diseases in the Immunocompromised Host, Fred Hutchinson Cancer Research Center, 2015-present
- Member, Institutional Review Board, VAPHS, 2015-present
- Panel Member, Global guideline for the diagnosis and management of mucormycosis, External Advisory Committee Member, Fred Hutchinson Cancer Research Center, Seattle, WA, 2015-present
- European Confederation of Medical Mycology (ECCM), 2018-present

Editorships

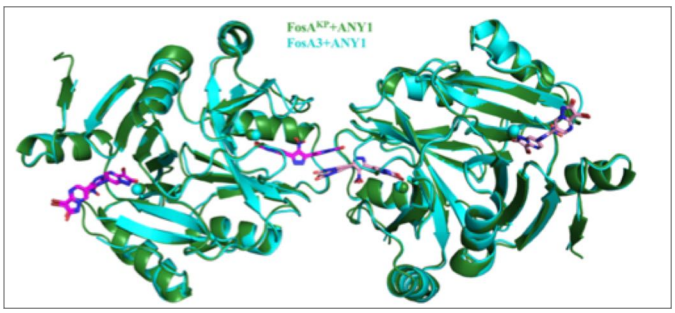
- Associate Editor, *Transplantation*, 2014-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019
- Ranked No. 1 amongst 94 editors, "Editor Performance Statistics," *Transplantation*, September 2018
- Top Doctors 2019, Best Doctors in America, 2019-2020

Nicolas P. Sluis-Cremer, PhD

Dr. Sluis-Cremer's laboratory uses a multi-disciplinary approach that includes biophysics, biochemistry, virology, and analysis of clinical samples to gain insight into the mechanisms of action of antiretroviral drugs; antiviral and antimicrobial drug resistance; and understanding how HIV-1 persists in infected individuals despite potent antiretroviral therapy. His lab also studies antibiotic resistance and is exploring novel therapeutic approaches to reverse fosfomycin resistance.



Working with Yohei Doi, MD, PhD, Dr. Sluis-Cremer has identified ANY1 that binds with high-affinity to

Study Sections

- Reviewer, NIH Study Section, Special Emphasis Panel/Scientific Review Group AARR-J (AIDS Predoctoral and Postdoctoral), 2011-present
- Reviewer, Chemistry of Life Processes Program in the Division of Chemistry, NSF Grant, 2011-present
- Reviewer, NIH Study Section, Special Emphasis Panel/Scientific Review Group AARR-J (AIDS Predoctoral and Postdoctoral), 2011-present
- Reviewer, Special Emphasis Panel in Response to RFA-AI-12-003 entitled Integrated Preclinical/Clinical Program for HIV Topical Microbicides (IPCP-HTM), NIH Study Section, 2011-present

Advisory Committee Memberships and Leadership Positions

- Member, Scientific Committee, HIV DART, Frontiers in Drug Development for Antiretroviral Therapies, 2010-present

Editorships

- Ad hoc Reviewer, Multiple journals (*Virology*, *Biochemistry*, *AIDS*, *Journal of Biological Chemistry*, *Nature*, *Antimicrobial Agents & Chemotherapy*, *Retrovirology*, *Journal of Virology*), 2013-present

Graham M. Snyder, MD, MS

Dr. Snyder's research in the field of infection prevention has focused on innovation in preventing device-associated nosocomial infections. He has developed content and implementation expertise in reduction of catheter-associated urinary tract infections, an important healthcare-associated infection.

A second major area of expertise in device-related infections focuses on endoscopic retrograde cholangiopancreatography (ERCP) duodenoscopes, which have been associated with outbreaks of infections due to highly resistant bacteria. With colleagues in Gastroenterology and Infection Control/Hospital Epidemiology, as well as trainees under his mentorship, Dr. Snyder conducted a clinical trial randomizing ERCP duodenoscopes to three arms of disinfection/sterilization. Related investigations have included the role for non-microbiologic sampling in duodenoscope contamination surveillance, maximum "hang time" for duodenoscopes prior to reprocessing, frequency and anatomic site of patient carriage of antimicrobial-resistant pathogens among this high-risk patient population, and the development of methods for sampling duodenoscopes.

Advisory Committee Memberships and Leadership Positions

- Publications Committee Member, Society for Healthcare Epidemiology of America, 2009-present

Giraldina J. Trevejo-Nunez, MD

Dr. Trevejo-Nunez's research focuses in understanding the host immune response against bacterial pneumonia, in particular the role of IL-22 to contain and enhance the immune response upon pneumococcal pneumonia.

Professional Affiliations and Society Memberships

- Member, Infectious Dieases Society of America (IDSA), 2007-present
- Member, American Association of Immunologists (AAI), 2014-present
- Member, American Thoracic Association, 2016-present

Daria Van Tyne, PhD

Dr. Van Tyne and her lab studies how bacteria evolve during human infection to resist antibiotics and the host immune system, using comparative genomics and functional approaches. They sequence the genomes of bacteria from human infections and use functional genomics to identify and characterize novel resistance mechanisms. They also work to develop new therapeutic approaches for multidrug-resistant infections.

Professional Affiliations and Society Memberships

- Member, American Society for Microbiology, 2013-present

Peter J. Veldkamp, MD, MS

Dr. Veldkamp's long-term interests are HIV care, general infectious diseases, and travel/tropical medicine. These diseases especially affect underserved populations in low resource settings. The challenge to diagnose and treat these conditions with minimal cost and maximal efficacy appeals to him. Dr. Veldkamp strives to

enhance the health care providers' impact in patient-centered care settings.

Advisory Committee Memberships and Leadership Positions

- Member, Academy of Master Educators, University of Pittsburgh School of Medicine, 2009-present

J. Alex Viehman, MD

Dr. Viehman focuses his clinical research in several areas, including drug resistance, antibiotic stewardship, and quality improvement. Currently, he is working on projects evaluating patient risk factors for drug-resistant pathogens, including vancomycin-resistant *Enterococcus faecium* and adjunctive therapy for patients with *C. difficile* infection. In addition, he is evaluating barriers to vaccination against *Streptococcus pneumoniae* in patients who meet appropriate indications.

Advisory Committee Memberships and Leadership Positions

- Member, Antimicrobial Management Program, UPMC, 2013-present
- Member, Clinical Competency Committee, Infectious Diseases Fellowship, University of Pittsburgh, 2016-present
- Member, Quality Council-Infectious Diseases/HIV UPMC, 2017-present

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

Mohamed H. Yassin, MD, PhD

Dr. Yassin's research interests center on decreasing hospital-acquired infections. His areas of focus are infection prevention and hospital epidemiology; cost effectiveness analysis (CEA); surveillance for multidrug resistant organisms (MRSA, Acinetobacter, and other Gram-negative resistant pathogens); endoscopic processing; and Legionella prevention in hospital water.

Advisory Committee Memberships and Leadership Positions

- Chair, Infection Control Committee, UPMC Mercy, 2011-present
- Volunteer Physician, Free Clinic, Braddock, PA, 2012-present
- Member, Infection Control System-Wide, UPMC, 2013-present
- Member, Quality Improvement Committee, UPMC Mercy, 2013-present
- Member, E-practice Guide Committee, UPMC, 2013-present
- Member, Antibiotic Core Committee, UPMC, 2013-present

TEACHING ACTIVITIES

The division continues to prioritize education by teaching medical students, medical residents, infectious diseases fellows, and doctoral students in the School of Medicine and the Graduate School of Public Health. Faculty members in our division are involved with teaching medical students throughout their four years of training. Beginning in their first year, faculty members facilitate small group discussions on HIV/AIDS with first-year medical students and teach in our highly rated Medical Microbiology course that introduces the basic science and microbiology of infectious diseases. Our faculty members are facilitators in the Advanced Physical Exam course and teach in the Evidence-based Medicine blocks and the 4th year Selective in Clinical Pharmacology. Faculty members teach in various second-year courses that focus on infections in different organ systems, and in their third-year, medical students receive an HIV didactic session during the Combined Ambulatory Medicine and Pediatric Clerkship (CAMPC). In addition to the didactic session, faculty members facilitate small group discussions on the management of HIV/AIDS in the ambulatory setting. Beginning in their third year, medical students can elect to rotate in the HIV/AIDS clinic through CAMPC where they are supervised by clinical faculty members. Both third- and fourth-year medical students can elect to rotate on the inpatient general infectious diseases (ID) consult service, as well as receive didactic teaching in antimicrobials with the pharmacology elective.

This year, Lee Harrison, MD, & Nic Sluis-Cremer, PhD, were awarded a new 5-year T32 award, the first T32 focusing on antimicrobial resistance for the Division

ID faculty, including Hong Nguyen (left), teach in a variety of venues, including core conferences and more formal classes offered by the School of Medicine

Resident teaching primarily occurs during popular elective rotations on the inpatient general ID consult services. House staff (Medicine residents, CCM fellows, Pediatric ID fellows, Obstetrics/Gynecology, Transplant Nephrology fellows, Lung Transplant fellows, HIV fellows, Adolescent Medicine fellows, and Family Medicine residents) also have the opportunity to rotate in the HIV/AIDS clinic or on the Surgical ID and Transplant ID consult services, which offers one-on-one learning opportunities with the attending physician.

Faculty members also teach courses on the control and prevention of HIV/AIDS and prevention, treatment and control of global infectious diseases in the Infectious Disease and Microbiology program in the Graduate School of Public Health. Additionally, our faculty members teach residents about tropical medicine and parasitology in the Internal Medicine Residency global health track.

Infectious Diseases Fellows attending one of the DIvision's weekly conferences.

The ID fellowship training program continues to provide excellent clinical training and opportunities to conduct research with nationally prominent investigators. Fellows' development is carefully guided by faculty mentors and the division chief, who meet one-on-one with each fellow quarterly. Fellows spend time on the general, surgical and transplantation infectious disease consult services at the UPMC Presbyterian, UPMC Shadyside and VAPHS sites. Away rotations in hematology/oncology and bone marrow transplantation ID are available at international training sites including the Philippines and Mozambique. Rotations at these sites are available for focusing on tropical medicine/infectious diseases.

In addition to patient-oriented teaching and fellowship training, the ID division provides multiple didactic conferences:

- Weekly ID core curriculum lecture series featuring the division's finest lecturers
- Monthly ID journal club that pairs fellows with faculty mentors to optimize the fellows' presentations
- Weekly ID Grand Rounds that is the division's showcase for fellows and faculty members to discuss the diagnosis and management of a diverse range of infectious diseases
- Thrice-monthly HIV-AIDS educational conference during which students, residents, fellows and faculty members are educated about HIV drug resistance, comorbidities, coinfections, and updated on the latest topics of importance for this patient population
- Daily small group sessions with trainees at HIV/PACT clinic
- American Academy of HIV Medicine credentialing exam preparation
- Semi-monthly Transplant ID journal club and core curriculum lectures, during which fellows and faculty members are updated on the latest topics in infection prevention, diagnosis, and management in transplant recipients
- Monthly Transplant ID teleconference between UPMC, Cleveland Clinic, UNC, Mayo Clinic, and the University of São Paolo, Brazil, whereby each institution presents a case on a rotating basis. Our ID fellows are encouraged to present
- Periodic Tropical Medicine Grand Rounds teleconference between UPMC and University of Philippines Manila
- Monthly teleconference between UPMC and Bangalore/Misore-based clinics and hospital
- Quarterly Citywide ID Grand Rounds, during which each major hospital in the city of Pittsburgh takes turns presenting a new case

- Semi-annual fellows' research-in-progress meetings, during which research objectives and results are presented to the division's faculty members and critically reviewed by the division's Academic Committee

Teaching Awards and Honors

This year, Eun Jeong Kwak, MD, received the Faculty Teaching Award from the] Division of Infectious Diseases, and Ryan K. Shields, PharmD, MS, was honored with the Excellence in Education Award "Best Lecturer" by the Class of 2021 from the University of Pittsburgh School of Medicine at the 24th Curriculum Colloqium in January.

Clinical Fellows, FY2019

Current Fellows

Will Garner, MD
Medical School: Sidney Kimmel Medical College at Thomas Jefferson University
Residency: Case Western Reserve University, Cleveland, OH

Aaron Lucas, MD
Medical School: West Virginia University School of Medicine
Residency: UPMC, Pittsburgh, PA

Julia Zefirova, MD, PhD
Medical School: Kazan State Medical University
Residency: Saint Mary's Hospital, New York, NY

Departing Fellows

Ahmed Babiker, MD *Chief Fellow*
Medical School: University of Medical Sciences and Technology, Khartoum, Sudan
Residency: Providence Hospital, Washington, D.C.
Current Position: Medical Microbiology Fellowship, Emory University School of Medicine

Nupur Gupta, DO
Medical School: Midwestern University
Residency: Allegheny General Hospital, Pittsburgh, PA
Current Position: Physician, UPMC

Gavin Harris, MD
Medical School: SUNY Downstate College of Medicine
Residency: Albert Einstein College of Medicine Jacobi Medical Center

Infectious Diseases Fellowship, Class of 2019

Current Position: ID-CCM Fellow, UPMC, Pittsburgh, PA

Jonathan Sun, DO, MBA

Medical School: Touro University
Residency: Midwestern University/Canyon Vista Medical Center
Current Position: Physician, Kaiser Permanente-Santa Clara Homestead, Santa Clara, CA

Peter Volpe, MD

Medical School: Northeast Ohio Medical University
Residency: Case Western Reserve University, Cleveland, OH
Current Position: UPMC, Pittsburgh, PA

Fellow Activities

Ahmed Babiker, MD

Publications

- Marsh JW, Mustapha MM, Griffith MP, Evans DR, Ezeonwuka C, Pasculle AW, Shutt KA, Sundermann A, Ayres AM, Shields RK, **Babiker A**, Cooper VS, Van Tyne D, Harrison LH. Evolution of Outbreak-Causing Carbapenem-Resistant Klebsiella pneumoniae ST258 at a Tertiary Care Hospital over 8 Years. MBio. 2019 Sep 3;10(5).
- Sundermann AJ, **Babiker A**, Marsh JW, Shutt KA, Mustapha MM, Pasculle AW, Ezeonwuka C, Saul MI, Pacey MP, Van Tyne D, Ayres AM, Cooper VS, Snyder GM, Harrison LH. Outbreak of Vancomycin-resistant Enterococcus faecium in Interventional Radiology: Detection Through Whole Genome Sequencing-Based Surveillance. Clin Infect Dis. 2019 Jul 16.
- **Babiker A**, Clarke L, Doi Y, Shields RK. Fosfomycin for treatment of multidrug-resistant pathogens causing urinary tract infection: A real-world perspective and review of the literature. Diagn Microbiol Infect Dis. 2019 Jun 24:114856.
- Kadri SS, Lai YLE, Ricotta EE, Strich JR, **Babiker A**, Rhee C, Klompas M, Dekker JP, Powers JH 3rd, Danner RL, Adjemian J; NIH Antimicrobial Resistance Outcomes Research Initiative (NIH-ARORI). External Validation of Difficult-to-Treat Resistance Prevalence and Mortality Risk in Gram-Negative Bloodstream Infection Using Electronic Health Record Data From 140 US Hospitals. Open Forum Infect Dis. 2019 Feb 28;6(4):ofz110.
- **Babiker A**, Gupta N, Gibas CFC, Wiederhold NP, Sanders C, Mele J, Fan H, Iovleva A, Haidar G, Fernandes C. *Rasamsonia* sp: An emerging infection amongst chronic granulomatous disease patients. A case of disseminated infection by a putatively novel Rasamsonia argillacea species complex involving the heart. Med Mycol Case Rep. 2019 Apr 16;24:54-57.
- **Babiker A**, Mustapha MM, Pacey MP, Shutt KA, Ezeonwuka CD, Ohm SL, Cooper VS, Marsh JW, Doi Y, Harrison LH. Use of online tools for antimicrobial resistance prediction by whole-genome sequencing in methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant enterococci (VRE). J Glob Antimicrob Resist. 2019 Apr 18;19:136-143.
- **Babiker A**, El Hag MI, Perez C. Bartonella Infectious Endocarditis Associated With Cryoglobulinemia and Multifocal Proliferative Glomerulonephritis. Open Forum Infect Dis. 2018 Jul 27;5(8):ofy186.

- Dousa KM, **Babiker A**, Van Aartsen D, Shah N, Bonomo RA, Johnson JL, Skalweit MJ. Ibrutinib Therapy and Mycobacterium chelonae Skin and Soft Tissue Infection. Open Forum Infect Dis. 2018 Jul 18;5(7):ofy168.

Presentations and Abstracts

- **Babiker A**, Clarke L, Shields R, "Fosfomycin for treatment of multidrug-resistant pathogens causing urinary tract infection; A real-world perspective," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019
- **Babiker A**, Paronish J, Clancy C, Nguyen M-H, Shields R, "Emerging Waves of Carbapenem Resistance and Impact on Patient Outcomes from 2000-2017," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019
- **Babiker A**, Mustapha M, Pacey M, Shutt K, Ezeonwuka C, Ohm S, Cooper V, Marsh J, Doi Y, Harrison L, "The use of Online Tools for Antimicrobial Resistance Prediction by Whole Genome Sequencing in MRSA and VRE," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019

Honors and Awards

- Second place, "Bugs and Gloves: Transmission-based precautions made ridiculously easy!", Yearly DOM Fellows Teaching Competition, Pittsburgh, PA, April 2019
- Jonathan Freeman Scholarship Award, The Society for Healthcare Epidemiology of America (SHEA), Boston, MA, May 2019

Dr. Babiker receiving the Jonathan Freeman Scholarship Award from the Society for Healthcare Epidemiology of America

Nupur Gupta, DO

Publications

- Babiker A, **Gupta N**, Gibas CFC, Wiederhold NP, Sanders C, Mele J, Fan H, Iovleva A, Haidar G, Fernandes C. *Rasamsonia* sp: An emerging infection amongst chronic granulomatous disease patients. A case of disseminated infection by a putatively novel Rasamsonia argillacea species complex involving the heart. Med Mycol Case Rep. 2019 Apr 16;24:54-57.

Presentations and Abstracts

- **Gupta N**, McBeth S, Kaplan E, McDermott B, Despines L, McMahon D, "Increasing Care Engagement amongst People Living with HIV through a Text Messaging Intervention," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019

Honors and Awards

- Quality Improvement Research Award, "Increasing Care Engagement Amongst People Living with HIV Through a Text Messing Intervention," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019

Gavin Harris, MD

Presentations and Abstracts

- **Harris G**, Silveira F, Hughes K, Wallace D, "Respiratory viral panel testing in intensive care units: effect on outcomes," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh,

PA, April 2019

Jonathan Sun, DO, MBA

Presentations and Abstracts

- **Sun J**, Nguyen M-H, "Solid organ transplant (SOT) recipients as a model population to study carbapenem resistant Enterobacteriaceae (CRE) infections: How well do new anti-CRE agents perform?," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019

Peter Volpe, MD

Presentations and Abstracts

- **Volpe P**, Decker B, Clancy N, Buehrle D, Nguyen MH, "Back table perfusate fluid culturing does not reduce infections or mortality in liver transplant patients, and leads to increased antimicrobial usage," Department of Medicine Research Day, University of Pittsburgh, Pittsburgh, PA, April 2019

Postdoctoral Fellows, FY2019

Dusan Baek, PhD

Mentor: Dimiter S. Dimitrov, PhD

Dr. Baek is working on 1) the construction of a high quality antibody library, 2) screening and isolation of antibodies against disease-related targets, and, 3) the construction of an scFv antibody library displayed on the surface of yeast.

Gayatri S. Chilambi, PhD

Mentor: Daria Van Tyne, PhD

Dr. Chilambi studies 1) functional genomics of vancomycin-resistant enterococci in pediatric patients and 2) bacterial evasion of innate defenses at the ocular surface.

Mitra M. Eghbal, PhD

Mentor: Matthew J. Culyba, MD, PhD

Dr. Eghbal is investigating 1) the control mechanisms of the bacterial DNA damage response and 2) in-vivo evolution of S. aureus bacteremia in patients.

Alina Iovleva, MD

Mentor: Yohei Doi, MD, PhD

Dr. Iovleva studies the interplay of colistin resistance and virulence of *Acinetobacter baumannii* and is also investigating emerging resistance mechanisms in *A. baumannii* and *Enterobacteriaceae*.

Xianglei Liu, MD, PhD

Mentor: Dimiter S. Dimitrov, PhD

Dr. Liu is working on the development of CH2 domain as scaffolds for constructing CH2 based antibody libraries, as well as the development of binders for CD276 for therapeutic purposes.

Savrina Manhas, PhD

Mentor: John W. Mellors, MD

Dr. Manhas is working on the characterization of antibody sensitivity of HIV-1 Envelope sequences from individuals harboring clonally expanded viral reservoirs to better understand mechanisms of immune evasion.

Zehua Sun, PhD

Mentor: Dimiter S. Dimitrov, PhD

Dr. Sun is developing stable VH domain as scaffold for constructing VH phage libraries and CD22 binders for therapeutic purposes.

Camille Tumiotto, PhD

Mentor: John W. Mellors, MD

Dr. Tumiotto is working on the characterization of the HIV provirus in CSF samples from HIV infected patients.

Dr. Mellors emphasizes the importance of mentoring in both clinical and research endeavors—a philosophy he embraces and follows himself.

THREE-YEAR BIBLIOGRAPHY

John W. Mellors, MD *Division Chief*

Coffin JM, Wells DW, Zerbato JM, Kuruc JD, Guo S, Luke BT, Eron JJ, Bale M, Spindler J, Simonetti FR, Hill S, Kearney MF, Maldarelli F, Wu X, Mellors JW, Hughes SH. Clones of infected cells arise early in HIV-infected individuals. JCI Insight. 2019 Jun 20;4(12).

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