

Northwestern Transplant Hepatology Fellowship Handbook

2023-2024

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Introduction

Northwestern Medicine (NM), through its primary teaching site, Northwestern Memorial Hospital (NMH), offers premier Liver Transplant (LT) and Hepatology programs, both distinctive, and yet inexorably linked. While the Hepatology program is administratively contained within the Department of Medicine (DOM), it functions operationally within the Division of Solid Organ Transplant (SOT).

The LT program has numerous assets: (1) demonstrating continued success with both high volume (over 100 LTs per year, including living donation ~ 10% of the total) and excellent patient outcomes aligned with national norms; (2) numerous faculty thought-leaders; (3) unique partnerships with the community (Hispanic and African-American transplant programs); and (4) strong collaborations with a number of highly-regarded subspecialties within NMH such as Gastroenterology (GI), Interventional Radiology and Oncology.

In particular, the faculty have diverse interests and attachments to research (clinical, translational, and basic sciences), education (trainees, continuing medical education), national speciality organizations and industry. The faculty will serve as mentors and role models in all aspects of academic life and professional practice.

We believe in, and strongly support a collegial work environment with our colleagues and staff members. In such an environment enhanced patient-care, scientific collaboration, mentorship and deep friendships can all flourish.

This is an ACGME-accredited fellowship (1-2 positions/year) after which the fellows are eligible for Transplant Hepatology (TH) Board Certification.

Mission & Aims

To provide excellent patient care, generate substantive research, and train future academic leaders. We proudly serve the Chicagoland and Midwest region, with particular emphasis to under-served populations, exemplified through our African-American and Hispanic Transplant Programs.

- A. Clinical expertise in advanced liver disease (Hepatology, Pre- and Post-LT Hepatology)
- B. Clinical care and clinical education to Northwestern University, Chicagoland, and the Midwest region
- C. Generate substantive research in clinical, translational, and basic science through close collaboration with faculty mentors

Fellow Supervision & Evaluation Process

Definition

TH fellow: a 4th year fellow (PGY7), matriculated through the traditional pathway and has completed a 3-year GI fellowship; or, a 3rd year fellow (PGY6), matriculated through the integrated pathway and has completed 2 years of the GI fellowship. PGY6 fellows complete the GI fellowship upon completion of the TH fellowship. The PGY7 fellow may be internal or external in origin, whereas the PGY6 fellow is always internal. Both pathways lead to board eligibility for TH.

Policies

To ensure both patient safety and full educational opportunities, all TH fellows will be supervised by an attending physician (Hepatologist and/or Transplant Surgeon) while caring for patients at NMH, and during their rotation at Lurie Children's Hospital (LCH).

- A. TH fellows are trainees, under the supervision of the faculty. Graduated clinical responsibility is based upon their progression of education, experience, and judgment (overall competence)
- B. Specific credentialing documentation appropriate for the level of training is maintained
- C. Inpatient services have a supervisory attending during the day to monitor and assess trainees for: (1) communication and interviewing skills; (2) accurate and detailed recording of history; (3) performance of detailed examinations, and (4) procedural safety and competence; (5) overall appropriate management of patients; and, (6) appropriate interactions with junior trainees, referring specialists and colleagues/staff
- D. Faculty supervise trainees in all outpatient settings, with documented and attested patient encounters
- E. Documentation of trainee supervision during procedures (EGD, colonoscopy, biopsy) is maintained by TH fellow and the Program Director (PD)/Program Coordinator (PC)
- F. Subspecialty experiences (Pediatric TH and Transplant Infectious Diseases (TID)) are under the supervision of the particular PD and their allied faculty, as determined by the Residency Review Committee

Work Schedule

The TH fellowship occurs over 1 year, divided into 12 blocks (1 month = 1 block) for each fellow. The fellows alternate month to month between outpatient services (clinic (4) + external rotations (0.5 x 2) + vacation (1)) and inpatient services (6). Given various needs and pressures upon the services and/or the fellow(s), it is understood that some blocks may be shorter or longer than the traditional month. As such, the fellows efforts will be monitored and re-balanced on a quarterly basis. The Medvin fellowship (*vide infra*), if approved, is to be considered an outpatient experience.

Outpatient and inpatient months provide complex and complimentary exposure to clinical and educational experiences. There is more than sufficient faculty oversight and interaction throughout all of these experiences. As the months progress, and the experience and competency of the fellows increases, as deemed appropriate by both the faculty and the fellow(s), graduated autonomy (always with proximate supervision) will occur (*vide infra*).

Supervised Services

- A. Inpatient (Hepatology primary service and Hepatology consultations)

- B. Outpatient Clinics (Hepatology, Pre-LT and Post-LT)
- C. Procedures (EGD and colonoscopy, percutaneous liver biopsy)
- D. Research and/or Quality Improvement (QI) projects involving patients

Inpatient

Fellows have operational control of admissions, management and discharge of patients, under attending supervision, whilst directing and educating residents on the Hepatology primary service. Ultimately, in November of the academic year (5th month), fellows can round on the service as the *de facto* attending, with immediate follow-up with the supervising attending shortly thereafter (in-person, or by phone). In particular, admissions, unexpected discharges or significant change in clinical status, e.g. to ICU, or death, requires specific attending consent.

Outpatient

As the year progresses, and fellow competency and comfort increases, graduated autonomy occurs in these encounters: (1) evaluation of patients independently with comprehensive assessment and plan rendered to the supervising physician; (2) facilitating direct admissions (from clinic, or urgent care) to the Hepatology primary service; (3) nuanced management and triage of care regarding the substantive and sundry results that comprise Post-LT Nursing Rounds; and, (4) procedures in the form of endoscopy and percutaneous liver biopsy (*vide infra*). Regarding Post-LT Nursing Rounds, referrals to outside consultants and invasive diagnostic and/or therapeutic procedures, e.g. biopsy, ERCP, EUS, requires attending consent.

Procedures

Diagnostic and therapeutic procedures, in the form of EGD and/or colonoscopy, and percutaneous liver biopsies, are critical parts of the fellowship experience. All procedures occur throughout all rotations. In particular, the following require specific attending attention and consent: (1) consent of the patient; (2) the initiation and termination of all procedures; (3) administration of medications; and, (4) engaging therapeutic actions, e.g. variceal banding.

Attendance

The fellowship provides protected time for the TH fellows to attend their scheduled conferences & lectures. Faculty are aware that these conferences & lectures are mandatory, and as such, fellows will not be available during them. Attendance is recorded through the NM CME text message attestation, and tracked in Cloud CME.

Evaluation of the fellow

The assessment of fellow competency is rendered through “face-to-face” and electronic forms: (1) daily feedback from the supervising attending and/or PD; (2) end-of-rotation feedback directly from attendings, and formally documented through New Innovations (NI) evaluations - which detail competency metrics, and when taken over time, can reflect progression and/or need for remediation; (3) weekly office-hours with the PD; and, (4) semi-annual Clinical Competence Committee (CCC) reviews (rendered through “face-to-face” and electronic forms). Note, the CCC represents consensus faculty review of trainees’ professional current and future state, and methods for progress with interventions.

There are specific rotation evaluation forms in NI (outpatient is 1 month block continuously with the same attending; inpatient is 1 month block with one attending per week). These will be sent to the supervising attendings, with 1 week to complete. Content and completion of these forms will be monitored by the PC and PD.

Evaluations of the faculty

There are specific rotation evaluation forms in NI (outpatient is 1 month block continuously with the same attending; inpatient is 1 month block with one attending per week). These will be sent to the fellow, with 1 week to complete. As this is a small fellowship (1-2 fellows), their evaluations are integrated into a larger pool of GI fellow evaluations, and then rendered in a delayed fashion, to protect fellow anonymity.

Evaluation of the fellowship

Fellows and faculty evaluate the program throughout the year: (1) 1:1 personal correspondence with the PD; (2) weekly office-hours; (3) semi-annual CCC meetings; and, (4) annual Program Evaluation Committee (PEC) meetings. NI evaluations, which form the basis for discussion at the CCC meetings, are sent out in December and June.

Furthermore, Northwestern GME and the ACGME both mandate separate comprehensive annual reviews (objective data and interviews) of the TH fellowship to optimize the fellowship experience.

Faculty & Selected Staff

Transplant Surgery: Daniel Borja-Cacho, MD; Juan Carlos Caicedo, MD; Derrick Christopher, MD, MBA; Zachary Dietch, MD, MBA; Daniela Ladner, MD, MPH; Joseph Leventhal, MD, PhD; Satish Nadig, MD, PhD (Chief); Vinayak Rohan, MD; Dinee Simpson, MD

Hepatology: Justin Boike, MD, MPH; Amanda Cheung, MD; Andres Duarte-Rojo, MD, PhD; Daniel Ganger, MD; Richard Green, MD; Anne Henkel, MD; Dempsey Hughes, MD; Sean Koppe, MD; Laura Kulik, MD; Josh Levitsky, MD, MS (Academic Chief); Christopher Moore, MD; Sarang Thaker, MD, MS

Transplant Hepatology Fellowship Coordinator: Angela Tucker

Transplant Social Services: Janet Aminoff, LCSW (Clinical lead); Norma Haro, LCSW; Adriana Hollins, LCSW; Colleen Kelley, LCSW; Carla Kozlowicz, LCSW; Lydia Loveland, LCSW; Allison Nichols, LCSW; Stephanie Young, LCSW

Transplant Psychiatry/Psychology: John Franklin, MD

Telephone Numbers

Hospital Area Code

312-xxx-xxxx

	extensions
	6-xxxx = 926-xxxx 5-xxxx = 695-xxxx 4-xxxx = 694-xxxx 2-xxxx = 472-xxxx
14 East RN station (Feinberg: Hepatology inpatients)	6-2853
14 East Residents Room (Feinberg: Hepatology inpatients)	6-1394
Admissions	6-2074
Endoscopy (Galter: inpatient, or outpatient MAC)	6-6197 (Recovery) 6-6198 (Admitting) 4-0571 (Charge nurse)
Endoscopy (Lavin: outpatient conscious sedation/MAC)	6-2656 (Nurses station) 4-0375 (Charge nurse)
Emergency Department (Feinberg)	6-5188
Hepatology Clinic (Lavin - Workstation)	2-6992
Operator	6-2000
Pre-LT Hepatology RN Office (Arkes 19th floor)	5-5437
Pre/Post LT Clinics (Arkes 19th floor - "Nerve Center")	5-0476
Post-LT RNs (Arkes 19th floor - "Quiet Room")	5-6963
Surgical Pathology (Galter 7th floor)	6-3211
Transfer Center (admissions to Hepatology primary service)	6-3321

Fellowship Overview

The fellowship will provide the knowledge and experiences to become an independent and highly-qualified TH physician. By the end of the fellowship, fellows will have easily met and surpassed all requirements to take the ACGME TH Board Examination.

Fellows will care for patients manifesting a large variety of illnesses and in varying stages (acute or chronic presentations). This care will be within the framework of a multidisciplinary team: TH, Transplant Surgery, Interventional Radiology (IR), Interventional GI (IGI), TID, Transplant Nephrology, Psychiatry, Nutrition, Physical Therapy, and Social Services. The fellows will have

a meaningful working relationship with trainees in these disciplines and others. We strongly believe that this approach (both vertically and horizontally), not only improves patient care but enhances the quality of our Divisions, Departments and NMH generally.

A main objective of this fellowship is to better understand medical illnesses not only at a biological level, but within a larger psycho-social context. Daily teaching rounds and several weekly conferences & lectures will be integral to fellowship training and the principles aligned with it. Fellows will be given the opportunity to participate in institutional and professional organization committees. The fellowship curriculum is fluid and will be re-evaluated yearly (formally) and *ad hoc* to keep it relevant to trainee needs and national consensus requirements.

The core experience of the fellowship will consist in the evaluation and management of LT candidates and recipients. This will be achieved through extensive exposure in both the in- and outpatient settings, including a post-LT Hepatology Clinic throughout the year. Fellows will be expected to maintain broader competency through Hepatology Clinics and procedures (EGD, colonoscopy and percutaneous liver biopsy). These experiences can certainly be augmented with extra clinical/procedural opportunities, as requested.

Per ACGME requirements, the fellow will: (1) gain facility with interpreting liver biopsies (at least 200); (2) will attend/participate in transplant surgeries (at least 3); and, (3) organ procurement (at least 1). Other procedures, such as donation after cardiac death (DCD) procurement, and Living donor surgeries, while not required, are highly encouraged in order to gain a more thorough understanding of the unique issues and perspectives in the field of LT. Notably, the requirement for competency in performance of percutaneous liver biopsy has been withdrawn by the ACGME as of 2022, but is also still encouraged (*vide infra*).

Fellowship Goals & Objectives

The goal of the fellowship is to fully prepare fellows for the broad and deep complexity of LT medicine in the overarching healthcare space. This preparation is achieved by very close faculty mentorship during a multitude of interdisciplinary experiences throughout the academic year. These experiences are highlighted by an awareness and sensitivity to the social-cultural context of patients, providers and staff. Efforts are targeted to provide premium care and education to patients. The fellowship experiences are complemented by both formalized and individual didactic meetings. The research atmosphere, in a high-volume transplant center, facilitates broad scholarly engagement. The fellow will practice with graduated autonomy throughout the year in preparation for a rigorous career.

- A. Comprehensive evaluation and management of hepatology patients
- B. Comprehensive evaluation and management of pre-LT patients
- C. Comprehensive evaluation and management of post-LT patients
- D. Appreciation for the complex interventions and evaluations by our sub-specialty colleagues and the communication required for comprehensive and efficient care of patients

- E. An appreciation for and facility with multidisciplinary evaluation and management of transplant patients; the nuances of forming consensus in group actions
- F. An appreciation for and facility with the social-cultural context in which transplant evaluation and management takes place and efforts to identify, account for, and even in some cases remedy disparities as they impact upon transplant eligibility and management
- G. Further development as an educator and/or mentor to trainees and colleagues in our local and regional communities: (1) through operational control on our resident-run inpatient services; (2) and attendance and/or participation in educational/research meetings, respectively
- H. An appreciation for systemic issues that affect patient care outcomes (“quality”), and creating/facilitating projects that target these areas, e.g. Quality Improvement (QI) projects
- I. Maintaining and augmenting medical professionalism, in-regards to: (1) patient care; (2) faculty/staff interaction; (3) community engagement; and, (4) junior trainee and colleague education
- J. Faculty and staff will serve as role-models in all these regards (*vide supra*), furthered by formal educational conferences & Lectures provided by the DOM and Division of GI and Hepatology

Progression in training

Progression in training, in particular, graduated autonomy (from formal direct supervision most of the time, to part of the time, to indirect supervision/independence), is manifest in 4 domains (with attending discretion, and consent of the fellow) (1): outpatient clinical encounters, i.e., evaluation of patients alone and development of assessment and plan; (2) in/outpatient endoscopy (diagnostic and therapeutic) and percutaneous liver biopsy (performance, interpretation); (3) in/outpatient post-LT Nurse Rounds, i.e. the evaluation and management of acute, sub-acute and chronic outpatient clinical, blood, imaging, procedural and biopsy results; (4) inpatient (Hepatology primary service) with management of patients, oversight and education of the resident team. Note, for (4) rounding without an attending physically present, is to start in November. The attending is always available by phone to staff patients, and can be deemed to be in person, if they or the fellow requests it.

The assessment of fellow competency is rendered through: (1) daily feedback from the supervising attending and/or PD; (2) end-of-rotation feedback directly from attendings, and formally documented through New Innovations (NI) evaluations - which detail competency metrics, and when taken over time, can reflect progression and/or need for remediation; (3) weekly office-hours with the PD; and, (4) semi-annual Clinical Competence Committee (CCC) reviews (in-person; in-writing).

Evaluation of the fellow will occur as stated (*vide supra*).

Clinical Services Overview

The fellowship is designed to meet the requirements of the ACGME through varied and in-depth clinical experiences over the course of 1 academic year. Traditionally, these experiences are

divided between alternating inpatient and outpatient months, whether there are 1 or 2 fellows per year. As such, depending on the schedule, certain services may be without the TH fellow. All such services can function autonomously without the fellow, but are certainly enhanced by them. All clinical experiences are detailed in their designated section (*vide infra*).

- A. 6 months of inpatient services; Post-LT Hepatology Clinic continues
- B. 4 months of outpatient services [2 pre-LT clinics, 2 post-LT (Hepatology and Surgery) clinics, 1 Hepatology clinic, 2 endoscopy ½ days]
- C. If a fellow is selected for the Medvin Fellowship (*vide infra*), this will take the place of 1 month outpatient service
- D. ½ month Pediatric TH in/outpatient; Post-LT Hepatology and Surgery Clinics continue; location is LCH
- E. ½ month TID in/outpatient; Post-LT Hepatology and Surgery Clinics continue; location is NMH
- F. 1 month (20 working days) vacation; this does not include travel for interviews
- G. 5 days to attend national conferences

Hepatology Outpatient Services Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
AM	<p>Endoscopy 8:00-12:00 Ganger Kulik</p> <p>Hepatology 8:00-12:00 Boike Hughes Thaker</p> <p>Post-LT Surgery 8:00-12:00 Attendings</p>	<p>Pre-LT Return 8:30-12:00 Attendings</p>	<p>Endoscopy 8:00-12:00 Boike</p> <p>Hepatology 8:00-12:00 Cheung Hughes Kulik Thaker</p>	<p>Hepatology 8:00-12:00 Levitsky Moore</p> <p>Pre-LT New 8:30-12:00 Attendings</p>	<p>Hepatology Conf 7:00-8:00</p> <p>Pathology Conf 8:00-8:30</p> <p>Multi-Disc Conf 8:30-10:30</p>

PM	<p>Endoscopy 1:00-5:00 Duarte Hughes Thaker</p> <p>HBS 1:00-4:00 Attendings Kulik</p> <p>Hepatology 1:00-5:00 Boike Green</p> <p>Post-LT Hepatology 1:00-5:00 Moore</p>	<p>Endoscopy 1:00-5:00 Levitsky</p> <p>Hepatology 1:00-5:00 Ganger Hughes</p> <p>Post-LT Hepatology 1:00-5:00 Boike Duarte Moore</p> <p>Fellow's Lecture Series 4:30-5:30</p>	<p>Hepatology 1:00-5:00 Moore</p> <p>MAC Endoscopy 1:00-5:00 Attendings</p> <p>Post-LT Hepatology 1:00-5:00 Ganger Levitsky</p> <p>CTC Lecture Series 4:30-5:30</p>	<p>Hepatology 1:00-5:00 Duarte Ganger</p> <p>Liver Biopsy 1:00-2:30 Moore</p> <p>Post-LT Hepatology 1:00-5:00 Cheung Hughes Thaker</p> <p>Radiology Conf 1:00-2:30</p> <p>Case Discussions 2:00-3:00 Green</p>	<p>Endoscopy 1:00-5:00 Moore</p>
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Locations

- A. Case Discussions: Feinberg Pavilion, 14th floor, Hepatology Resident Team Room
- B. Endoscopy: Lavin Pavilion, 16th floor, Digestive Health Center (DHC) Endoscopy suites
- C. Fellow's Lecture Series: Arkes Pavilion, 19th floor, Solid Organ Transplant Center (SOTC) Conference Rooms (or virtual)
- D. Hepatobiliary Surgery (HBS) Clinic: Arkes Pavilion, 19th floor, SOTC Transplant Clinic
- E. Radiology Conference: Arkes Pavilion, 4th floor, Department of Radiology Conference Room (or virtual)
- F. Hepatology Clinic: Lavin Pavilion, 16th floor, DHC Pod B1/B2
- G. Hepatology Conferences & Lectures: Arkes Pavilion, 14th floor, GI Conference Room (or virtual)
- H. Jon Fryer, MD CTC Lecture Series: Arkes Pavilion, 19th floor, SOTC Conference Rooms (or virtual)
- I. Liver Biopsy: Arkes Pavilion, 19th floor, SOTC Transplant Procedure Bays
- J. MAC Endoscopy: Galter Pavilion, 4th floor, Endoscopy Suites
- K. Multi-Disciplinary Conference (MDC): Arkes Pavilion, 19th floor, SOTC 19-083 (or virtual)
- L. Pathology Conference: Galter Pavilion, 7th floor, Pathology Labs (or virtual)
- M. Pre-LT Clinic (New and Return): Arkes Pavilion, 19th floor, SOTC Transplant Clinic
- N. Post-LT Surgery Clinic: Arkes Pavilion, 19th floor, SOTC Procedure Bays
- O. Post-LT Hepatology Clinic: Arkes Pavilion, 19th floor, SOTC Transplant Clinic

Hepatology Inpatient Services Schedule

Note: Conferences & Lectures and/or other meetings continue; Post-LT Hepatology Clinic continues.

Monday – Thursday: Standard schedule

7:45 ~ 8:30 am	Multidisciplinary Rounds (MDR)
8:30 ~11:00 am	Hepatology primary service rounds
Late morning/Afternoon	Hepatology consult service and procedures (Optional)
Afternoon	Service follow-up; educate residents; administrative time

Friday: Non-standard schedule

7:00 – 8:00 am	Hepatology Conference & Lectures (modular)
8:00 – 8:30 am	Pathology Conference
8:30 – 10:30 am	Multidisciplinary Committee (MDC)
Morning/Afternoon	Rounding; service follow-up; educate residents; endoscopy

Saturday: Non-standard schedule

8:00 am ~ 12:00pm	Hepatology primary service rounds
	*Coverage dates determined by TH fellows
	*TH fellow round independently (starting in November)

Sunday: Off

On-Call Status

The fellow will be expected to keep the pager on throughout the day until 6pm, but will not, in general, be expected to manage patients after-hours (whether in/outpatient). If the fellow is going to be unavailable, the pager should be forwarded to their co-fellow (if available), or the GI fellow on-call. The fellow will not exceed the 80-hour work week (on average over 4 weeks); this has never in fact been an issue. Fellows will actively document their weekly duty hours; non-compliance can result in temporary suspension of privileges. Moonlighting is allowed, but does require PD approval. Total work cannot exceed (combined with official work hours), the stated maximum hours, per ACGME.

Didactic Curriculum

Preamble

The curriculum (September through June) is mainly directed at GI and TH fellows; however, TH faculty, Hepatology advanced practice providers (APP), allied pharmacists, and all Hepatology rotators may be in attendance. Depending on the particular event, especially for invited speakers, many allied NM faculty and staff may also attend.

Hepatology Conferences & Lectures (group-learning)

The GI and TH fellows will attend and/or participate in weekly hour-long conferences & lectures, Fridays, 7:00-8:00 am, in Arkes Pavilion, 14th floor, GI Conference Rooms (or virtual). Note, these conferences & lectures simultaneously function as part of the “Academic Conferences and Lectures” (*vide infra*).

- A. Didactics: faculty present core concepts in Hepatology and/or LT
- B. Bile: As a group, Transplant hepatologists and surgeons, IR, and Interventional IGI discuss complex and/or otherwise recurrent biliary issues in our patient population (mostly post-LT) through, in many cases, nuanced or multi-staged approaches. TH and IGI fellows present 4-8 cases in total
- C. Clinical Cases: TH and GI fellows present 4 cases in total - detailing pertinent history, clinical course, and salient points for clinical practice
- D. Journal Club: TH fellow presents 2-3 important articles, every semester; presenting methods, results and relevance of the article to the group; goal is to facilitate discussion amongst faculty and fellows
- E. Morbidity and Mortality: TH and Transplant Surgery fellows present 1-2 cases every semester; cases will elicit discussion regarding root-cause analysis and multi-disciplinary efforts to improve outcomes
- F. Pathology review: TH and GI fellow present 3 cases each (10 minutes per case); focused mostly on biopsy description and interpretation; this is to be highly interactive - presenters are to call upon the GI fellows for the above
- G. Faculty & TH Fellow research: faculty present on their accumulated and/or on-going research; fellows will present their QI project and/or otherwise scholarly activities (including a research) - this will occur June, with duration ~ 30 minutes

Hepatology Grand Rounds (group-learning)

Invited external guest faculty, of national and/or international renown, speak on an area of their expertise to the Division of GI and Hepatology. Usually 3-4 faculty per year are invited. These events will take place on certain Thursdays, 7:00-8:00 am, in Prentice Pavilion, 3rd floor, Conference Rooms.

This experience is usually supplemented by: (1) dinner and/or lunch with NM faculty and the invited speaker; TH fellows are encouraged attend; (2) group meeting between fellows (GI and TH) and the speaker to discuss interesting cases and/or career advice; and, (3) 1:1 meetings between NM faculty and the invited speaker; TH fellows are encouraged to meet with all speakers

Administrative notes: (1) when Grand Rounds are in-person, the TH fellow will escort the visiting faculty from the Hyatt Centric Chicago Magnificent Mile, 633 North St Clair St (across from Arkes Pavilion), to the conference room.

Fellow’s Lecture Series (group-learning)

These lectures, presented by NM faculty, showcase a broad array of SOT topics highly focused on clinical practice. The main target audience is transplant fellows (hepatology, nephrology and surgery), but certainly all trainees and faculty are welcome. These lectures occur throughout the

academic year, on Tuesdays, 4:30-5:30 pm, in Arkes Pavilion, 19th floor, SOTC conference rooms.

Transplant Comprehensive Curriculum (self-learning)

Fellows have access to the Comprehensive Trainee Curriculum (CTC) videos (up to 1 hour each) (<https://www.myast.org/comprehensive-trainee-curriculum-ctc>), produced by the American Society of Transplantation (AST), covering all aspects of SOT. A comprehensive reading list of Hepatology and LT related topics is provided (and iterated) on a monthly basis. Fellows will be given access to the TH Board Review Lectures.

Northwestern Clinical Protocols and Policies (self-learning)

NM has extensive and specific LT patient protocols (*vide infra*), covering: (1) the transplant evaluation process; (2) immunosuppression management; (3) hepatobiliary cancer evaluation and management (pre- and post-LT); (4) laboratory testing (pre- and post-LT); (5) post-LT clinical and laboratory follow-up schedules; (6) ID monitoring, prophylaxis and management; (7) management of immunosuppression non-infectious complications pertaining to blood tests, biliary (e.g. strictures) and vascular issues (e.g. thrombosis), and parenchymal (e.g. cellular rejection); and, (8) enhanced primary care management in the post-LT setting.

These protocols should be reviewed carefully and often, noting that they may in many cases extend beyond, and/or not align with published literature, and/or other transplant institutions.

Office hours

Every week, Fridays, 12:00-12:30 pm (or another mutually agreed upon time), the fellows can meet with Christopher Moore, MD, the TH Fellowship PD. This meeting is multi-purpose: (1) for clinical questions that arise from in- and outpatient services and/or readings; (2) to further discuss and expound upon the weekly CTC videos; (3) to ensure individual wellness; and, (4) facilitate feedback for improvement. The PD is readily available to discuss all issues facing the fellows and the fellowship daily. The PD office is in Arkes Pavilion, 19th floor, SOTC 19-037.

Clinical Protocols & Policies

These protocols and policies can be accessed through the NM Interactive website: [Home - Home \(sharepoint.com\)](#), i.e. the Homepage. Therein select “Policies and Procedures” in the top headline, and then select “All Policies and Procedures,” which will take you to the “Policy Manager.” In the top headline, search for particular subjects, e.g. “liver transplant prophylaxis,” or other key terms; or type in the equivalent reference code. These protocols and policies simultaneously function as part of the fellow’s “Didactic Curriculum” (*vide supra*).

Protocols & Policies

- A. Initial Evaluation of Acute Liver Failure [30.1045]
- B. Alcohol Protocol in LT [30.1002]
- C. Evaluation of Cardiac Disease Risk in LT Candidates [30.1075]
- D. LT Waitlist Management [30.0035]

- E. Procedure for Initial Evaluation of Hepatocellular Carcinoma and Cholangiocarcinoma Pre-Transplantation [30.1046]
- F. Hepatitis C Positive Donor Protocol [30.1049]
- G. Alprostadil Usage After LT [30.1005]
- H. Hepatitis B Prophylaxis in HBsAg LT Recipients [30.1008]
- I. Hepatitis B Prophylaxis LT Recipients with HBcAb Positive Donors [30.1009]
- J. Hepatitis B Prophylaxis in Non-liver Transplant Recipients of HBcAb Positive Donors [30.1012]
- K. Surveillance of Care for Patients with HCC or Cholangiocarcinoma Post-Transplantation [30.1048]
- L. Liver and LKT Recipient Outpatient Follow-Up Schedule [30.1032]
- M. Immunosuppression Therapeutic Drug Monitoring [30.1016]
- N. Liver Only Renal Sparing Immunosuppression Protocol [30.1021]
- O. Everolimus [30.1050]
- P. Living and Deceased Donor LT Recipients Immunosuppression Protocol [30.1019]
- Q. Immune-Related Liver Disease LT Immunosuppression Protocol [30.1022]
- R. Simultaneous LKT Immunosuppression Protocol [30.1044]
- S. Liver Biopsy Procedure [30.1004]
- T. Identification and Management of Rejection Protocol [30.1003]
- U. Management of Leukopenia [30.1023]
- V. Long-term Care and Management of the Liver, Kidney and Pancreas Transplant Recipients [30.1056]
- W. NASH long-term follow-up (*vide infra*; not included in NM Protocols & Policies)

	1 month	4-6 months	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 years
Labs (to include in addition to standard labs)												
Urine protein and Cr	X	X	X	X	X	X	X	X	X	X	X	X
HgbA1c	X	X	X	X	X	X	X	X	X	X	X	X
Fasting lipid profile		X	X	X	X	X	X	X	X	X	X	X
Procedures												
Biopsy (for cause +/- 5 yr protocol)							X					X (optional)
Imaging (select one of below LSMs)												
MRI PDFF/MRE or US ARFI			X		X		X		X			X
Fibroscan/CAP			X	X	X	X	X	X	X	X	X	X
Echocardiogram* (If h/o abnormal previous echo or symptom driven)												
Questionnaires (if patient consented to registry)												
CARDIA Y30 (Sedentary Behavior)	X	X	X	X	X	X	X	X	X	X	X	X
PROMIS 29 (Ability to Participate in Social Roles and Activities)	X	X	X	X	X	X	X	X	X	X	X	X
Willett 80 out (Dietary Assessment)	X	X	X	X	X	X	X	X	X	X	X	X

Post-LT Testing & Visit Protocols

Test	Time	month 1	m2	m3	m4-12	year 1-3	y3-9	y ≥ 10
CMP		3x/week	2x/wk	1x/wk	q2wk	q1m	q3m	q6m
Mg					q2wk to 6m			
CBC + diff		3x/wk	2x/wk	1x/wk	q2wk	q1m	q3m	q6m
Drug levels^a		3x/wk	2x/wk	1x/wk	q2wk	q1m	q3m	q6m
Lipids^β		q6m					q1y	q1y
Hgb A1c^γ		q6m						
AFP (HCC)^δ		q6m to 5y						
CA 19-9 (CCA)^δ								
UA (mTORi)^ε		q1y						
UPC (mTORi)^ε		q6y				q1y		
Visits		1x/wk	1x/wk	1x/wk	q1m to 6m, then at 9m	q1y		q2y

Notes

α: Immunosuppression medications include tacrolimus (FK506), in two forms, the short-acting, branded prograf © (BID dose), and long-acting branded envarsus © (daily); cyclosporine; mTORi (sirolimus and everolimus); mycophenolate and azathioprine; in general, all these medications should be drawn as trough levels, i.e. before taking AM doses

β: Lipids should be drawn while fasting (12hr)

γ: Hgb A1c is drawn for patients with pre-LT NASH

δ: AFP is drawn for “high-risk” malignancy recipients, see “NM Clinical Protocols & Policies;” CA 19-9 is drawn for all CCA or mixed HCC/CCA recipients, both of which are by definition “high-risk” malignancy recipients, see “NM Clinical Protocols & Policies”

ε: UA and urine protein-creatinine ratio are only required mTORi patients

Inpatient Experiences

Preamble

The NMH SOTC is administratively divided into medical and surgical services, which each have pre- and post-LT components for Liver and Kidney patients. Pertinently, for inpatients needing a LT and/or a simultaneous liver and kidney transplant (SLKT), two broad categories exist: (1) Hepatology primary service for pre-L(K)T and long-term (≥ 1m) post L(K)T patients who are suitable for a medical floor (*vide infra*); (2) Transplant surgical service for pre-L(K)T in the CTICU, or short-term (≤ 1m) post L(K)T patients who are suitable for the surgical floor (*vide infra*). As a result, depending on the patient's issues, and/or their time from L(K)T, the TH personnel involved will either function as a primary service, or as a consultant (in either case covering procedures); and *vice versa* for the Transplant surgery personnel. Further, all surgical issues (including suturing issues) can be initially staffed with Transplant surgery personnel. Thus, the daily practice is inherently interdisciplinary, collaborative and cognitively and technically challenging.

Hepatology Consult Service Rounds

Patients on the Hepatology consult service fall into these general categories: (1) acute and/or chronic HB diseases that are ineligible and/or inappropriate for LT; (2) long-term post-LT recipients admitted for non-transplant issues, with otherwise stable graft function; and, (3) hepatic risk assessment for non-LT surgeries. This service is managed directly by the GI fellow, with the assistance of a senior resident and/or APP, and staffed directly with the attending. These rounds occur daily, in the late morning and/or afternoon, and are decentralized - encompassing Galter, Feinberg and Olson Pavilions, and Prentice Hospital.

Administrative notes: The TH fellow is not responsible for the operation of this service, but is nonetheless encouraged to attend rounds so as to solidify and augment their own hepatology fund of knowledge. It is the reality that some patients on the consult service may in time, or with otherwise new information, become eligible for further transplant evaluation, and/or require, e.g., transplant immunologic adjustments. As such, it benefits the fellow to: (1) monitor this service; (2) advise the GI fellow for workflow assistance; and (3) coordinate care *ad hoc* with transplant staff. For pre/post-LT ICU patients, the fellow may indeed be the primary trainee consultant (schedule permitting, otherwise defaulting to the GI fellow).

Hepatology Primary Service Rounds

Hepatology primary service houses up to 12 patients, under the direct management of the attending and TH fellow who supervise a resident team (3 interns and 1 senior). Interns and residents will admit, manage, present, and discharge all patients. Detailed assessment and management of the following will occur: (1) active medical issues for which they are admitted; (2) issues affecting listing capability or maintenance across these domains: (a) medical; (b) surgical; (c) frailty and rehabilitation; (d) psycho-social; and (e) financial.

Given the complex nature of these patients, a number of allied consultants are commonly involved: (1) TID will assist with nuanced management of complex and/or atypical infections, particularly in the immuno-suppressed state; (2) Transplant Nephrology, as relates to volume management with diuretics and acute kidney injury, chronic kidney disease, and determination of KT eligibility; (3) IGI will assist with biliary complications (including transgastric biopsy), particularly in the post-LT patients; (4) IR will assist with TIPS, vascular and biliary access, and HCC liver-directed therapies; fluid removal through thora/paracentesis; (5) Transplant Surgery will handle/direct all surgical issues (an can triage to allied surgical services *ad hoc*) and/or vascular issues affecting the post-LT hepatic artery and portal vein; (6) PT and Nutrition Service - almost universally consulted on our patients given their advanced disease state and deconditioning; and, (7) Psychiatry - their evaluation, particularly for alcohol patients is essential in terms of assessing for recipient success in the post-LT state. These rounds take place daily, 8:30-11:00 am, in Feinberg Pavilion, 14th floor, East.

The TH fellow is expected to have up-to-date and detailed knowledge of all patients, for both their immediate issues and LT status (studies required for listing or maintenance of listing) and living donor status (as applicable). Overall, the fellow will gain the experience of managing a broad spectrum of inpatient pre/post-LT issues. The fellow serves several critical roles: (1) facilitating communication between the attending and residents; (2) helping the residents to understand the complex multidisciplinary issues of these patients; (3) ensuring proper

communication with our consultants and transplant staff; and, (4) providing an essential continuity-of-care function for these complex patients – given that the attendings rotate on a weekly basis.

Administrative notes: the fellow is to communicate with: (1) pre-LT nurses daily regarding patient medical and listing issues; and, (2) post-LT nurses whenever transplanted patients are discharged - to ensure accurate and safe continuity-of-care. In general, all endoscopic procedures for this service will be performed by the Hepatology consult service GI fellow (*vide infra*). In some cases, the TH fellow may perform these procedures and/or provide oversight to the GI fellow during the procedure. The pre/post-LT nursing staff are located in Arkes Pavilion, 19th floor, SOTC.

Multidisciplinary Rounds

MDR is utilized to discuss all patients housed on the SOT services (*vide supra*). The groups represented at MDR include (1) fellows and attendings for TH, Transplant Surgery, Transplant Nephrology, TID; (2) Inpatient Social Services; (3) Transplant nurse coordinators; and, (4) Surgical ICU attending. The respective fellows will each present, briefly, on their service (or of otherwise notable) patients: (1) active medical issues; (2) issues affecting listing capability or maintenance across these domains: (a) medical; (b) surgical; (c) frailty; (d) psycho-social; and, (e) financial. These rounds occur daily, 7:45-8:30 am, in Feinberg Pavilion, 7th floor, CTICU Conference Room (or virtual).

The MDR represents a significant opportunity for the education and overall training of the fellow in understanding the complex nature of these patients: (1) developing concise, substantive presentations; (2) communication with consultants; (3) learning from consultants regarding the unique complications and nuanced management in these patients; and (4) learning to communicate and collaborate towards consensus management.

Outpatient Experiences

Hepatobiliary Surgery Clinic

The HBS clinic evaluates both benign and malignant HB lesions for optimal radiologic and/or surgical intervention (which do not include destination LT). The clinic can assist with all patients regardless of transplant status. It is staffed jointly by TH, Transplant Surgery and IR. Given the nature of the disease, anatomic access, and patient comorbidities, this clinic will utilize advanced techniques in nuanced ways, in many cases, beyond what one would expect (or even be considered) from guidelines. These clinics occur on Mondays, 1:00-5:00 pm, Arkes Pavilion, 19th floor, SOTC Transplant Clinic.

Administrative notes: This clinic, while not part of the standard fellow curriculum, is of obvious utility to all parts of Hepatology. Fellows are encouraged to attend, insofar as it does not conflict with their mandated responsibilities.

Hepatology Clinic

The Hepatology Clinic evaluates acute HB injury, chronic HB disease including compensated and decompensated cirrhosis, and HB lesions and cancers. Patients remain here insofar as they remain medically controlled, or ineligible, or uninterested for LT evaluation. This clinic is for both “new” and “return” patients; though invariably patients being discharged from the Hepatology primary or consult services will be “returns” - having been staffed formally during the inpatient stay. By nature, the majority of Hepatology primary service patients will follow-up in the Pre-LT clinic (“New” or “Return”) (*vide infra*). However, if deemed not a pre-LT candidate, patients will become Hepatology patients. This clinic occurs every day (date/time is attending specific), except Fridays, in Lavin Pavilion, 16th floor, DHC Pod B1/B2.

While the bulk of this fellowship deals with issues related to the pre- and post-LT experiences, solidifying, and augmenting general hepatology knowledge is very important. It not only informs the LT experience, but is also crucial for the long-term successful practice of any hepatologist, whether they choose to remain at an academic center with or without LT capability.

Administrative notes: residents will discuss with the Hepatology primary service attending and/or the TH fellow to determine which provider will manage this patient in the outpatient setting. A patient staffed on the Hepatology consult service should follow-up with the attending who staffed the original consult (not to the attending who was on when the patient was discharged). If there are no available return appointments dates in the time frame required, contact that clinic attending for direction; in many instances they can also follow-up with an APP in the clinic as well.

The fellow participates in this clinic during their outpatient service months. In particular, the fellows will be assigned to an attending for a 3 month (quarterly) period; thus a total of 4 attendings over the academic year. During inpatient months, this clinic is optional, and as such, fellow availability would be determined by their inpatient responsibilities and the timing of this clinic. Assignments will be distributed during orientation.

Post-LT Hepatology Clinic

This Post-LT Hepatology Clinic handles: (1) immunosuppression medications and side-effects; (2) infectious prophylaxis and infectious complications; (3) nutrition; (4) kidney function and volume management; and, (5) primary care issues, which may be exacerbated given the nature of immunosuppressive medications. Patients are seen in the Post-LT Hepatology Clinic approximately 4 weeks after their LT, in all cases after they have been through the Post-LT Surgery Clinic (*vide infra*). Approximately 10-12 patients are seen in these clinics during a half-day. A full support staff, including post-LT nurses and coordinators, are available to carry out management plans and follow-up with the patients. These clinics occur daily (attending specific), 1:00-5:00pm, in Arkes Pavilion, 19th floor, SOTC Transplant Clinic.

Administrative notes: When the fellow is inpatient, they are responsible, via the residents, for coordinating the discharge plans (timely follow-up date, and summary of hospitalization) to the post-LT RNs (via Epic) - maintaining continuity-of-care with this clinic. If no fellow is on service that month, then the residents will handle this, with support from the inpatient service attending, or the patient’s primary TH attending.

This clinic functions as a continuity clinic for the TH fellow throughout the whole academic year. This clinic is mandatory except during vacations. In particular, the fellows will be assigned to an attending for a 3 month (quarterly) period; thus a total of 4 attendings over the academic year. Assignments will be distributed during orientation. No orders or results will go to the fellows, unless initially distributed by the clinic attending.

Post-LT Nursing Rounds

There is a vast amount of data being retrieved on the post-LT patients (rapidly with new patients, and more slowly with longer term patients, into perpetuity). This data comprises: (1) transplant surgical and immuno-suppressive issues; (2) primary care issues intersecting with the LT space; (3) psychosocial issues; and (4) financial and occupational issues. Interpretation and action upon this data requires nuanced understanding of the patient's history, current medical status, and a practical sense of utility for both the patient's health and broader healthcare limitations.

It is attending discretion regarding how autonomous they want the fellow to be in responding to nurses after the probation period ("graduated autonomy"). As fellow efficiency and competency increases, they can determine greater amounts of clinical effort in this regard. Messages to the fellows should be returned to the attending/RNs within 24 hours. No orders or results will go to the fellows, unless initially distributed by the staffing attending. Fellows and attendings should agree upon a common time of contact (duration to be usually < 15 min). These rounds take place in Arkes Pavilion, 19th floor, SOTC Quiet Room (or virtually).

Administrative notes: Fellows are assigned to an attending (Epic inbox) for 3 months (a quarter) at a time; *ergo*, they will work with 4 attendings per year in this regard. Assignments will be given at orientation. Post-LT RNs will send up to 5 patient issues (an issue may contain multiple messages back-and-forth) per day to fellows, with the attending cc'd on it. Probationary period: for at least the first week of each quarter (and likely more so in the first quarter), fellows will work closely with the attending to learn and integrate clinical practice patterns and nuances to outpatient post-LT care. After a consensus plan is formulated (ideally the same day), it can be forwarded to the Post-LT RN team.

Post-LT Surgery Clinic

It is the case that the details of the donor, the graft, the anatomic connections, and the immediate post-operative complications may have significant and long-standing consequences for the patient. Thus, a facility with this critical and complex surgical-medical state is vital to understanding the patient's trajectory, and their natural history. This clinic will provide a very unique experience as it is essentially surgical in nature (with a number of in-clinic procedures to be performed). This is an excellent continuity-of-care opportunity, as in most cases the fellow is following a patient they managed pre-LT, and in some cases participated in the transplant operation as well.

After patients have undergone LT, and are discharged (usually by postoperative day 5), they will enter the Post-LT Surgery Clinic (usually within a week). This clinic is staffed by the TH fellow, assisted by post-LT nurses, staffed with Transplant Surgery attendings. Census is usually 3-8 patients. Several complex issues are managed: (1) immunosuppression medications and side-effects; (2) infectious prophylaxis and infectious complications; (3) nutrition; (4) kidney

function and volume management; and (5) surgical complications. This clinic may also contain long-term LT patients who have had recent surgical complications, and/or are otherwise deemed to warrant evaluation, at the discretion of the requesting attending. This clinic takes place on Mondays, 8:00 am-12:00 pm, in Arkes Pavilion, 19th floor, SOTC Procedure Bays.

Administrative notes: This clinic is to continue during external rotations (Pediatric TH and TID); fellows are exempt during their vacation. Fellows should inform the administrative assistant of the staffing attending if they are to be absent, and/or when they are on inpatient service months (i.e. if only 1 fellow that year). Note, the workflow is at discretion of staffing attending, however a comprehensive “Post-LT Surgery Clinic Template” (containing all pertinent queries to complete the note) will be provided as well (see associated materials). For questions regarding attending *du jour*, and or absences to this clinic, please contact administrative coordinator, Daisy Ramirez daisy.munoz@nm.org.

Pre-LT New & Return Clinics

The Pre-LT *New* Clinic evaluates decompensated cirrhotic and/or HB cancer patients who could benefit from LT. Usually 4-6 patients are evaluated on Thursdays, 8:30 am-12:00 pm, by a multidisciplinary team that includes Transplant Surgery, TH, Psychiatry, Physical Therapy, Nutrition, and Social Services. Depending on the particular dates, different TH attendings will staff patients. Patients may be referred from: (1) Hepatology clinic at NMH; (2) GI clinics or NM Hepatology satellites in the Chicagoland and Northwest Indiana areas; (3) second opinions from other LT centers; and (4) international locales, e.g., the United Arab Emirates. Management of acute and chronic hepatologic complications, and overall appropriateness (medical, surgical, financial, frailty and psycho-social) for further LT evaluation and/or listing are considered and engaged. Fellows will see patients individually and staff with attendings *du jour*. A full support staff, including pre-LT nurses and coordinators, are available to carry out management plans and follow-up with the patients.

These patients are discussed by the attendings (or by the TH fellow if staffed with the former) on Fridays, 8:30-10:30 am, at the MDC (*vide infra*). If deemed appropriate for further evaluation, the patients will follow-up in the Pre-LT *Return* Clinic, also staffed by the same multidisciplinary team, as mentioned. This clinic, comprising usually 8-16 patients, occurs on Tuesdays, 8:30 am-12:00 pm. It continues the management of the patient’s acute and chronic conditions, while simultaneously working-up, completing and/or maintaining their listing status. Both clinics (*New* and *Return*) are located in Arkes Pavilion, 19th floor, SOTC Transplant Clinic.

Administrative notes: No orders or results will go to the fellows, unless initially distributed by the staffing attending.

Satellite Clinics

Satellite clinics allow for patients (Pre/Post-LT and Hepatology) who live far away to be seen conveniently by our Hepatology group (attendings and/or APPs). Each clinic is staffed differently, and appropriateness for the clinic is determined uniquely. These clinics occur all over the Chicagoland and Northwest Indiana areas. Scheduling to this clinic should be cleared by the attending and/or APP of that clinic beforehand.

Administrative notes: In general, these clinics are not staffed by fellows; however, if the fellow has a particular interest to access this clinic, or under extraordinary circumstances of short staffing, the fellow may certainly join, or their presence be requested, respectively. For further interest, can contact Sean Koppe, MD sekoppe@nm.org.

Urgent Evaluation Clinic

This Urgent Evaluation clinic is activated to determine if a “return” pre/post-LT patient (i.e., staffed prior with a transplant attending during an in/outpatient setting) requires either direct admission to the Hepatology primary service (thus expeditiously bypassing the complexities of the ER), or, needs rapid and direct ER assessment. These evaluations typically occur a few times per month (scheduled usually in the days prior, or even the same day). An available TH fellow will usually have been alerted by the requesting attending beforehand to evaluate the patient. Ultimate decisions will be made in conjunction with both the patient’s primary outpatient Hepatologist and the Hepatology primary service. These urgent visits do not require a formal admission note by the evaluating fellow, but rather a verbal sign-out to the Hepatology primary service. This clinic takes place *ad hoc* (day, time) in Arkes Pavilion, 19th floor, SOTC Procedure Bays.

Elective Experiences

Pediatric Transplant Hepatology Rotation

LCH, adjacent to NMH, has a large pediatric LT program that has close collaborations with our own program. This rotation will address the nuanced issues of Pediatric TH: (1) etiologies and management of end-stage liver disease; (2) immunosuppressive medications and complications; (3) procedural/surgical complications; and (4) the psycho-social environment surrounding the patients. This rotation lasts 2 weeks, and is to take place during the second-half of the academic year. It will comprise both in/outpatient services. These services are staffed by Pediatric TH attendings and their fellows.

Administrative notes: the fellow’s post-LT Hepatology and Surgery Clinics will continue throughout this rotation. This rotation should be planned a few months in advance with Catherine Chapin, MD (Pediatric TH Fellowship PD) CChapin@luriechildrens.org. These services will be entirely contained within LCH.

Transplant Infectious Diseases Rotation

Given the nature of our pre/post-LT patients, a wide variety of infectious complications are manifest, in many cases with atypical, and/or more severe presentations. This rotation lasts 2 weeks, and is to take place during the second-half of the academic year. This rotation has both in/outpatient services. During the inpatient component, the fellow is part of the TID consultative service, which usually has TID fellows and Internal Medicine residents on it. The outpatient component comprises pre/post-LT patients seen for a variety of active and preventative infectious issues.

Administrative notes: The fellow’s Post-LT Hepatology and Surgery Clinics will continue throughout this rotation. This rotation should be planned a few months in advance with Michael

Angarone, DO mangaron@nm.org. Outpatient services will be in Arkes Pavilion, Suite 940; whereas inpatient rounds are decentralized, and encompass Galter, Feinberg and Olson Pavilions, and Prentice Hospital.

Supplemental Services

Fellows will gain significant working knowledge of associated sub-specialties, including Transplant Nephrology (acute kidney injury, hepato-renal syndrome, chronic kidney disease, renal replacement therapies, indications for simultaneous liver-kidney transplant, post-LT kidney injury) and Interventional Radiology (chemo/radio-embolization for HCC and other lesions; TIPS ± shunt embolization for bleeding or other portal hypertension complications). There is daily collaboration between subspecialty faculty and fellows throughout the year in managing these complex patients. However, if specific, more in-depth training is requested, *intra-mural* 2-week rotations can be obtained, insofar as the other requirements of the fellowship are met.

Interested fellows can participate in detailed immunologic discussions as related to organ (tissue) typing/matching, transplant, and rejection with the Transplant Immunohistology Laboratory group. Fellows can contact Transplant Immunology Laboratory Director, Anat Tambur, PhD a-tambur@northwestern.edu throughout the year to set-up meetings.

Procedures

Preamble

Hepatology attendings can, in general, perform EGDs, colonoscopies (diagnostic and therapeutic) and percutaneous liver biopsies. However, as a practical matter for inpatients: (1) general GI service will perform colonoscopies; and, (2) Interventional Radiology (IR), and to a lesser extent, Interventional GI, will perform all inpatient biopsies depending on the contextual needs of the patient. The detail, timing and overall appropriateness of procedures can be confirmed with the Hepatology attending.

Administrative notes: scheduling of any inpatient endoscopies should go through the GI fellow, who directly manages the Hepatology consult service, and observes upon the Hepatology primary service. In general it is this GI fellow who is performing the EGD and colonoscopies, regardless of the official attending (Hepatology or GI) staffing the case.

Regarding procedures, no orders or results will go to the fellows by default, unless initially distributed by an attending beforehand. Nonetheless, it is encouraged that the fellow follow-up on these patients and their results - ensuring they are interpreted and acted upon in a timely fashion. The fellow is to keep a detailed record of their procedures, most importantly: (1) biopsies reviewed; (2) organ procurements and transplants; and (3) biopsies performed (as appropriate). These details are invariably requested by institutions for the purposes of hiring, maintaining and/or advancing faculty through academic appointments.

In the unfortunate event that requirements are not met: (1) the program will deem competency based upon the quality and quantity of the procedures and their related management; and (2) the immediate post-fellowship hiring institution will be alerted so as to adjust allowed privileges and/or facilitate *in situ* training towards competency.

Endoscopy

Fellows are approved to perform endoscopy (colonoscopy and/or EGD) under the supervision of NM GI and Hepatology faculty. In regards to Hepatology, exposure to indications for, nuances of, and complications of EGD are deliberately enhanced. Moreso, given the gravitation for complicated patient scenarios to NM, the fellow can expect to increase their facility with EGD performance in these aspects: (1) severe thrombocytopenia; (2) iatrogenic anticoagulation; (3) nuanced variceal banding techniques; and, (4) practical real-time triaging towards IGI and/or IR procedures, e.g. TIPS.

These procedures take place either in Lavin Pavilion, 16th Floor, DHC Endoscopy Suites (mostly conscious sedation, or select low-acuity MAC cases), or, Galter Pavilion, 4th floor, Endoscopy Suites (all MAC cases; inpatients are *de facto* MAC; otherwise for high-acuity outpatients). In general, please discuss with attendings prior to joining them for procedures, so as to determine appropriateness and the day's workflow.

Administrative notes: fellows throughout the year (heavily during outpatient months) are expected to assist in weekly endoscopy sessions with Justin Boike, MD, MPH, Wednesday mornings (EGD and colonoscopy), and Christopher Moore, MD, Friday afternoons (EGD), and (extra) TH attendings *du jour*, Wednesday afternoons (EGD and colonoscopy). TH fellows will not usually perform endoscopy on inpatient services – this is reserved for the GI fellow on the Hepatology consult service. Certainly, fellows can scope with any and all Hepatology or GI faculty.

Liver Biopsy

In the setting of: (1) changes to disease-state protocols; (2) access to other interventional methods (IGI or IR); and, (3) patient preferences, the number of biopsy procedures available to hepatology fellows have declined. Nonetheless, there are still a sufficient number of protocol or for-cause ultrasound-guided percutaneous biopsies still performed by the TH fellow and a supervising attending.

Continued utilization of this procedure enhances an appreciation for and working knowledge of: (1) indications (pathophysiology); (2) procedural methodology and problem-solving in real-time; (3) post-procedure monitoring; (4) managing complications; and (5), incorporating these data into their larger knowledge of biopsy interpretation and Hepatology in general. These procedures take place on selected Thursdays, 1:00 - 3:00 pm, in Arkes Pavilion, 19th floor, SOTC Procedure Bays.

Administrative notes: as of 2022, the ACGME has withdrawn the requirement for liver biopsies as a TH fellowship criterion. As a pragmatic response, our program will deem fellow competency based upon the quality and quantity of the procedures and related management. Please confirm available Thursdays with Procedure Bay nurses and the staffing physician. It is

important to follow-up on results of all biopsies and to share them with the Referring attending for a plan of action. Remember to record pertinent data (e.g. anonymized identifier; indication; interpretation) for future employment.

Transplant Surgery and Organ Procurement

The fellows will attend/participate in transplant surgeries (at least 3) and organ procurement (at least 1; more are encouraged, in particular donation after cardiac death (DCD) donors). Surgical activities should be undertaken in the second-half of the academic year, and completed before June. Transplant Surgery operations will take place in Feinberg Pavilion, 7th floor, Operating Rooms. Fellows must coordinate case times with Katie Crylen (Transplant Surgery PC) KCRYLEN@nm.org, and adjust as needed for appropriate coverage of their inpatient and/or outpatient obligations. Note, Living Donor (LD) surgeries are scheduled weeks/months in advance, and as such these are excellent opportunities to plan ahead of time. For upcoming surgeries contact Lori Clark, RN LClark@nm.org.

Conferences & Lectures

Bile Conference

This conference simultaneously functions as part of the “Didactic Curriculum;” please see that section for expanded details (*vide supra*).

Case Discussions

This conference is geared towards internal medicine residents who rotate through the Hepatology primary service, but is nonetheless useful to all GI and/or TH fellows. The team will present a vignette, drawn from an interesting inpatient case, and then discuss pathophysiology underlying the presentation and management considerations with Richard Green, MD (team should confirm with him in days prior). Given the nature of the service, topics will overlap amongst medical specialties, ethics and economics. These discussions take place every Thursday from 2:00 - 3:00 pm, in Feinberg Pavilion, 14th floor, Hepatology Resident Team Room (or virtual).

Cost-effective Analysis

While there is not a formal course in this fellowship for cost-effective analysis, this subject is discussed daily between the fellow and attending (1:1 interactions) on clinical services (inpatient/outpatient and procedures). This subject is also reviewed during: (1) Journal Clubs (an existing module of the “Hepatology Friday Conferences;” (2) MDC every Friday; (3) Quality Assurance/Performance Improvement (QAPI) every 2 weeks on Friday; and, (5) attending relevant DOM Grand Rounds (every Tuesday morning during the academic year). Fellows also have the ability to meet NMH financial associates in regards to understanding, documenting and implementing appropriate billing.

Department of Medicine Grand Rounds

DOM Grand Rounds brings scholars of national and international renown to expound upon their research and/or discuss major issues within Medicine, Science, and healthcare. While these speakers address the DOM, the larger NM community is invited as well. Grand Rounds occur

throughout the academic year, on Tuesdays, 7:30-8:30 am, in Feinberg Pavilion, 3rd floor, Feinberg Conference Room (or virtual).

Fellow's Lecture Series

These lectures simultaneously function as part of the “Didactic Curriculum;” please see that section for expanded details (*vide supra*).

Hepatology Conference & Lectures

These conferences & lectures simultaneously function as part of the “Didactic Curriculum;” please see that section for expanded details (*vide supra*).

Hepatology Grand Rounds

This lecture simultaneously functions as part of the “Didactic Curriculum;” please see that section for expanded details (*vide supra*).

Jon Fryer, MD CTC Lecture Series

These lectures focus on NIH-funded transplant research generated by faculty from NM or, more broadly, Northwestern University, and/or other institutions. The objectives include: (1) dissemination of relevant research; (2) generating multi-disciplinary collaborations; and (3) more generally, to enhance faculty collegiality. The target audience includes Transplant faculty and fellows, and all other Northwestern faculty and staff so interested. These lectures occur throughout the year, every Thursday, 4:30-5:30 pm, in Arkes Pavilion, 19th floor, SOTC Conference rooms (or virtual).

Multidisciplinary Conference

The MDC comprises Transplant Surgeons and Hepatologists, Nurses, Psychiatrists, Nutritionists, Social workers, and as needed TID, Cardiology, and Oncology sub-specialists. This meeting has manifold interests: (1) it serves to review potential patients for LT, seen the day prior in the Pre-LT *new* clinic; (2) reviews pending patients for LT, who are being managed in the Pre-LT *return* clinic; (3) review inpatients on the Transplant Surgery and Hepatology primary services; (4) evaluation of living donors; (5) evaluation of HCC and/or Cholangiocarcinoma patients, some of whom may not be transplant eligible; and, (6) to discuss operational, administrative and ethical issues important to the Division. The outpatient fellow will present patients they staffed in the Pre-LT *new* clinic, whereas the inpatient fellow will present patients that are currently on the Hepatology primary service, or who have been on service in the last weeks. MDC occurs every Friday, 8:30-10:30 am, in Arkes Pavilion, 19th floor, SOTC 19-083 (or virtual).

Administrative notes: Fridays in particular have many activities that overlap in time, e.g. the MDC with traditional Hepatology primary service rounds. Depending on the attending and the needs of the service, rounds may begin earlier or later than usual, and in some cases are interrupted by communications with the MDC. How to navigate this dilemma precisely is fellow dependent, but the fellow's first responsibility is to their education. Thus, regardless of service dynamics, the fellow's time for Hepatology conference, Pathology conference and MDC are protected. It is also acceptable for the fellow to participate in rounds and listen in on the MDC simultaneously. The attendings are aware of the primacy of the fellow experience.

Pathology Conference

This conference is an excellent opportunity to improve diagnostic interpretations of biopsies as pertains to both regular hepatologic issues (e.g. acute and chronic liver diseases; inflammatory patterns; and, fibrosis staging), and, post-LT rejection (acute and chronic) presentations. Many difficult cases, and thus nuanced management, are based on discussions at this conference. In attendance are fellows and attendings from TH and Pathology. This conference occurs every Friday, 8:00-8:30 am, in Galter Pavilion, 7th floor, Surgical Pathology Laboratory (or virtual).

Administrative notes: The fellow should document (e.g. anonymized ID; indication; and, findings) all liver biopsies reviewed for their own records. This document will also be submitted to the PD/PC at the end of the year.

Quality Assurance/Performance Improvement (QAPI) Conference

This conference is a multidisciplinary meeting comprising Transplant Surgeons and Hepatologists, Nurses, Social Workers, Dieticians and Psychiatrists. QAPI seeks to assess complications, adverse outcomes and/or otherwise unexpected events that befall the LT patients. In this assessment, root cause analysis of the event(s) is performed, and ultimately deriving an action plan to eliminate and/or mitigate such occurrences (trends) in the future. QAPI occurs every 2 weeks (2nd and 4th week of the month), 8:30-9:00 am, in Arkes Pavilion, 19th floor, SOTC 19-083 (or virtual). Note, that on these days MDC starts immediately afterwards.

Radiology Conference

Radiology conference is a multidisciplinary meeting comprising Transplant Surgeons and Hepatologists, Oncologists and IR. Therein the group reviews approximately 15-25 cases. Most reviews involve patients with HCC and/or cholangiocarcinoma (for resection, LT, and/or liver-directed therapies), but benign lesions are evaluated as well. In certain cases, non-malignant biliary and pertinent HB vascular issues are discussed. Differential diagnosis, and diagnostic and treatment considerations, are the focus of this meeting. This conference provides an excellent opportunity to understand the complex anatomy and physiology that surrounds pre- and post-LT patients, and the multi-modal approach utilized (radiologic and/or surgical) to handle HB diseases. Conference occurs every Thursday, 1:00-2:00 pm, in Arkes Pavilion, 4th floor, Department of Radiology, Conference Room (or virtual).

Administrative notes: For cases that require discussion at this conference (and weekly on-line link to it), please alert the IR PC Karen Grace, RN karen.grace@nm.org. Summaries of each patient are later collated and sent out by email on Friday to the conference members.

Scholarly Activities

This is a clinical fellowship, and as such, formal primary research is not a requirement. However, one intra-mural QI project is required and to be submitted to the PD/PC before the end of fellowship. Publishable scholarship is strongly encouraged (ideally at least 3), and many opportunities are available given the varied interests and intensity of faculty research. Given the nature of the fellow's traditional schedule, there is in fact ample time to generate a successful QI project and publish scholarly work. The fellow's scholarly activity is to be presented during the

TH Fellows Symposium (30 minutes per fellow; presented to Hepatology faculty and GI fellows), in June. Fellows are highly encouraged to attend national conferences, e.g. the annual AASLD Liver Conference, whether presenting research or not.

Fellowship Committees

Fellows will participate in two formal *intra-mural* committees that are administratively aligned with similars of the GI fellowship. This fellowship is a logical extension of the GI fellowship (conceptually and operationally with shared pathophysiologies, procedures, and supervising faculty and staff) and thus shared resources for these committees are utilized.

The Program Evaluation Committee (PEC). The PEC formally meets annually to evaluate the fellowship along these domains: (1) current status; (2) strengths and deficiencies; and (3) implement corrective action plans. Additionally, the fellowship is assessed/adjusted throughout the year via feedback sessions that occur as part of weekly Office Hours (*vide infra*), and otherwise feedback from the faculty to the PD. This committee is composed of Christopher Moore, MD and Josh Levitsky MD, MS (Hepatology faculty), and PC Anglea Tucker. One TH fellow will serve as a liaison to the Committee.

The Wellness Committee (WC). The WC formally meets annually to evaluate the overall wellness (*vide infra*) of the fellows. This committee is composed of GI Fellowship PD Leila Kia, MD, Christopher Moore, MD and Anglea Tucker. One TH fellow will serve as a liaison to the Committee.

Wellness

The physical and psychological wellness of the fellows are top priorities at NM. We continually strive to understand and meet the needs of our fellows in a complex and changing work environment. Wellness, in the trainee space, comprises in part: (1) a psychological state, without a debilitating distress, elicited by and through the education and clinical experiences; (2) a more generalized sense of work-life balance; (3) collegial and productive relations with other trainees, faculty and staff; and, (4) a positive outlook in regards to future broad endeavors.

Wellness is assessed and adjusted through various manifestations: (1) 1:1 dialogue between fellows and faculty during shared clinical encounters; (2) weekly Office Hours between the fellows and PD, and *ad hoc* daily; (3) as part of the annual WC and semi-annual CCC; and, (4) monthly subsidized wellness events, near or on campus. Furthermore, a Northwestern Graduate Medical Education (GME) Internal Review committee meets yearly with fellows and faculty (separately) to assess, amongst other qualities, the overall fellow's wellness, and the compliance of our program with the expectations set forth by the GME Office and the ACGME. Historical review of such data has demonstrated that our program maintains excellent fellow well-being.

Time-off/Absences

During the fellowship there is 1 month (precisely 20 working days) vacation time allotted; it is an ACGME mandate that fellows take all their vacation time. These days should be taken off during outpatient blocks. If absence is required during an inpatient block, the co-fellow (if extant) should cover inpatient services. fellows should not take vacation at the same time. Please inform the relevant attendings and/or staff (for clinics, procedures) of absences. As these arrangements can take some time, plan for absences, and commensurate coverage as needed, at least 1 month in advance. Sign-over pagers to the co-fellow (if extant) and implement the relevant restrictions to Epic and work email. Consider informing GI fellows of endoscopy availability given the strong demands for procedural experience.

Attendance at national and international conferences is encouraged (up to 5 working days). It is understood that inpatient responsibilities may conflict with the ability to attend. Ultimately, attendance is at the discretion of the service attending as pertains to patient care. As such, plan accordingly with the necessary individuals, at least a month in advance. Reimbursements regarding academic travel should be pro-actively discussed with the PC to understand the degree of current financial coverage and/or appropriateness.

Research Trials

There are a number of active research (in/outpatient) trials under the administration of the TH faculty. Awareness of these trials is useful for a number of reasons: (1) maintaining and expanding clinical and scientific knowledge in the field; (2) potential participation in the research, with authorship in publications; (3) building mentorship with the faculty; and, (4) identifying both in/outpatients for inclusion in trials. To see all current trials through EPIC (type dot phrase): “.HEPATOLOGYSTUDIES”. For further information, contact research coordinators via EPIC staff messaging (type): "Hepatology Clinical Research Pool”.

Professional Associations

Fellows should apply and maintain membership in at least two societies, the AASLD and the AST. Besides the obvious intellectual and professional benefits, membership is required to access a number of activities: (1) AST Fellows Symposium on Transplantation, for which the TH Fellowship PD will provide you with a letter of support; (2) the AST online CTC modules, for standardized fellowship learning for board examination; see the “Didactic Curriculum” section (*vide supra*); (3) eligibility/access to the official AASLD and AST annual meetings (in-person or virtual); and, (4) AASLD Advanced/Transplant Hepatology Awards; encompassing travel and career development aspects - note that this is usually accessed and applied for in the year preceding the TH fellowship, so as to start concurrent with matriculation.

Application and membership fees will be eligible for reimbursement by the DOM; please submit to the fellowship PC. Depending upon the level of participation in national meetings, and annual DOM discretionary funding, significant or whole reimbursement for travel costs may be possible as well.

Preparation for After Fellowship

Part of the fellowship involves securing the next position after graduation, either through a faculty or private practice pathway. The vast majority of our graduates acquire a clinical educator faculty position. In either pathway, the degree of transplant-specific effort is highly variable. Such is the variety of opportunities, and more so interests of the graduates, that there is a national push to change the name of the fellowship from “transplant hepatology” to “advanced hepatology.” The PD and faculty will provide strategic advice and other forms of assistance through the application and interview process; a process quite different from prior employment transitions that trainees are accustomed to. We believe that our program has been quite successful in both pathways, as evidenced by the feedback of our alumni.

Before contacting employers, plan specific meetings with the PD and the transplant faculty regarding this process. The faculty are experienced, influential and have collaborations with all major academic centers in the country. Thus, faculty will provide: (1) granular guidance in applying for high-quality positions (and the lifestyle surrounding it); and, (2) communications, on the applicant’s behalf, to the employer, will be the critical element in securing an offer. Furthermore, our alumni are interested in assisting the fellow in this process. Networking, whether from fellow to faculty, or faculty to faculty are truly important in this way, and certainly in growing a program or practice in the future. For contact information on all alumni, see attached materials.

Accommodations can be easily made so that interview timeframes (in-person or virtual) are not compromised by clinical duties, and will not require utilization of vacation time. Planning and faculty meetings usually begin in August, with interviews to follow then and can last into the first few months of the year. In most cases, positional offerings will be made in the first quarter of the year, but there is large variation due to institutional inertia.

After receipt of an offer and/or contract, the program is also interested in reviewing it with the applicant. Some important points to remember: (1) maintain a continuous dialogue with the PD and the faculty so that navigation is optimized; (2) alert the PD to any issues immediately, and meet all deadlines; (3) in regards to employment and lifestyle, the fellow should always consider themselves (and their family first); disregard allegiances from institutions or faculty, whether implied or articulated; and, (4) the fellow has the full support, confidence, and confidentiality of the PD in whichever path you choose, whether faculty or private practice and the varieties about them.

Medvin Fellowship

The Medvin Fellowship is funded by the family of a grateful LT patient, and was instituted in 2023. The goal is to financially support one current fellow in the Transplant programs (hepatology, nephrology or surgery) for an external fellowship at an allied institution: (1) to learn

institutional methods of practice; (2) potential for scholarly work and research; and, (3) fostering professional and institutional relationships.

This fellowship will be 1 month in duration (maximum), functioning as a clinical observership at the Barcelona Clinic Liver Cancer (BCLC) at the Hospital Clinic of Barcelona (Spain). Interested fellows should discuss with the PD in November, and if accepted, the fellowship would occur during the Spring, and be completed before June. This time would be considered administratively as “outpatient.” Acceptance will require: (1) designation of excellent academic and professional standing, as deemed by the PD; (2) statement (no more than a page), addressed to the Medvin Fellowship Committee, regarding (a) weekly structure of the fellowship (inpatient, outpatient, procedures); (b) goals (clinical, and/or research) to be accomplished during that time frame. Upon return, the fellow will present upon their experiences at the BCLC during the Jon Fryer, MD CTC Lecture Series (*vide supra*). The fellow can forge a day-to-day workflow through correspondence with the BCLC PD prior to arrival.

Modifications for National Health Crisis

Preamble

The COVID-19 pandemic brought about unprecedented healthcare pressures. In particular, the robust nature of the virus prompted sustained high influxes of patients to hospitals, with NMH being no exception. As such, numerous clinical services were transformed (and thus trainees mobilized) to manage this crisis. This pull naturally created dislocations, also exacerbated by trainees themselves becoming infected (and quarantined), that immediately affected all services, including Transplant. Necessity thus required numerous adaptations for all trainees, to both maintain their safety, wellness and clinical education, whilst still providing proper care to patients. Protocols were thus generated for COVID-19 to address these issues, and can be invoked and adapted to future national health crises.

Hepatology primary service census: resident support, and thus the census, are subject to change; the former is determined by Internal Medicine Residency PD and the DOM, and the latter by the TH faculty. Ultimately, TH fellow roles may be expanded to those traditionally assigned to residents. To offset this strain to training and overall wellness, supplementary personal and/or work-hour modifications will be made *ad hoc*. If Hepatology primary service is full, overflow patients will go to Hepatology consult service: these are still managed by the fellow (as a consultant, if not quarantined (*vide infra*)), and staffed with the attending, as a traditional consult would be. The decision to return to work is ultimately decided by Northwestern Corporate Health policies, without exceptions.

Two Fellow Algorithm

- A. If the inpatient fellow is quarantined (“quarantined fellow”); then the outpatient fellow (“non-quarantined fellow”) takes over all in-patient responsibilities.
- B. How the non-quarantined fellow is utilized in the inpatient role is determined by the attending on the inpatient service. The ability of the non-quarantined fellow to continue their traditional outpatient role (e.g., endoscopy) is at the discretion of the attending on service.

- C. The quarantined fellow (if not too ill; self-determined) will take over outpatient roles virtually – particularly important would be: (a) Post-LT Hepatology Clinic; (b) Post-LT Surgery Clinic; and, (c) Post-LT Nursing Rounds. Fellows should alert relevant attendings to necessary modifications.
- D. If the outpatient fellow is quarantined, then: (a) inpatient staffing and responsibilities stays the same; and (b) outpatient staffing and responsibilities are modified as per item (C).
- E. The non-quarantined fellow (if originally designated the outpatient fellow) should count *ad hoc* inpatient days as true inpatient days. As such, these days should be paid back by the other fellow within the quarter (subsequent 3 months) to maintain equity.

One Fellow Algorithm

- A. If the fellow is quarantined during inpatient services, the attending will take over all their responsibilities.
- B. The quarantined fellow (if not too ill; self-determined) may participate virtually with the Hepatology primary services, at their discretion. This can involve communicating with the residents: (a) pre-rounds review/guidance for overnight events/admissions; (b) post-rounds guidance; (c) afternoon review of work-flow issues and/or new admissions; and, (d) education.
- C. Similarly, if the fellow is quarantined during outpatient services, (if not too ill; self-determined), they may participate virtually in clinics and/or allied services (see Two Fellow Algorithm (C))