

## **Transplantation Infectious Disease/Immunocompromised Host Service Fellowship in Infectious Disease Transplant Medicine**

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### **I. Structure**

The Transplantation Infectious Disease and Compromised Host Program developed as a part of the comprehensive and life-long care provided to transplant recipients and other immunocompromised individuals with unique susceptibility to infection. The program in Transplantation Infectious Disease is an integral part of the MGH Transplant Center and Infectious Disease Division of the MGH Department of Medicine. This program facilitates the evaluation, prevention, and treatment of infectious disease in Liver, Kidney, Pancreas, Heart, and Lung recipients as well as those with hematopoietic malignancies, recipients of stem cell transplants and immunomodulator therapies. Over 300 solid organ transplants and over 800 stem cell transplants are performed at MGH each year.

This service provides a unique educational opportunity for Infectious Disease Fellows and other trainees in infectious disease management of immunocompromised individuals. This program has trained many of the leaders in this field worldwide. The training program provides at least one advanced clinical year focused on the clinical care of these “at risk” populations as well as research opportunities. *The extraordinary growth of these patient populations each year provides exposure to all forms of immunosuppression and therapies (including immunotherapy and CAR-T cells) – and to participate in clinical trials and translational research in these populations.* More specialized advanced experiences in stem cell transplantation and in other immunocompromised host populations (solid tumor, immune deficiencies) are also available.

The Compromised Host Program allows the rapid communication of clinical recommendations to the primary care medical and surgical teams on a continuous basis. Our team members are integrated into the primary care teams for our patients. We are afforded a unique opportunity to participate in the development of antimicrobial and immunosuppressive protocols on the clinical service and in development of clinical trials. Both the ID Division and the MGH Transplant Center have Clinical Trials Units which provide such experiences. Of the MGH Transplant ID Faculty alone, six hold NIH support for investigation of fundamental mechanisms of disease and translational studies. There is an ongoing relationship with basic research scientists studying models of transplantation (in the Infectious Disease Division, Transplant Centers and Transplantation Research Centers, Harvard Immunology Division) with particular interests in T- and B-cell biology, organ repair and regeneration, bone marrow transplantation, xenotransplantation and in the development of preclinical models of tolerance induction for clinical use. Other sites (Ragon Institute, Broad Institute, Harvard School of Public Health) are available for the interested trainee.

### **II. Clinical Activities – Fellowship Description**

This Fellowship Program is open only to those trainees who have successfully completed an approved first year Infectious Disease Fellowship Program and completed Internal Medicine Training. The **Fellows in Transplant Infectious Disease** carry progressively greater responsibility for the clinical care of complex immunocompromised hosts as well as for the education of residents and Fellows in earlier years of training and for presentation of the biomedical literature in related fields at weekly journal clubs and clinical rounds. The Fellows will also develop and complete a research study (targeting publication) that will be developed with one or more of the staff.

Optional added years of training in clinical or basic research are designed to allow the Fellows greater independence as Clinical or Basic investigators. Such opportunities are dependent upon the availability of research funding and acceptance by a specific mentor for that experience. The MGH Transplant Center has a training grant (NIH T32, Fishman, Co-PI) which is available for 2-3 years of support for some basic immunology fellows. In the second year, clinical track options include the Program in Clinical Effectiveness at the Harvard School of Public Health (by application, 2 summers) and progressive responsibility for a clinical research project in outcomes research with the Program faculty. In basic science, Fellows will assist in the design and performance of a bench research project in the general field of Transplantation Immunology and Infectious Disease with one or more of the faculty of the Transplant Infectious Disease Program or the faculty of the Transplantation Research Programs at MGH and BWH. The fellows will gain independence as a clinician in the weekly outpatient clinic if desired as a component of these programs.

One attending physician and one first year Infectious Disease Fellow and one-two second year **Fellows in Transplant Infectious Disease and Compromised Host Medicine** staff the inpatient Transplant ID Service, with physicians from outside institutions participating on the service by special arrangement. Transplantation Infectious Disease participates in the pre-transplant evaluation of new patients in the outpatient clinic and, as needed, inpatients. The Fellows and Attending round with the Transplant team and the Leukemia/BMT Teams each morning and second year fellows will also participate in the outpatient care of Transplant recipients (see below). A formal fellowship program has been in existence since 1997. ***The goals of the Fellowship in Infectious Disease Transplant Medicine have been endorsed by the Infectious Disease Society of America (written by Drs. Fishman and Robin Avery).*** Fellows are active members of both the Infectious Disease Division of the MGH and the MGH Transplant Center. Individualized academic programs are developed for trainees upon acceptance into the program. **Applicants will have completed an ACGME-certified clinical Infectious Disease fellowship or the equivalent by the time they start training.** Transplant ID Fellows will participate in both in-patient and out-patient clinical programs. Each Fellow will complete one clinical year of advanced training under direct supervision of the faculty of this program. This program is designed for those selected fellows completing their first, clinical year in Infectious Diseases and desiring an expanded exposure to patient management in Immunocompromised Hosts. It is separate from a full-time research track which is also available in this area with a commitment of at least 1-2 additional years for training.

#### **Transplant Infectious Disease Attending Physicians:**

**Dr. Jay A. Fishman, Director**

Dr. Camille Kotton, Clinical Director

Dr. Eric Rosenberg, Director, MGH Microbiology Laboratory

Dr. Mark Poznansky

Dr. Arthur Kim  
Dr. Sarah Hammond  
Dr. Joseph ElKhoury  
Dr. Michael Mansour  
Dr. Alyssa Letourneau  
Dr. Sarah Turbett  
Dr. Pierre Ankhoma  
Dr. Jacob Rosenberg

By the end of their training, they will understand:

- Multidisciplinary approaches to complex patients with organ failure, malignancy, and immunosuppression.
- The pre- and post-transplantation assessment of critically ill patients and the timeline of infection after transplantation (See, e.g., Fishman JA, NEJM, 2007, 357, 25:59-72; Am J Transplant 2017; Am J Transplant. 2017; 17:856-879. doi: 10.1111/ajt.14208 PMID: 28117944.)
- Management of patients with side-effects of immunomodulator therapies.
- The optimal deployment of diagnostic techniques in clinical management including radiological and molecular diagnostic tools
- Development of individualized prophylactic strategies including immunizations
- Important aspects of basic science relevant to transplantation immunology and infectious disease. They will participate in a clinical/basic science research project and will contribute to peer-reviewed publications. Additional research training is available for interested fellows.

### **Inpatient Clinical time**

Expectation is 7-8 months total, with optional experiences as arranged for individual trainees. The senior fellows may participate in rounds on one of the hematology-oncology inpatient services with the NP/resident teams for teaching purposes to assist in the care of these complex patients.

### **Outpatient Clinic**

Weekly (generally) on Wednesdays, starts 9:00am, should be done by 12: noon.

- Emergently as needed if not required on inpatient service
- Attending backup for inpatient service may be needed when TXID fellow is on service & in clinic
- ID continuity: HIV clinic 2x month, HIV pts only (prior MGH ID fellows only)
- No clinic when on offsite rotations (will have clinic during research periods)

**Transplant ID Rounds and Journal club** (Tuesday 12 noon with the BWH Compromised Host Service): Present carefully reviewed papers on immunocompromised hosts as suggested and reviewed with attending physician. Will include basic and clinical papers preferably from major journal: Request attending guidance (inpatient attending) on articles

### **Clinical Protocol development**

**Antimicrobial stewardship:** Partake in antifungal and other stewardship activities as they pertain to Transplant ID (may intersect with protocol development)

**Employment Search:** Important component of year – discuss with Dr. Fishman regularly through year

**Research project** (Coordination and approval by program directors) – may participate in multiple projects through year. Full-time research after the clinical year may be available under a Transplant Immunology Training grant and individual lab mentors as arranged with preceptors. Each Fellow is expected to develop a writing/research project by the end of September with mentor.

**Meetings and funding:** AST Fellows meeting (funded by AST)

**Vacation:** Same time allotment as first year fellows (not taken from research time)

### III. Clinical Activities - Transplantation

The Abdominal Transplant team is responsible for renal, liver, pancreas, and bowel transplants as well as ancillary surgical procedures (dialysis access, general surgery) in solid organ transplant recipients. This team generally includes the Transplant Surgery Attending, 2-3 Surgical Residents, a rotating first year Infectious Disease Fellow from the combined Partners Infectious Disease Program, a Nephrology Fellow and Nephrology Attending, an Attending Gastroenterologist and Fellow, and participation of representatives from Nursing, Pharmacy and Social Service. Fellows may also round with the Leukemia-BMT Service (NP's and/or residents and attending MDs). Consultations on patients on the Cardiac (Heart Failure and Transplant), Pulmonary, Stem Cell, CAR-T, and Leukemia and Lymphoma services are seen on a routine basis. Visiting fellows who have completed Infectious Disease training elsewhere may apply to join this program.

Weekly activities include:

- Friday morning (8 AM) conference on clinically related topics in solid organ transplantation and Morbidity and Mortality Conference monthly
- Tuesday noon ‘**Compromised Host Conference**’ (Zoom, with BWH) to discuss ID issues from active patients and present journal articles weekly
- Wednesday morning Transplant “Chief’s Rounds (8:30 AM, Blake 6) and Transplant Center Grand Rounds (quarterly, 7:30 or 8:00 AM in Bigelow Amphitheater, Zoom)
- Special Transplant Immunology (noon Friday) and Immunology (Thursday noon, CNY)
- Special lectures and Visiting Faculty.
- Leukemia and BMT Conferences: Weekly Fridays 2-4PM (Yawkey 2-210)

### Outpatient Experience

A variety of patients are seen in the Transplant Infectious Disease and Immunocompromised Host outpatient clinic:

- Pre-transplant evaluation for all patients undergoing kidney, liver, pancreas, heart, and lung transplantation, prior to HSCT or immunomodulator therapies
- Follow-up after inpatient stays (or emergency room/observation) for active infectious disease issues
- Urgent access for transplant recipients with acute issues appropriate for outpatient evaluation
- Monitoring via OPAT (Outpatient Antibiotic Therapy) is performed on many transplant patients per year to ensure safety and enhance therapeutic efficacy

- “Travel after Transplant Clinic” provides focused travel advice and care for solid organ and bone marrow transplant recipients

Infectious disease fellows and internal medicine residents in the out-patient clinic enhance their knowledge of:

- Pre-immunosuppression evaluation
- Immunomodulator therapies (CAR-T, checkpoint inhibitors)
- Acute evaluation of illness in immunocompromised hosts
- Routine follow-up of inpatients with active infectious disease issues
- Vaccines in immunocompromised hosts
- Mitigation of risk of side effects from antibiotic therapy
- Enhancing lifestyle safety after transplant, including travel medicine

Patient educational tools regarding transplant infectious diseases topics (including vaccines, pets, food safety, arboviral avoidance).

To the degree possible, all Infectious Disease Fellows including the Fellows in Infectious Disease Transplant Medicine participate in the teaching activities of the Infectious Disease Division during their participation on the Transplant Service. All Transplant I.D. Attending physicians also participate in the Clinical and Teaching activities of the M.G.H. Infectious Disease Division. Activities include Management Conference (Monday A.M.), Intercity Rounds with the ID physicians of other Boston Centers (Wednesday AM), and a didactic seminar series. There are additional clinical conferences and journal clubs that are available for those with special interests in the field.

## Formally Supervised Trainees

1997	Barbara Alexander / Chief, Transplant Infectious Disease, Professor, Duke University
1997-1998	Ban Hock Tan / Chief, Infectious Disease in Oncology, Singapore
1998-1999	Mun Sam Lam / Consultant, Transplant Infectious Disease, Singapore
1999	Atul Humar / R. Fraser Elliott Chair in Transplantation University Health Network Director, University of Toronto Transplant Institute Toronto, ON.
2000	Dino Sgarabotto / Consultant, Transplant and Oncology ID, University of Padua
2001-2002	Albert Shaw / Professor, Infectious Disease, Yale University, Basic Immunology Research
2001-2003	Costi Sifri / Professor, Infectious Disease, University of Virginia
2002-2005	Nicholas Mueller / Professor, Transplant Infectious Disease and HIV, University of Zurich
2003-2005	Camille Kotton / Assoc. Professor HMS, Transplant Infectious Disease, M.G.H.
2003-2005	Stanley Martin / Director Infectious Disease, Geisinger Health
2004-2005	Michael Ison / Director, Respiratory Disease Branch, NIAID, NIH
2005-2006	Karen Doucette / Chair, Infectious Disease Division, Co-Director Transplant Infectious Disease and HIV-HCV Co-infection Program, Professor, University of Alberta
2007-2008	John Davis / Professor, UCSF, Associate Dean for Curriculum, UCSF School of Medicine.
2007-2009	Nicolas Issa / Assoc Professor, Transplant Infectious Disease, Brigham and Women's Hospital, Boston, MA.
2008-2009	Alejandro Retrepo / Assistant Professor, Baylor College of Medicine, Infectious Disease, Baylor St. Luke's Medical Center
2009-2010	Anoma Nellore / Associate Professor, Infectious Disease, MD Univ Alabama, Birmingham
2010-2011	Bettina Knoll / Assoc Professor, Brown University, Transplant Infectious Disease..
2011-2012	Paritosh Prasad, Transplant ID, Professor of Medicine, University of Rochester
2012-2014	Alissa Wright, Associate Professor, University of British Columbia, Infectious Disease.
2013-2015	Pritha Sen, Assistant Professor, Harvard Medical School, Transplant ID, BWH
2013-2015	Sarah Turbett, Assistant Professor, Transplant ID and Laboratory Medicine, MGH
2014-2015	Tara Babu, Assoc Professor, University of Rochester, Transplant ID
2015-2017	Arianne Buchan, The Ottawa Hospital, CA. Transplant ID
2016-2017	Rebekah Lane, Registrar in Medicine, Auckland City Hospital, Auckland, NZ, ID.
2017-2018	John Hogan, Assoc Prof Medicine, Transplant ID, NYU
2017-2018	Philip Ponce, Assistant Prof Medicine, Univ Texas San Antonio, Transplant ID
2018-2019	Olivia Smibert, Registrar in Medicine and PhD Candidate, Univ. Melbourne
2018-2019	Nicolas Barros-Baertl, Director, Transplant ID, Indiana Univ. Health
2019-2021	Matthew Roberts, Attending Physician and Consultant Transplant ID, Univ. Adelaide
2020-2021	Christian Larsen, Assistant Professor, Univ Texas Southwestern , Transplant ID
2021-2022	Eliezer Nussbaum, Clinical and Research Fellow, MGH, Clinical Microbiology
2022-2023	Anna Apostolopoulou, Clinical and Research Fellow, MGH, Transplant ID