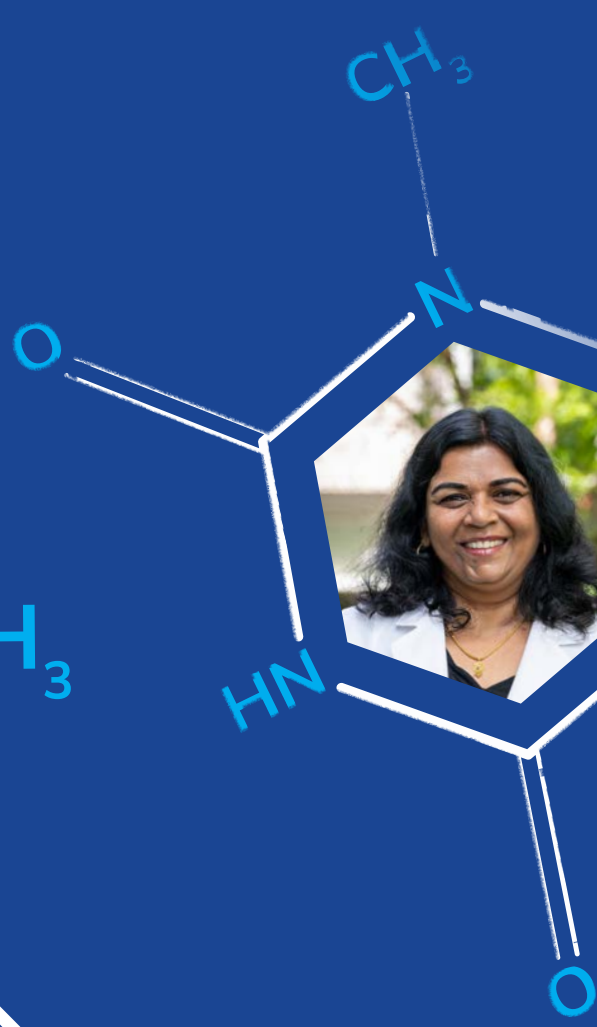


MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

Annual Report

2025

Department of **Pathology**

Message From the Chair

Charles A. Parkos, MD, PhD

Carl V. Weller Professor and Chair

Fiscal Year 2025 brought both challenges and exciting new opportunities for the Department of Pathology. With the decade-long Pathology Relocation and Renovation project completed, our faculty and staff have been working diligently to support the expansion of Michigan Medicine. This past year, the expanded Ypsilanti Health Clinic was opened and the Pavilion Tower is scheduled to open in November 2025. Furthermore, the Frances & Kenneth Eisenberg Troy Center for Specialty Care is on track for opening in late FY26. Each new site will serve as a home for members of our Pathology team, enabling us to expand our reach and provide even better care to patients here in Michigan and beyond.

Digital Pathology has ushered in transformative changes. The phased deployment began with pediatric-placental, cardiac, and renal pathology early in FY25, expanded to autopsy and forensics, neuropathology and muscle biopsies in November, breast and gynecologic pathology in February, and genitourinary pathology in May, with frozen section service in Room 1 launching at the close of the fiscal year. Full department-wide implementation is expected to be completed in FY26. These advancements are already fostering new avenues for collaboration, education, and research.

Our residency program continues to excel, as it continues to be the top program in the Midwest and among academic medical centers, and has moved up to #3 nationally. Residents and fellows are now trained in both digital and traditional diagnostic pathology, ensuring their success in the field moving forward.

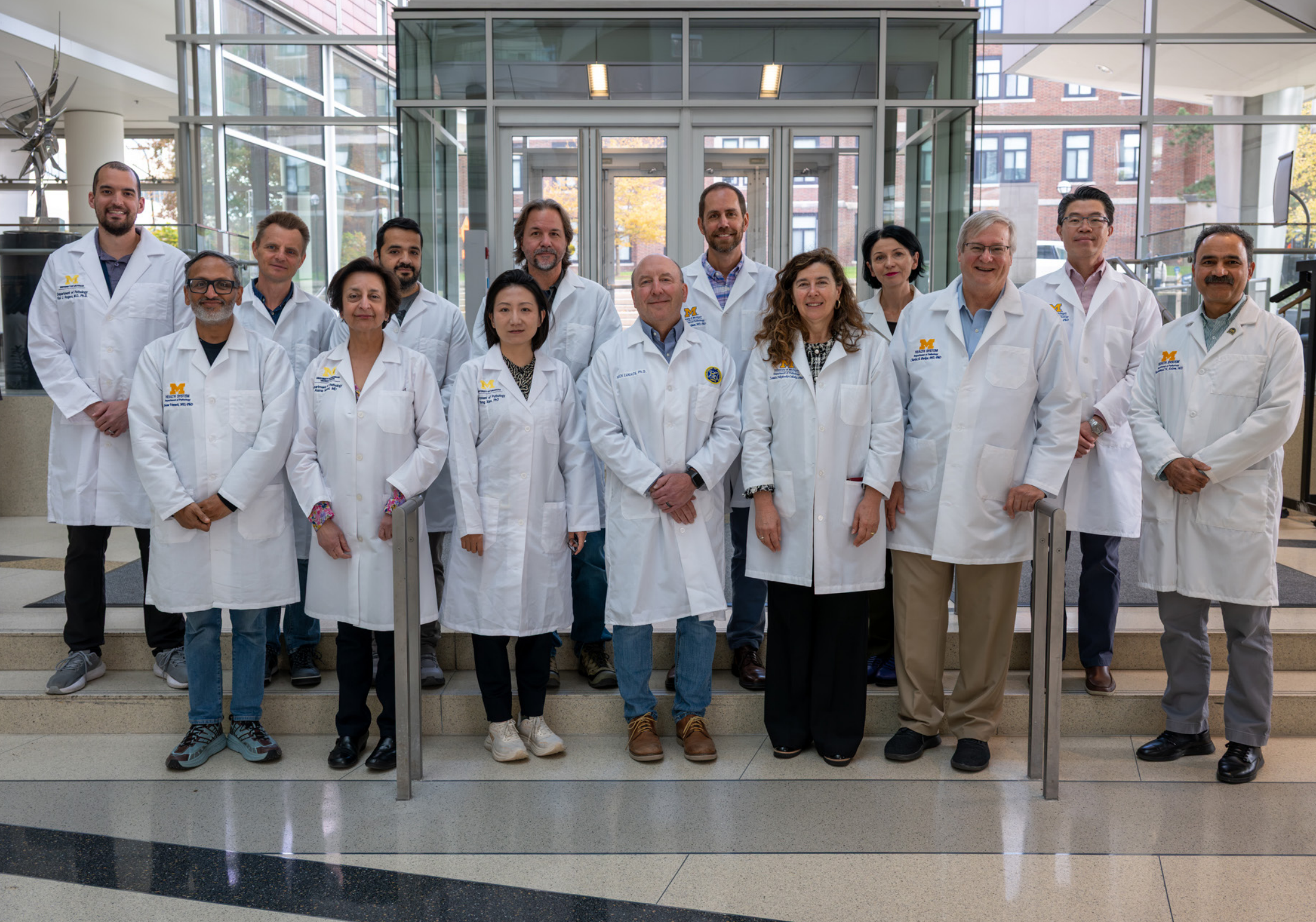
Our clinical laboratories processed 7.8 million billable tests, generating $1.16 billion in gross clinical revenue, a 6.4% increase from the previous year. Anatomic and Clinical Pathology volumes increased by 15.8% and 5.6% respectively, and Diagnostic Genetics and Genomics revenue rose by 11.2%. These accomplishments are a testament to the remarkable dedication of our faculty, trainees, and staff.

At the end of FY25, we bid farewell to our Clinical Pathology Director, Dr. Riccardo Valdez. Dr. Lee Schroeder graciously stepped in to lead Clinical Pathology, and we are grateful for his energy and innovation.

A major challenge this year resulted from federal policy changes that delayed grant funding and a subsequent 5% decrease in federal funding. Altogether, total grant funding reached nearly $30.4 million. Despite these challenges, our preliminary NIH grant rankings rose from 9th to 7th nationally in overall funds received, and from 6th to 5th for R01 awards. Our faculty published a record 624 manuscripts, many of which appeared in high-impact scientific journals.

In summary, FY25 has been a year of continued service to our patients, scientific innovation, and institutional support at the highest levels of excellence. I hope you enjoy this Annual Report.

Dr. Riccardo Valdez giving his parting words at his farewell party.



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Annual Report compiled by: Lynn McCain, Editor; Anastazia Hartman, Editor; Brent Temple, Design and Layout; Anastazia Hartman, Beth Light, Camren Clouthier, Dustin Johnston, and Elizabeth Walker, Photography; John Hamilton, John Harris, Christine Shaneyfelt, and David Golden, Data. A special thanks to the many contributors who provided the content for this report.

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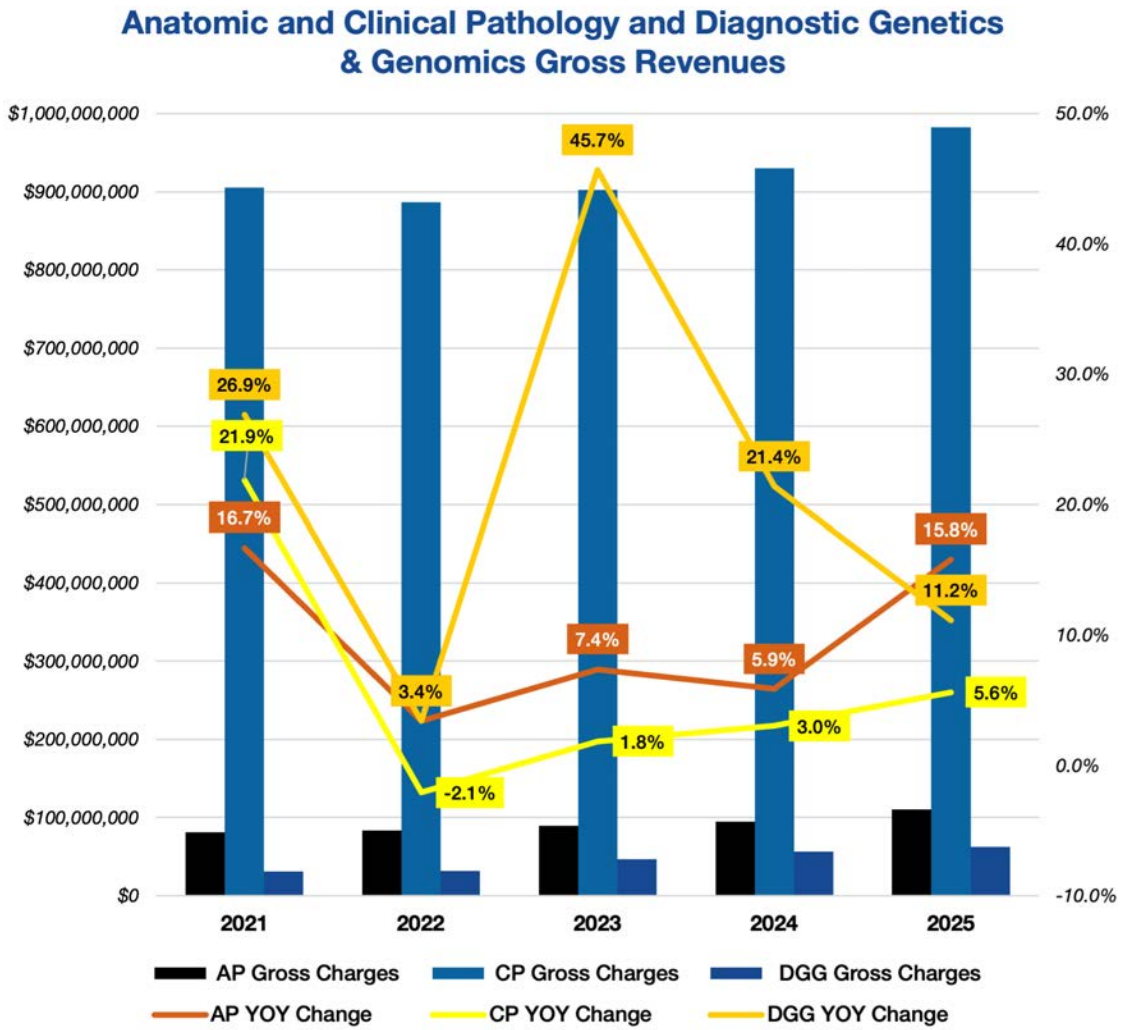
Clinical Mission

The mission of the Department of Pathology is "to create the future of our discipline by educating and nurturing the leaders and health providers who will care for us, unifying our common commitment to excellence across traditional barriers to collaboration and creativity, building solutions that leverage the power of data to solve real problems and create unique value, and leading the way for application of the right diagnostic tools, for the right patient, at the right time."

To accomplish this mission, our department has three primary foci: Clinical Care, Research, and Education. The aim of our clinical mission is to provide exemplary diagnostic pathology and laboratory services to our patients and health care providers across Michigan Medicine and its statewide network to support clinical decision-making and improve patient outcomes. By taking advantage of our innovative cutting-edge research including the rapid translation of findings into clinical practice, our education expertise and high-quality consultative services , we strive to widen access to high-quality diagnostic pathology services using state-of-the-art clinical laboratories at the North Campus Research Complex (NCRC) and at the University Hospital (UH).

The clinical laboratory services are divided into four primary divisions: Anatomic Pathology, Clinical Pathology, Diagnostic Genetics and Genomics, and Michigan Medicine Laboratories (MLabs). The following pages describe the activities of these four divisions.



By the Numbers

Instructional	**52**
Clinical	**100**
Research	**29**

PhD	**25**
Fellows	**24**
Post Doc	**36**
Residents	**29**
MLS Interns	**44**

RESEARCH

Annual Expense Budgets

› Medical School	**$93 M**
› UM Hospital	**$219 M**
Sponsored Spending	**$29 M**
Billable Tests	**$7.8 M**
DC/SF	**$341**
IDC/SF	**$149**

CDA Direct Reports
10

Dotted Line Reports
3

RANKED
#7
NIH GRANT FUNDS AWARDED

Anatomic Pathology

L. Priya Kunju, MD
Director, Anatomic Pathology

Stephanie Skala, MD
Section Head, Surgical Pathology

Kyle Perry, MD
Service Director, Bone and Soft Tissue Pathology

Anatomic Pathology (AP) deals with the testing of tissues, solid tumors, and cells as well as autopsies and forensics. AP experienced a decrease in volume of 1.9% from 157,403 cases in FY24 to 154,454 cases in FY25. The AP clinical service is comprised of several sections including Surgical Pathology, Cytopathology, Dermatopathology, Ophthalmic Pathology, Renal Pathology, Neuropathology, Autopsy and Forensic Pathology, and Pediatric/Perinatal Pathology, each with its own section head. Surgical pathology includes multiple subspecialty services each with a designated service chief. Most of these services support weekly multidisciplinary tumor boards.

Clinical Activities

RVU Trends in Anatomic Pathology

Total RVUs generated by AP in FY25, expressed as a 12-month rolling average, were 26,170 RVUs/month. This represents a 10.6% increase over FY24. RVU stands for relative value unit and is an incomplete payer-imposed measure of professional work that has become an industry standard for monitoring clinical productivity.

FTE Trends in Anatomic Pathology

Total clinical FTEs for AP faculty were 54.0 in FY25 compared to 51.2 in FY24, representing a 5.5% increase. Over the past five years, AP staffing has increased by 13.3% from 47.7 FTEs to 54.0 FTEs, due to the hiring of new faculty members each year to meet the demands of our constantly growing AP service workload and increasing complexity. This included employing faculty with dual fellowships and hybrid skill sets in an AP subspeciality paired with molecular pathology and hiring three new AP Hospitalists to primarily cover hospital-based services such as frozen sections.

RVU and FTE Trends in Anatomic Pathology

Total work RVUs/FTE in FY25 showed a 4.4% increase. On average, each clinical FTE in AP generated 512.9 RVUs/month in FY25 compared to 507.0 in FY24. However, these data vary for different AP services and from month to month due to faculty hiring throughout the year.

Surgical Pathology

The Surgical Pathology section encompasses a general sign-out service and multiple subspecialty services, each with its own service chief. The clinical service provided by surgical pathology faculty includes frozen section coverage at University Hospital (UH), adult surgeries at C.S. Mott Children's and Von Voigtlander Women's Hospital, Frankel Cardiovascular Center, East Ann Arbor Medical Center, and Brighton Center for Subspecialty Care. Telepathology continued to be leveraged to support our frozen section service remotely. General Surgical Pathology (also known as "Room 1") service handles biopsies and surgical resection specimens not covered by other subspecialty areas. In FY25, 13,851 general specimens were processed, which represents an increase of 1.2% from the prior year. Likewise, this service has experienced a 6.3% overall increase when compared to specimen volumes from five years ago.

Bone and Soft Tissue Pathology

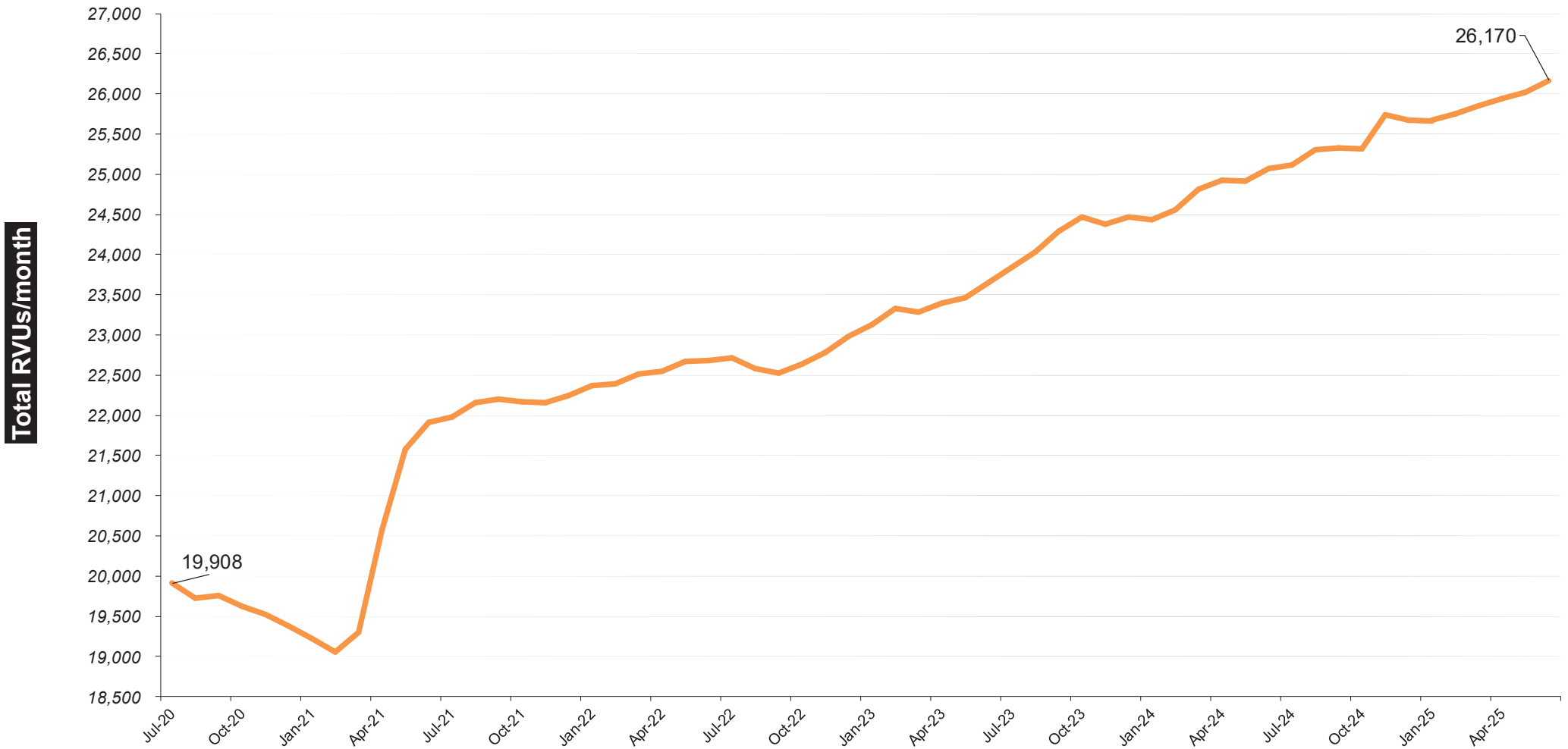
Bone and Soft Tissue Pathology is focused on the diagnosis and study of diseases of the bone and surrounding soft tissues. Bone and Soft Tissue consult cases, which include very challenging, unique, and rare lesions, decreased by 7.9% with 1,862 cases received in FY25. This consult service has shown an overall 9.8% increase compared to specimen volumes from five years ago.

Breast Pathology

Breast Pathology is a subspecialty of surgical pathology with expertise in the interpretation of breast lesions from various specimen types including needle core biopsy, lumpectomy,

Total RVUs/Month as a Rolling Average

Expressed as 12 month Rolling Average
FY2020 - FY2025



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Service Director, Breast Pathology

Thomas Giordano, MD, PhD
Service Director, Endocrine Pathology

Laura Lamps, MD
Service Director, Gastrointestinal / Hepatobiliary Pathology

L. Priya Kunju, MD
Service Director, Genitourinary Pathology

Kathleen Cho, MD
Service Director, Gynecologic Pathology

Jonathan McHugh, MD
Service Director, Head and Neck / Oral-Maxillofacial Pathology

and mastectomy specimens. Our Breast Pathology service includes a unique dedicated frozen section laboratory for margin assessment and intraoperative consultation. The Breast Pathology division also features a consultation service that assists with diagnostically challenging cases. In FY25, the Breast Pathology service processed 4,042 cases which represents a 6.8% decrease compared to FY24 and 20.6% increase compared to five years ago. This service also completed 1,817 extramural consultations (transfer and private consults) in FY25, which is a 4.4% decrease from FY24 and represents a 20.5% increase compared to volumes from five years ago.

Endocrine Pathology

Endocrine Pathology is the study of diseases of the endocrine system including the thyroid, parathyroid, pituitary gland, endocrine pancreas, and adrenal glands. This service completed 864 challenging consult cases in FY25, which is a 4.7% increase from FY24 and represents a 60.3% increase compared to specimen volumes from five years ago.

Gastrointestinal/Hepatobiliary Pathology

Gastrointestinal Pathology (GI) is a subspecialty of surgical pathology that deals with the diagnosis and characterization of neoplastic and non-neoplastic diseases of the digestive tract and accessory organs such as the pancreas, gallbladder, and liver. The Gastrointestinal/Hepatobiliary service completed 23,761 in-house cases in FY25, a decrease of 2.2% as compared to FY24. Case numbers show a 7.9% increase compared to five years ago. This service also completed 5,334 extramural consultations (transfer and private consults) in FY25, which is a 9.7% decrease from FY24 and represents a 4.4% increase compared to volumes from five years ago.

Genitourinary Pathology

Genitourinary Pathology (GU) is a subspecialty of surgical pathology that deals with the diagnosis and characterization of neoplastic and non-neoplastic diseases of the urinary tract, excluding medical disorders of the kidneys, which fall under renal pathology. This includes diseases of the male genital tract and testes. The GU service processed 3,910 cases in FY25, which was up 9.8% from the prior year. Overall, GU specimen volumes are up 6.4% compared to specimen volumes from five years ago. This service also completed 2,449 extramural consultations (transfer and private consults) in FY25, which is a 3.4% increase from FY24 and represents a 32.7% increase compared to volumes from five years ago.

Gynecologic Pathology

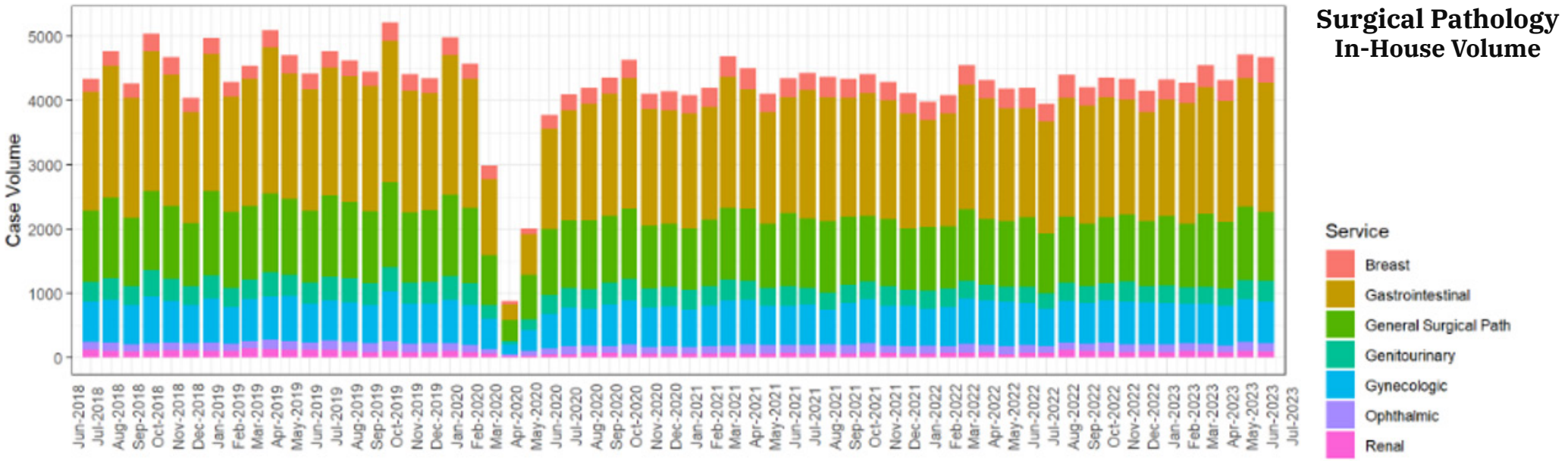
Gynecologic Pathology (GYN) is the subspecialty that deals with the study and diagnosis of diseases involving the female genital tract. The GYN service processed 7,663 cases in FY25, which is a 2.0% increase from the prior year. This represents a 0.9% increase compared to specimen volumes from five years ago. This service also completed 1,881 extramural consultations (transfer and private consults) in FY25, which is a 6.5% decrease from FY24 and represents a 23.8% increase compared to volumes from five years ago.

Head and Neck Pathology/Oral-Maxillofacial Pathology

Head and Neck Pathology covers neoplastic diseases of the thyroid gland, salivary glands, and head and neck. Oral-Maxillofacial Pathology is concerned with the diagnosis and study of diseases affecting the oral and maxillofacial region and is sometimes considered to be a specialty of dentistry and pathology. Internally generated head and neck cases were included in the general Surgical Pathology service described above. Consult cases are handled by our head and neck service and amounted to 1,745 cases in FY25, which was a 7.0% increase over FY24 and represents a 33.9% increase compared to specimen volumes from five years ago.

Pulmonary/Thoracic Pathology

Pulmonary Pathology is a subspecialty of surgical pathology that deals with the diagnosis and characterization of neoplastic and non-neoplastic diseases of the lungs, pleura, and mediastinum. In-house cases are not tracked separately from other Surgical Pathology cases. However, the Pulmonary Pathology service evaluated 2,860 complex consultation cases in FY25, with a 7.7%



Annual Case Volumes

AP Service	FY21	FY22	FY23	FY24	FY25	1-YR	5-YR
Autopsy & Forensics	2,050	1,659	676	585	583	-0.34%	-71.56%
Cytopathology	35,305	35,942	35,391	33,945	33,335	-1.80%	-5.58%
Dermatopathology	23,681	23,646	23,884	22,011	21,154	-3.89%	-10.67%
Frozen Sections	3,068	2,872	2,849	2,551	2,621	2.74%	-14.57%
Neuropathology	710	753	707	1,033	1,178	14.04%	65.92%
Ophthalmic Pathology	1,384	1,453	1,445	1,595	1,507	-5.52%	8.89%
Outside Case	27,996	30,935	32,878	33,743	33,051	-2.05%	18.06%
Pediatric & Perinatal	5,645	5,890	6,172	6,617	6,698	1.22%	18.65%
Renal Pathology	809	856	1,166	1,155	913	-20.95%	12.86%
Surgical Pathology	47,136	47,085	48,322	51,598	51,071	-1.02%	8.35%
Technical Only	1,216	2,123	2,089	2,570	2,343	-8.83%	92.68%
Total	**149,000**	**153,214**	**155,579**	**157,403**	**154,454**	**-1.87%**	**3.66%**

Outside Case Volumes

AP Service	FY21	FY22	FY23	FY24	FY25	1-YR	5-YR
Breast	1,508	1,768	1,911	1,901	1,817	-4.4%	20.5%
Cardiac	24	15	39	41	55	34.1%	129.2%
Cytology	1,076	1,223	1,193	1,412	1,181	-16.4%	9.8%
Dermatopathology	6,377	6,757	6,421	6,657	6,786	1.9%	6.4%
Endocrinology	539	655	788	825	864	4.7%	60.3%
Gastrointestinal	5,108	5,548	5,873	5,910	5,334	-9.7%	4.4%
Genitourinary	1,845	2,252	2,346	2,369	2,449	3.4%	32.7%
Gynecologic	1,520	1,735	1,914	2,012	1,881	-6.5%	23.8%
Head & Neck	1,303	1,403	1,552	1,631	1,745	7.0%	33.9%
Hematopathology	2,400	2,713	2,783	2,851	2,716	-4.7%	13.2%
InterDepartmental Consult	608	296	394	281	396	40.9%	-34.9%
Misc Outside Case	6	1	5	4	13	225.0%	116.7%
Muscle	22	34	25	16	23	43.8%	4.5%
Neuropathology	879	1,144	1,536	1,336	1,475	10.4%	67.8%
Ophthalmic	75	83	92	92	83	-9.8%	10.7%
Pediatric	408	456	445	652	551	-15.5%	35.0%
Pulmonary	2,563	2,961	2,960	3,100	2,860	-7.7%	11.6%
Renal	34	52	87	39	28	-28.2%	-17.6%
Soft Tissue	1,696	1,827	2,109	2,022	1,862	-7.9%	9.8%
Total	**27,991**	**30,923**	**32,473**	**33,151**	**32,119**	**-3.1%**	**14.7%**

decrease compared to FY24, and an 11.6% increase compared to specimen volumes from five years ago.

Case Volume: All Surgical Pathology services in FY25 include all in-house specimens and extramural consultations (transfer and private consults). This case volume for Surgical Pathology was 87,760, which represents a varied year-over-year change for different subspecialties, with an overall 1.3% decrease from the prior year and 9.9% increase over five years ago.

Frozen Sections: Case volume for FY25 was 2,621 representing a 2.7% increase compared to FY24 and a 14.6% decrease from five years ago.

Surgical Pathology In-house Turnaround Time: Defined from when a specimen is received in pathology until the case is signed out, overall decreased an average of 6.3% compared to one year ago. This turnaround time is 15.7% faster compared to five years ago. This can be attributed to several measures including leveraging informatics for better tracking of turnaround time and delayed cases, as well as immediate notification of faculty about late cases.

Cardiovascular Pathology

Cardiovascular Pathology examines the heart and major blood vessels to determine the diseases of these organs, whether congenital or acquired in life. Cases include surgical specimens from living patients or autopsy specimens from deceased patients as well as heart biopsies. A formal cardiovascular pathology service was created in February 2022 in Anatomic Pathology.

Case Volume: The cardiovascular surgical pathology case volume of 1,282 for FY25 reflects a 13.8% increase compared to the previous year.

Turnaround Time: Average turnaround time for cardiovascular surgical pathology cases was 2.3 days in FY25, which decreased by 2.3%.

Pediatric and Perinatal Pathology

This medical subspecialty is focused on childhood diseases as well as perinatal conditions affecting the placenta and fetus. The work includes pediatric surgical pathology cases as well as autopsies and placental examinations.

Case Volume: The pediatric surgical pathology case volume of 7,356 for FY25 reflects a 0.4% decrease compared to FY24 and an 18.8% increase compared to specimen volumes from five years ago. Placental exams increased by 0.7% to 2,343 cases in FY25 and showed a 28.4% increase over five years. Pediatric fetal exams increased 5.6% from FY24 with 301 cases performed, whereas pediatric autopsies had 20 cases, which is a 39.4% decrease from FY24.

Turnaround Time: Average turnaround time for pediatric surgical pathology cases was 2.1 days in FY25, a decrease of 10.7% in the last year and of 1.2% in the last five years.

Dermatopathology

Dermatopathology focuses on the study of cutaneous diseases at a microscopic and molecular level. The dermatopathology service utilizes light microscopy, immunofluorescence, and molecular testing.

Case Volume: The Dermatopathology service experienced an overall 2.5% decrease in FY25 and handled a total of 27,940 cases. This included a 7.4% decrease in specimens from Michigan Medicine patients (in-house cases) which accounted for 50.9% of the cases seen. Cases from patients outside Michigan Medicine (MLabs cases) were up 4.2% in FY25.

Turnaround Time: Overall turnaround time for dermatopathology cases averaged 4.1 days, showing an average 0.9% increase from FY24.

Neuropathology

Neuropathology is a branch of pathology that focuses on the diagnosis of diseases of the central and peripheral nervous systems and incorporates non-neoplastic conditions targeting skeletal muscle.

Case Volume: For FY25, there were a total of 3,023 cases signed out compared to 2,699 cases in FY24, representing a 12.0% increase. Over a five-year period, this service has witnessed a 55.0% increase in neuropathology cases. Consult cases saw a

Kristine Konopka, MD
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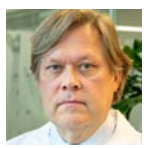
David Gordon, MD
Service Director, Cardiovascular Pathology

Raja Rabah, MD
Section Head, Pediatric and Perinatal Pathology



Thomas Brenn, MD
Section Head, Dermatopathology

Andrew Lieberman, MD, PhD
Section Head, Neuropathology

Victor Elner, MD, PhD
Section Head, Ophthalmic Pathology

Evan Farkash, MD, PhD
Section Head, Renal Pathology

Judy Pang, MD
Section Head, Cytopathology

Allecia M. Wilson, MD
Section Head, Autopsy & Forensic Pathology

10.6% increase from FY24, and 68.8% increase over five years.

Turnaround Time: On average, cases increased to 5.0 days, showing a 9.0% increase from FY24, but an 8.9% improvement compared to five years ago.

Ophthalmic Pathology

Ophthalmic Pathology focuses on diseases of the eye and unique periorbital structures. These cases are predominantly signed out at the W.K. Kellogg Eye Center in Ann Arbor.

Case Volume: This service accounted for 1,603 cases in FY25, a decrease of 5.5% as compared to the prior year and an 8.9% increase over the past five years.

Turnaround Time: Averaged 4.2 days, showing a decrease of 2.6% in FY25 and a 27.2% improvement over five years.

Renal Pathology

The Renal Pathology service focuses on the diagnosis and characterization of medical diseases (non-tumor) of the kidneys.

Case Volume: Medical renal biopsy case volume decreased to 922 in FY25, representing a 20.7% decrease and a 10.9% increase in one-year and five-year-over-year changes, respectively. This decline in volume is entirely due to a decrease in transplant biopsies. Previously, 3-6-12 month protocol biopsies were performed on nearly all patients. The 6-month protocol biopsy was dropped, and clinicians were also more selective about doing surveillance biopsies on more fragile patients, living-related transplants, and patients with long travel times.

Turnaround Time: For medical renal biopsies, the overall turnaround time was 10.4 days in FY25, representing a decrease of 72.5% compared to last year, and a 20.5% decrease compared to five years ago.

Cytopathology

Cytopathology is a branch of pathology that performs diagnostic testing on samples consisting of mostly individual cells, such as Pap tests, body fluids, brushings, and fine needle aspirations (FNA). Our cytopathologists perform rapid on-site evaluations (ROSE) at multiple clinics and procedure rooms throughout Michigan Medicine. Telecytology is frequently employed to support this service. ROSE enables rapid specimen triage and diagnostics for patients while they are still at the medical center, eliminating the need for follow-up visits due to inadequate sampling. Our cytopathology team is also skilled at performing palpation-guided and ultrasound-guided FNAs themselves.

Case Volume: Our cytopathology service processed 33,335 cases in FY25, which was down 1.8% from FY24 and 5.6% compared to five years ago. Gynecologic Pap tests represented the bulk of these cytopathology cases. There were 8,236 nongynecologic cytopathology cases in FY25, in addition to 3,899 FNAs, which included percutaneous and endoscopic aspirations.

Turnaround Time: The average turnaround time for all cytology cases was 1.6 days in FY25, which is approximately a 2.8% increase from previous years.

Autopsy and Forensic Pathology

Hospital and forensic autopsies and examinations represent major activities within Anatomic Pathology. Our fellowship-trained forensic pathologists handle forensic cases from Washtenaw County. All Michigan Medicine adult and pediatric autopsies as well as all forensic cases from Washtenaw County are performed in the University Hospital (UH) morgue. Wayne and Monroe County forensic cases, performed at the Wayne County Medical Examiner's Office, were discontinued in FY22, and Livingston County cases were discontinued in FY23, which will account for overall decreases in the number of autopsies and exams.

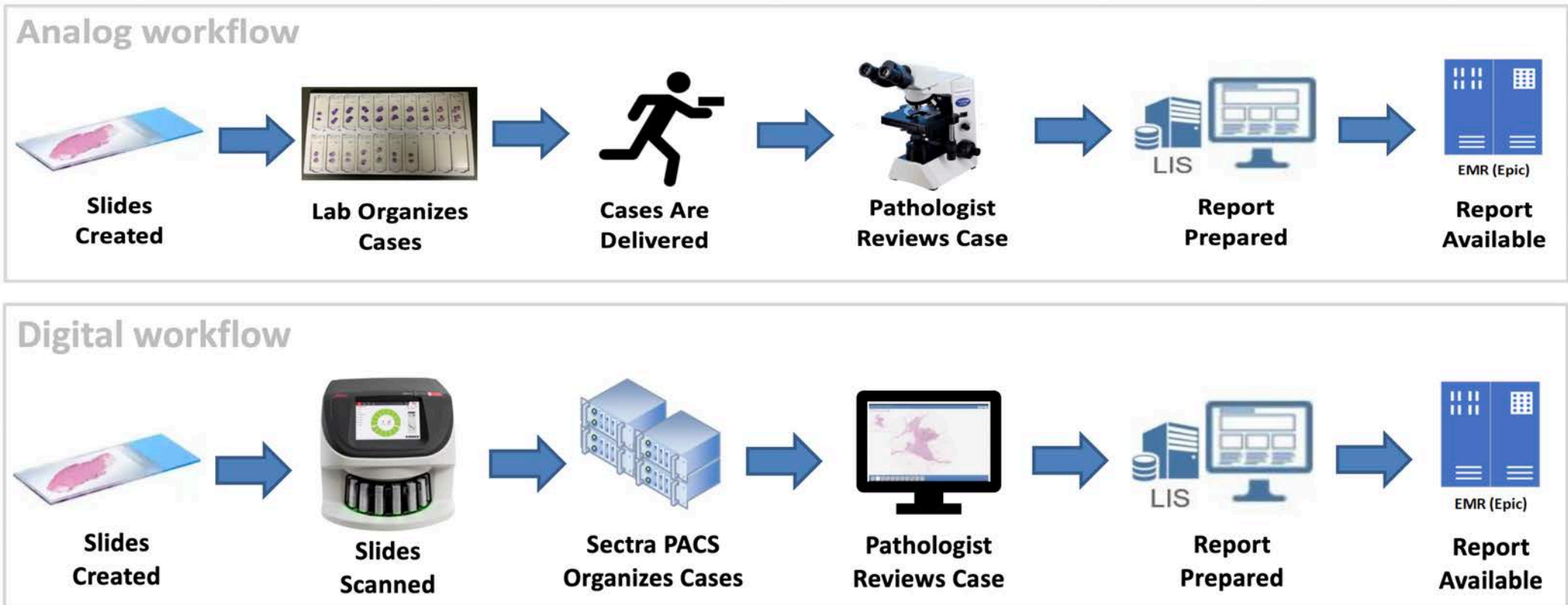
Case Volume: Autopsies performed in the UH morgue were down 22.3% from FY24 and showed an 18.1% decrease over the past five years.

Turnaround Time: Demonstrated an average of 50.2 days to finalize an autopsy, representing a 0.8% overall decrease compared to last year and a 22.7% decrease compared to FY21.

Consultation Service

Our extramural consultation service is an important component

Digital Pathology is Tranforming Glass Slides Into Digital Whole Slide Images (WSIs)



Legend: LIS (Laboratory Information System); EMR (Electronic Medical Record); PACS (Picture Archiving and Communication System. *(See more on Digital Pathology, pg. 18)*

Autopsy and Forensic Services FY25

	FY21	FY22	FY23	FY24	FY25
Wayne County	3,463	3,626	-	-	-
Washtenaw/Livingston County	647	588	560	393	426
Michigan Medicine	151	141	131	161	122

Case Volume / UH, Washtenaw County

	FY21	FY22	FY23	FY24	FY25	1-YR	5-YR
Brain Cases	42	44	48	64	46	-28.13%	9.52%
UH (Adult) Autopsies	125	111	106	124	102	-17.74%	-18.40%
UH (Adult) Exams	-	-	1	-	-	-	-
UH (Peds) Autopsies	24	28	23	33	20	-39.39%	-16.67%
Washtenaw Autopsies	378	336	383	311	352	13.18%	-6.88%
Washtenaw Exams	104	100	101	82	74	-9.76%	-28.85%
Total	**673**	**619**	**662**	**614**	**594**	**-3.26%**	**-11.74%**

of our practice. The rare and difficult cases encountered with this service challenge our faculty to continue to deepen their expertise and expose our trainees to cases otherwise rarely seen. This practice strengthens our brand at regional and national levels, leads to research opportunities in rare diseases, is fundamental to the success of subspecialty fellowships, drives revenue, and enhances patient recruitment to Michigan Medicine.

Case Volume: In FY25, the extramural AP consultation practice total case volume was 32,119, which represents a 3.1% decrease from FY24 and a 14.8% increase as compared to five years ago.

Turnaround Time: Increased to an average of 4.9 days per case. This represents an 18.3% increase over last year and a 59.4% slower turnaround time compared to five years ago. The increase in turnaround time is primarily due to changes in staffing.

Technical-Only Histological Service

Our histology laboratory offers outside laboratories access to our test menu including immunohistochemical and *in situ* hybridization stains, which are handled by our highly skilled technologists. For a limited menu, we also perform both technical stains and pathologist interpretation.

Case Volume: Cases were down 9.6% compared to FY24 at 1,962, but have increased 165.9% as compared to five years ago.

Turnaround Time: Increased by 14.1% from FY24 to 1.2 days, but demonstrated a 40.9% reduction from FY21.

Digital Pathology

Anatomic Pathology advanced its digital pathology initiative with budget approval in early FY24. Transitioning from traditional glass slide sign-out to digital whole slide images required coordinated updates across lab operations, creation of a picture archiving and communication system (PACS), and development of user interface worklists and supporting devices. *(See pg. 17)*

Improvements to lab operations included physical renovation, incremental staffing, scan trials, and application development to assess slide image quality. By May 2024, renovations were

completed to place scanners in an optimal location, reducing excess handling of slides. New team members, including scan techs, a business analyst, and a system developer, were hired. Scan trials were performed, and several continuous workflow improvement measures were implemented, such as building operational dashboards. In November 2025, the team partnered with the vendor to introduce Image QC using artificial intelligence, significantly decreasing the time required for scan techs to validate image quality for sign-out.

Integration between the PACS and the laboratory information system (LIS) was essential. Extensive effort went into designing the PACS interface from the end-user perspective, and collaboration with Radiology was invaluable throughout this development. PACS-driven pathology workflows were designed to streamline case assignment, slide distribution, image availability, and result finalization. These workflows ensured that once a slide was scanned and validated, the digital image seamlessly moved through the Scanners, PACS, and user worklists without manual intervention. Additional features such as automated refresh, specimen-level grouping, stain routing, and error handling were incorporated to maintain reliability and reduce operational burden.

User interface worklists and devices were configured in alignment with the staged service roll-out. A phased go-live plan was established early to ensure a smooth transition to digital sign-out. By June 2025, Stage 1, 2, and 3 services (Renal, Pediatric, Cardiac, Autopsy, Neuro, Breast, and Gynecologic Pathology) had successfully transitioned to digital workflows. September 2025, Stage 4 services (Genitourinary and Room 1) went go live. The remaining services (Gastrointestinal, Ophthalmic, and Dermatopathology) are scheduled for go-live in FY26. Faculty workstations and sign-out rooms were upgraded in advance of each launch, and service-specific worklists were created. Digital pathology slide validation for all services was completed.

In total, 49 faculty, 19 administrative staff, 12 scan techs or EM Lab staff, and 49 residents and fellows received updated workstations and formal training in Sectra digital pathology. Surveys conducted throughout the year demonstrated high satisfaction across all user groups.

Personnel

In AP there are 63 faculty members that sign out, including many world-renowned pathologists. This does not include pathologists who are part of leadership of other divisions or active emeritus faculty. Since July 2024, nine new faculty were hired. The service also trained eight ACGME fellows and 13 non-ACGME fellows/ clinical instructors.

Academic Activities

AP faculty excelled at fulfilling our research mission. AP pathologists collectively published 151 peer-reviewed articles in prestigious journals. Our faculty delivered numerous presentations at regional, national, and international meetings and other institutions.

Education

Medical School Teaching/Graduate School Teaching

Under the organizational leadership of Dr. Madelyn Lew, 25 AP faculty participated in medical school teaching (M1-M4 students), including lectures, labs, and experiential learning. Several AP faculty members also participated in teaching and mentoring our graduate students.

Residency Program/Fellowship Program

AP faculty across disciplines dedicated many hours to teaching our residents and fellows. Residents in AP were exposed to excellent learning opportunities in surgical pathology, cytopathology, and autopsy/forensic pathology. AP fellows were exposed to challenging cases from our extensive consultation practice and participated in many multidisciplinary conferences and tumor boards.

Mustafa Yousif, MD
Director, Digital Pathology

Clinical Pathology

Lee Schroeder, MD, PhD
Director, Clinical Pathology

The Division of Clinical Pathology (CP) provides both medical and operational leadership for both high-volume and specialized clinical laboratory services. While most of CP's laboratories are located at University Hospital (UH) and the North Campus Research Complex (NCRC), the Division also oversees Point-of-Care testing across the enterprise and manages satellite laboratories to support chemotherapy infusion at multiple Ambulatory Care Units, including the Brighton Center for Specialty Care, West Ann Arbor Health Center, and Northville Health Center. CP faculty and operations staff play a crucial role in ensuring that all departmental clinical laboratories across all divisions maintain accreditation and comply with regulatory requirements.

Like the medical laboratories within the Anatomic Pathology and Diagnostic Genetics and Genomics Divisions, the Clinical Pathology Division's laboratories are CLIA-certified and accredited by multiple agencies (CAP, AABB, ASHI, FACT). These laboratories play a vital role in diagnosing and managing human disease through both automated and manual testing of blood, body fluids, bone marrow, and fresh or fixed tissue specimens. Our work is enhanced by expert medical interpretation and clinical consultation, which are essential to the value that the CP Division provides in advancing the clinical, educational, and research missions of Michigan Medicine and the University of Michigan as a whole.

In FY25, the CP Division maintained a comprehensive array of medical laboratory disciplines and support services, including: Clinical Core (Clinical Chemistry, Clinical Toxicology and Mass Spectrometry, Hematology, Coagulation, Biochemical Genetics); Transfusion Medicine (Blood Bank, Apheresis, Cell Therapy); Immunology and Special Chemistry; Clinical Microbiology; Hematopathology (Diagnostic Hematopathology, Bone Marrow Processing and Analysis, Flow Cytometry); Histocompatibility; Point-of-Care Testing; On-Campus and Satellite Phlebotomy; and Specimen Processing. Notably, in FY24, the administrative oversight of the Clinical Cytogenetics, Molecular Diagnostics, and Medical Genetics (MMGL) laboratories transitioned fully to the Division of Genetics and Genomics.

In FY25, the medical laboratories in the CP Division were responsible for 7,412,001 billed tests and panels (up 4.8% from FY24) and $982,206,789 in gross charges (up 5.6% from FY24). While testing volumes increased by 4.8% in FY25, the number of allied health staff supporting the CP laboratories rose by only 0.8% (581 FTE in FY24 and 585 in FY25).

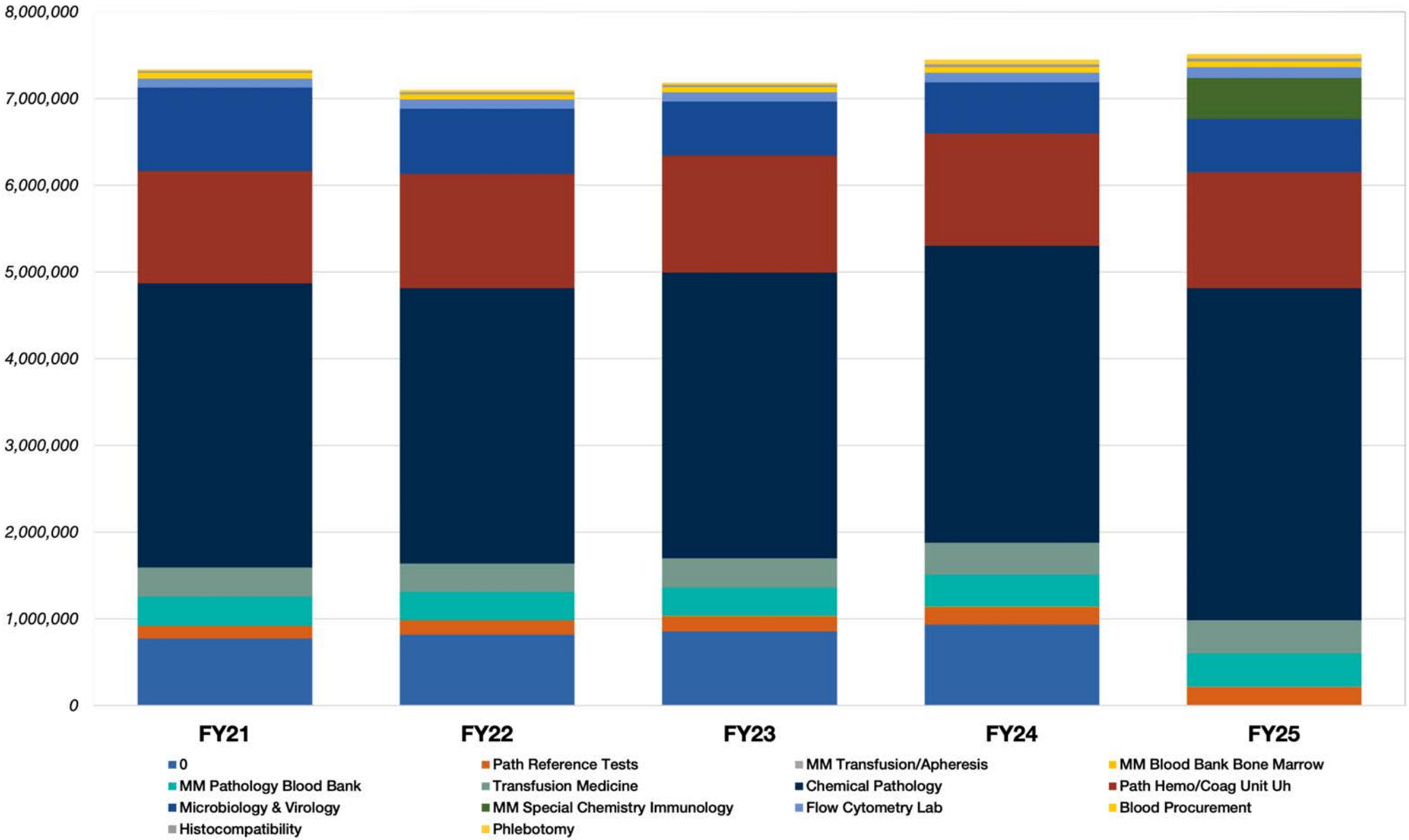
Summary Type Description	Detail Sub Description	FY24	FY25
FTEs	Nursing MNA	7.83	9.47
	Allied Health P&A	266.54	258.90
	Professional & Administrative	20.71	24.88
	Office	0.09	0.00
	Technical	0.57	0.15
	Allied Health Tech	282.47	290.49
	Nursing P&A	1.00	1.00
	Nursing Technical	2.24	0.93
Total FTEs		**581.45**	**585.82**

Table: FTE allocations in Clinical Pathology

Leadership of the CP Division transitioned from Riccardo Valdez, MD to Lee Schroeder, MD, PhD in March 2025, including the CLIA directorship of the Division's primary laboratories. The CP Division currently comprises 23 active clinical faculty, four emerita/emeritus faculty, two adjunct faculty, and one visiting faculty member. In FY25, Lidong Zhai, PhD, FACMG joined the

Clinical Pathology Billed Tests by Service

Fiscal Years 2021-2025



Division as the Medical Director of the Biochemical Genetics Laboratory. Additionally, three faculty members received academic promotions in May 2025: Michael Bachman, MD, PhD and Lee Schroeder, MD, PhD were promoted to Clinical Professor, and David Manthei, MD, PhD was promoted to Clinical Associate Professor. These promotions take effect in September 2025.

In May 2025, the CP Division Director and team successfully managed the biennial inspection by our regulatory accreditor, the College of American Pathologists, conducted by the University of Pittsburgh Medical Center. Of approximately 8,000 checklist items reviewed, the departmental laboratories received 52 citations. Each was addressed satisfactorily for continued accreditation. The citations help to improve our system's quality and cover a range of areas, including incomplete competency and personnel records, gaps in procedure or SOP documentation, environmental monitoring deficiencies, and issues related to proficiency testing practices and personnel qualification requirements.

In FY25, we successfully integrated the Biochemical Genetics Laboratory (BGL), which recently transitioned from the Department of Pediatrics to the Department of Pathology, into the Clinical Core Laboratory. Lidong Zhai, PhD, FACMG (BGL medical director), in collaboration with Shane Quinonez, MD, and Ayesha Ahmad, MBBS, from Pediatrics, worked closely with Clinical Core Laboratory and BGL managers to ensure a smooth and effective transition.

FY25 marked significant activity with two unions. The union contracts with the SEIU and UMMAP were ratified in November 2024 and February 2025, respectively. The SEIU contract was signed in FY25, while plans are being made for a final contract with UMMAP in FY26. To facilitate communication and prevent or address challenges, monthly meetings are held with both unions. There are over 200 phlebotomists and phlebotomist specialists represented in SEIU. Department-wide, there are over 500 UMMAP staff, including clinical senior technologists, medical laboratory scientist specialists, laboratory technicians, and specimen processors.

Statewide integration with our partners at University of Michigan Health-Sparrow and University of Michigan Health-West is progressing, with laboratory interfaces at both sites fully active as of FY25. These interfaces enable seamless test referrals, allowing laboratory tests not performed at UMH-Sparrow or UMH-West to be sent to UMH-Ann Arbor for analysis in our laboratories. While our partnership with UMH-West began prior to FY25, we launched our interface with UMH-Sparrow in March 2025. Tests now included in this integration include serum free light chains, whole blood lead, HLA B27 for ankylosing spondylitis, quantitative CMV PCR, and tacrolimus, among others. Additionally, during FY25, we performed over 73,000 tests and panels for MyMichigan Health facilities. Strategic planning is underway with our partners to identify high-priority tests that each system currently sends to reference laboratories and bring them in-house, with the potential to improve both financial margins and turnaround times across the network.

In FY25, we expanded our locally performed test menu to include several significant additions. This included PCR testing for bacterial vaginosis and Candida vaginitis, which improved diagnostic accuracy, sensitivity, and turnaround time compared to Gram stain and culture methods. We also implemented primary HPV PCR testing with reflex to cytology early in FY25, followed by a consented study to validate HPV PCR testing on patient-collected vaginal specimens, with go-live planned in FY26. We also installed a fully automated molecular diagnostic platform to replace culture-based methods for Staphylococcus aureus/MRSA screening. We verified and implemented a Candida auris screening PCR, which significantly improved our rapid IPE investigation response capabilities. We introduced total syphilis antibodies as part of a newly implemented reverse algorithm for syphilis diagnosis, as well as IgG and IgM antibodies for Borrelia, to support modified two-tier testing for Lyme disease. Additional new offerings included a laboratory-developed test for Vitamin B1 by mass spectrometry and same-day clozapine therapeutic drug monitoring. We also launched Traumatic Brain Injury (TBI) biomarker testing (GFAP and UCH-L1), in collaboration with the Emergency Department, making our institution one of the first healthcare systems nationwide to provide this service. FY25 also included the validation and implementation of one new laboratory-developed flow cytometry panel, specifically the HCL:

Hairy Cell Leukemia and other B-cell neoplasm panel.

Furthermore, we validated over 50 tests on new instrumentation to enhance workflow efficiency and accommodate equipment upgrades or replacements. Additional process improvements implemented this year include an updated LDL-C calculation and the introduction of a pediatric eGFR formula.

Clinical Core Laboratory Section

The Clinical Core Laboratory (CCL) is located on the University Hospital main campus. It provides 24/7/365 clinical testing via automated lines for hundreds of health- and disease-related analytes in blood, urine, and other body fluids. The around-the-clock staff supports the inpatient, outpatient, and emergency service practices for adult and pediatric patients. In addition, the CCL performs testing for patients seen at our offsite laboratory and medical practice locations (e.g., West Ann Arbor, Northville, Canton, East Ann Arbor, Brighton Specialty). The CCL was medically supported by Carmen Gherasim,PhD, Brian Harry,MD, PhD, Shih-Hon (Sean) Li, MD, PhD, David Manthei, MD, PhD, Steven Pipe, MD, Riccardo Valdez, MD, Jeffrey Warren, MD, and Mark Girton, MD in FY25. The subsection of the Clinical Microbiology Laboratory, based at UH, was moved under the operational oversight of the CCL; however, the subject matter expertise continues to be provided by Michael Bachman, MD, PhD, Paul Lephart, PhD, D(ABMM), and Virginia Pierce, MD, of the Clinical Microbiology Laboratory based at NCRC. Additionally, with the planned integration of the Biochemical Genetics Laboratory (BGL) into the Clinical Core Laboratory in July 2024, Lidong Zhai, PhD, FACMG (BGL medical director), together with Shane Quinonez, MD and Ayesha Ahmad, MBBSfrom the Department of Pediatrics, worked with CCL and BGL managers to assist with the transition process. Zhai, Quinonez, and Ahmad will continue to provide medical support for the BGL.

Eric Vasbinder was promoted to CP Associate Operations Director, with oversight of the Clinical Core Laboratory (CCL), Phlebotomy, and Specimen Processing. A co-management structure was established, with Kristy Wendt and Amy Rosendaul assuming operational leadership of CCL for Hematology, Coagulation, Clinical Chemistry, Clinical Toxicology, and Mass Spectrometry, Emergency Department Laboratories, and Satellite Laboratories. The management team continued to work closely with the CCL faculty to maintain accreditation standards and regulatory compliance. Other ongoing efforts included realignment of internal organization, continuous focus on quality improvements, and maintenance of a clinically relevant test menu. CCL staff continued to participate in professional development activities, including cross-training with CCL sections, internal CAP inspections, and attendance at scientific conferences.

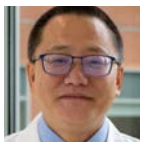
Carmen Gherasim, PhD
Section Director, Clinical Core Laboratory

Clinical Chemistry, Clinical Toxicology and Mass Spectrometry, Emergency Room Labs, and Satellite Labs

These areas of the CCL perform STAT and routine testing in general chemistry, endocrinology, drug analysis, and toxicology. The test menu includes routine chemistries (electrolytes, creatinine, liver function, glucose, and proteins), lipids, vitamin testing, cardiac markers, tumor markers, reproductive hormones, hepatitis serology testing, metals testing (e.g., lead), therapeutic drug monitoring, drug-of-abuse testing, and intraoperative parathyroid hormone testing. The area is equipped with state-of-the-art automated analyzers that utilize spectrophotometry, immunoassays, mass spectrometry, and other methods for a comprehensive range of diagnostic testing. The chemistry section of the CCL administers the clinical labs in the Adult and Children's Emergency Services areas.

In FY25, the Clinical Core Laboratory, Chemistry and Clinical Mass Spectrometry, performed 3,972,806 test panels, representing an overall increase of 11.28% compared to FY24. The slight decrease in Clinical Mass Spectrometry volume was due to small declines in testing performed in Toxicology (e.g., Tacrolimus) and testing send out due to staff shortages in BGL.

Mark Girton, MD
Subsection Director, Hematology



Lidong Zhai, PhD
Subsection Director, Biochemical Genetics Laboratory

Subsection	FY24	FY25	% Change
Clinical Chemistry	3,425,770	3,831,148	11.83%
Clinical Mass Spec	144,264	141,658	-1.8%
Total	**3,570,034**	**3,972,806**	**11.28%**

Table: Test panel performance.

Additional highlights from this area include:

- Validation and implementation of the Roche automation line with c503 (x2) and e801(x2) analyzers that perform 50+ tests, including hs-Troponin T.
- Validation and implementation of Clozapine testing in February 2025, following a request from our inpatient pharmacy. Since the test was previously sent out to Mayo, the test improved the turnaround time and enhanced medication management for patients with schizoaffective disorders.
- Validation and Implementation for blood-based biomarkers for Traumatic Brain Injury (TBI) for patients presenting to the ER with suspected TBI. The test, in conjunction with clinical information, informs the decision of whether a CT scan is necessary in a given patient.
- Implementation of the extended Martin Hopkins equation for LDL-C calculation to replace the Friedewald equation. This improves diagnostic classification and reduces unnecessary direct LDL testing. ADLM Academy recognized the work as an Implementation Story at ADLM ASM 2025, Chicago, IL.
- New Carcinoembryonic Antigen (CEA) Fluid test code: Implemented to differentiate between serum and body fluid CEA orders, streamlining test ordering processes.
- Established a pediatric Estimated Glomerular Filtration Rate (PGFR): Reported for patients aged 12 months to 17 years, based on patient height and measured creatinine to support a more accurate renal function assessment in pediatric populations.
- New Drug Screen Panels: New panels that include fentanyl, buprenorphine, and/or methadone. Validity testing (creatinine) was included with Drug8-Drug10 panels.
- Partnered with Endocrinology to establish NT-proBNP screening of diabetic patients for heart failure. This new test code helps to distinguish testing performed for DM screening versus testing in the setting of congestive heart failure.
- Development, validation, and implementation of Vitamin B1 in whole blood by LC-MS/MS. The test was brought in-house in October 2024 to improve TAT and reduce the costs of sendout testing.

Hematology and Coagulation

This area of the CCL performs automated and manual testing and measures the various components of blood and body fluids (e.g., red blood cells, white blood cells, and platelets), identifies and quantifies abnormal cells, assesses clotting factor levels, determines the impact of medications on blood clotting processes, and helps diagnose diseases of the kidneys and urinary tract. Quantitative flow cytometry is performed on peripheral blood and stem cell harvest products to assess CD34-positive stem cells in support of the Transfusion Medicine Section and the stem cell transplant program. The CCL Hematology Laboratory also remains involved in the bone marrow biopsy process, providing laboratory technicians to assist with these bedside clinical procedures.

# Panels Ordered	FY24	FY25	% Change
Clinical Hem/Coag	1,293,549	1,336,142	3.29%

Table: *Panels ordered.*

Additional highlights from this area include:

- QTBNK - Went live with a consolidated T & B Cell Subset test to maximize workflow efficiency
- Automated body fluids have been interfaced through our existing middleware, Caresphere Work Solutions (CWS), to avoid human error.

Biochemical Genetics Laboratory

The BGL serves as the state of Michigan's sole laboratory for newborn screening confirmatory testing and provides comprehensive diagnostic and management support for inborn errors of metabolism. Dr. Lidong Zhai, along with Drs. Shane Quinonez, Ayesha Ahmad, and Catherine Keegan from the Department of Pediatrics provided medical support for the BGL.

In FY25, the BGL performed 2,765 billed tests, compared with 3,995 in FY24 and 2,968 in FY23. The lower volume in FY25 was primarily due to methylmalonic acid testing being sent out as a result of FTE shortages following unexpected staff departures. Excluding methylmalonic acid, the average monthly volume increased by 27% in FY24 and by 43% in FY25 compared to FY23.

Major laboratory activities include the revalidation of acylcarnitine testing (target go-live in Q2 FY26), biotinidase testing, and amino acid monitoring via dried blood spots testing, planned with further development.

Clinical Immunology & Special Chemistry Section

The Clinical Immunology and Special Chemistry laboratories perform testing to assess immune responses in patients with autoimmune, infectious, and similar conditions; testing for patients with protein disorders such as those seen in multiple myeloma and related disorders; and hemoglobinopathy evaluations in patients with suspected red blood cell disorders. The following CP faculty provided clinical service in this section in FY25: Drs. David Manthei (Section Director), Jeffrey Warren, David Keren, Lee Schroeder, Shih-Hon (Sean) Li, Carmen Gherasim, Mark Girton, and Brian Harry. This section performed 553,848 tests in FY25, compared to 492,779 in FY24, representing a 12.4% increase, in line with multiple years of testing volume increases exceeding 12%.

Highlights from this section include:

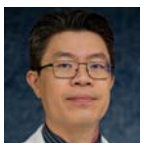
- Transitioned syphilis screening from the traditional to the reverse algorithm, improving laboratory detection of some patient stages.
- Implemented testing confirmation (IgG and IgM) for Borrelia (Lyme disease) to utilize the modified two-tier testing algorithm, dramatically improving the resulting time.
- Piloted and implemented specimen tube tracking to aid specimen management and retrieval.
- Initiated workflow to process testing from UMH-Sparrow, representing a significant portion of the increase in testing in some areas.
- Significant volume increases impacting not only the overall test menu, but also more manual processes, such as immunofixation, saw approximately 10% increases as well.

Transfusion Medicine Section

The Transfusion Medicine (TM) Section consists of the following areas: the Blood Bank and Immunohematology Reference Laboratory, the Apheresis Procedure Unit, and the Cellular Therapy Laboratory. The TM Section was supported by the following faculty during the last year: Jensyn Cone Sullivan, MD, Laura Cooling, MD, Robertson Davenport, MD, Jennifer Jones, MD Chisa Yamada, MD, and Shih-Hon (Sean) Li, MD, PhD. After a long and competitive national search for a new TM faculty member, Kai Rogers, MD, accepted an offer at the rank of Clinical Assistant Professor in May 2025.

FY25 saw modestly increased utilization of packed red blood cells (10%) and markedly increased utilization of apheresis platelets (23%) compared to FY24. Utilization of low-titer O-positive whole blood, plasma, and cryoprecipitate remained unchanged. FY25 was a year of preparing for the future state, with considerable input applied to the design and construction of the D. Dan and Betty Kahn Health Care Pavilion Blood Bank. We also evaluated three options for new automated immunohematology analyzers to replace our two ORTHO VISION Max analyzers. The Blood Bank moved forward with the Bio-Rad IH-1000 system and is currently validating analyzers for use at University Hospital and the Pavilion. The Immunohematology Reference Laboratory (IRL) saw a marked drop in bone marrow product ABO typing as

David Manthei, MD, PhD
Section Director, Clinical Immunology & Special Chemistry



Shih-Hon Li, MD, PhD
Section Director, Transfusion Medicine

Chisa Yamada, MD
Subsection Director, Apheresis Services

it was moved from the IRL to the main Blood Bank for validation on automated analyzers. Special antigen typing increased in the IRL, primarily due to increased numbers of automated red blood cell exchanges for patients with sickle cell disease. To support the growth of transfusion services, operational leadership added two new supervisors, Renad Mohamed, MT(ASCP), and Cristian Purdom, MT(ASCP).

The Apheresis Procedure Unit (APU) saw shifting numbers of procedures in FY25 compared to FY24. Autologous hematopoietic progenitor cell collections for multiple myeloma began to receive plerixafor upfront during mobilization along with G-CSF, shortening collections by 1-2 days per patient. This is reflected in decreased HPC collections in FY25 compared to FY24 (196 FY25 vs 301 FY24) and allowed for doubling of mononuclear cell collections for CAR T-cell therapy (131 FY25 vs 61 FY24 collections). Automated RBC exchanges grew by 10% and are expected to continue to grow in FY26, driven by expanded inclusion of sickle cell patients who require more aggressive management of iron overload. Another notable change was a marked decrease in the number of therapeutic plasmapheresis procedures (917 FY25 vs 1,332 FY24), primarily due to fewer exchanges for myasthenia gravis, neuromyelitis optica spectrum disorder, transverse myelitis, focal segmental glomerulosclerosis, and antibody-mediated rejection for heart and kidney transplants. Much of FY25 was dedicated to onboarding extracorporeal photopheresis (ECP) into the APU to better serve Michigan Medicine patients with graft-versus-host disease and peripheral cutaneous T-cell lymphoma. To support increased patient volume and services, the APU added 3 new nurses in FY25.

The Cellular Therapy Laboratory (CTL) saw essentially unchanged numbers of total hematopoietic stem cell (HPC) transplants in FY25 compared to FY24. The number of frozen bags decreased, likely reflecting shorter collections in our autologous patients with multiple myeloma. Remarkably, CAR T-cell infusions doubled, reflecting the rapid growth of both FDA-approved commercial products and clinical trials, especially for autoimmune diseases and solid tumor malignancies. Indeed, the CTL onboarded 25 new clinical trials, representing a nearly 60% increase compared to FY24. To support this expansion in clinical care, the CTL successfully added three new staff members in FY25.

The TM Section was successful in inspections and site visits by the Foundation for the Accreditation of Cellular Therapy (FACT), National Marrow Donor Program (NMDP), College of American Pathologists (CAP), Therakos, AstraZeneca, and Vor Bio, demonstrating its continuing commitment to quality, compliance, and patient care.

The Transfusion Medicine team was honored in numerous ways in FY25:

- Apheresis Procedures Unit – Michigan Medicine Office of Patient Experience, “Overall Rating of Care” top two sites, awarded twice in FY25.
- Jensyn Cone Sullivan, MD – American Society for Clinical Pathology (ASCP) 40 Under Forty 2024 Honoree.
- Sheri Hugan, MLS(ASCP)SBBCM – Michigan Association of Blood Banks (MABB) Founders Award.
- Mary Ellen Kremhelmer, RN, Elizabeth Robinson, RN, Dawn Jucha, RN, and Elizabeth DeWitt, RN – School of Nursing DAISY Award nominations.
- Dawn Jucha, RN, Brianna Felstein, RN, and Mary Brown, Administrative Assistant Intermediate – Making a Difference Awards.

Jensyn Cone Sullivan, MD
Subsection Director, Cellular Therapy Laboratory

Daniel Boyer, MD, PhD
Section Director, Hematopathology

Hematopathology Section

This section focuses on the evaluation of blood, bone marrow, lymph nodes, and other tissues to assess for benign, reactive, and neoplastic disorders, using a variety of techniques, including routine microscopy (morphology), flow cytometry, and immunohistochemistry, with the incorporation of data from cytogenetic and molecular diagnostic testing in many cases. This section was supported by 10 Hematopathologists in FY25 (Drs. Daniel Boyer, Robert Bell, Noah Brown, Mark Girton, Annette Kim, Kamran Mirza, Anamarija Perry, Charles Ross, Russell Ryan, Lauren Smith) who variably participate on each of three clinical services (in-house biopsies, flow cytometry/blood and

body fluid smear interpretation, and transfer and consult case interpretation). Four of the primary Hematopathology section faculty participated in the interpretation of myeloid next-generation sequencing tests in FY25 (Drs. Bell, Boyer, Brown, and Kim). Case volumes continued to increase in FY25. In FY25, 2,609 bone marrow and other tissue biopsies collected from Michigan Medicine patients were diagnosed and signed out by the Hematopathology team, compared to 2,403 in the previous year. The diagnostic service also managed 2,459 cases from external healthcare systems associated with patients seeking care at Michigan Medicine (transfer cases) and 1,603 external cases sent by other pathologists for primary diagnosis or expert opinion (consult cases). The flow cytometry lab performed 113,232 billed tests in FY25 compared to 110,751 in FY24, a 2.24% increase. Of note, the test volume in flow cytometry specifically includes 7,226 leukemia and lymphoma immunophenotyping panels. There has been a 37% increase in volume since FY21 based on actual flow cytometry tests performed for leukemia and lymphoma immunophenotyping. Efficiency gains from modifying specimen preparation protocols and workflow have helped to accommodate the increase in test volume.

Notable FY25 achievements in this section include:

- Validation and implementation of one new laboratory-developed flow cytometry panel, HCL: Hairy Cell Leukemia and other B-cell neoplasm panel.
- Currently, six out of seven of the hematopathology flow technologists are trained to perform and enter preliminary case reports for MLabs and in-house flow cases. This endeavor has reduced the time spent by Pathologists on report preparation when no trainee is assigned to the flow cytometry/fluid service.

Clinical Microbiology Section

The Clinical Microbiology Laboratory (CML) comprises multiple subspecialty areas, including bacteriology, virology, mycology, mycobacteriology, parasitology, antimicrobial susceptibility testing, molecular microbiology, and the core microbiology laboratory. Together, these subsections focus on identifying pathogens to support the diagnosis and treatment of patients. Medical direction for the CML was provided in FY25 by Drs. Michael Bachman, Paul Lephart, and Virginia Pierce.

In FY25, the CML performed 616,584 total billed tests, compared with 591,523 in FY24, a 4.2% increase.

New Instrumentation and Assay Implementation

Antimicrobial Susceptibility Testing

- Installed and verified new HiQ Sensititre antimicrobial susceptibility analyzers and validated susceptibility testing for sulbactam-durlobactam, as well as updated CLSI minocycline breakpoints for Acinetobacter spp. and Stenotrophomonas maltophilia.

Microorganism Identification

- Completed installation and validation of next-generation MALDI-TOF instruments, replacing end-of-life systems and verifying the latest FDA-approved reference library.

Molecular Testing Expansion

- Verified and launched molecular testing for bacterial vaginosis and candida vaginitis, improving diagnostic accuracy, sensitivity, and turnaround time compared with Gram stain and culture methods.
- Implemented primary HPV PCR testing with reflex to cytology early in FY25, followed by a consented study to validate HPV PCR testing on patient-collected vaginal specimens, with go-live planned in FY26.
- Installed the BD MAX system, a fully automated molecular diagnostic platform. Verified and implemented an IVD Staphylococcus aureus/MRSA screening PCR, replacing a culture-based method.
- Verified and implemented an IVD Candida auris screening PCR on the Diasorin MDx platform, significantly improving rapid IPE investigation response capabilities.

Paul Lephart, PhD
Section Director, Clinical Microbiology Laboratory

Matthew Cusick, PhD
Service Director, Histocompatibility Laboratory

Quality and Stewardship Initiatives

- Validating patient self-collection for bacterial vaginosis, candida vaginitis, and HPV PCR testing supports improved access and alignment with Michigan Medicine's BASE (Belonging and Inclusion, Access, Safety and Quality, and Experience) priorities, focused on creating a more equitable, safe, and excellent healthcare system for patients, families, and team members.
- Expanded the Non-Conforming Event (NCE) database to support monitoring, trending, and staff feedback with improved graphing for quarterly reporting. The system was featured during Quality Month and will be used as the template for a harmonized NCE database across the CP Division.
- Maintained monthly General Lab Staff Meetings to strengthen communication and engagement.
- Implemented a MiChart order set enabling reflex ordering of the meningitis PCR panel (MEPAN) based on abnormal CSF parameters or direct ordering by authorized providers.
- Partnered with the Infection Prevention Program (IPP) to optimize gastrointestinal PCR panel (GIPAN) utilization, reducing unnecessary orders after day 3 of admission and promoting targeted C. difficile testing.
- Provided critical leadership during a national blood culture bottle shortage, collaborating with infectious diseases, pharmacy, supply chain, and hospital operations to:
  - Establish triage guidelines based on clinical necessity.
  - Educate clinicians on appropriate ordering practices.
  - Explore alternative diagnostics and optimize specimen collection protocols.
  - Monitor real-time inventory and adjust workflows to maintain diagnostic continuity.
  - This proactive, systemwide approach preserved testing capacity and patient care quality, demonstrating the CML's essential role in institutional resilience and crisis response.

Strategic Outlook

FY25 represented a pivotal year for the Clinical Microbiology Laboratory, marked by critically needed investment in instrumentation for its two core functions: microorganism identification and antimicrobial susceptibility testing, as detailed above. The laboratory continued its shift toward molecular diagnostics, introducing new assays to address previously unmet clinical needs. Continued collaboration with Infectious Diseases, Infection Prevention and Epidemiology, Infectious Disease Pharmacy, Antimicrobial Stewardship, the Division of Quality and Health Improvement, and Michigan Medicine hospital leadership underscores our commitment to maintaining the highest standards of quality and patient care. Looking ahead to FY26, the CML will continue to prioritize quality improvement while expanding access to accurate, rapid, and clinically impactful microbiology results.

Histocompatibility Laboratory

The Histocompatibility (HLA) Laboratory performs various clinical tests to assess donor-recipient compatibility and evaluate immunologic risks for solid organ and stem cell transplants. Additionally, the laboratory performs disease association testing. Analytical methods employed include serologic techniques, flow cytometry, and molecular methods, such as next-generation sequencing. Ongoing projects focus on enhancing informatics systems to improve turnaround times, reduce costs, and create an interactive test result platform for healthcare providers, all while upholding the highest standards of quality and accreditation. The clinical testing activity of the HLA laboratory over the past five years is shown below:

Test	FY21	FY22	FY23	FY24	FY25
Disease Association	1,739	923	1,638	1,946	2,515
High Res. Typing	1,477	838	5,952	6,647	7,037
Low Res. Typing	1,245	2,341	4,905	4,640	4,419
Antibody Screening	3,687	2,064	3,903	4,038	5,500

Antibody Specificity	10,801	6,900	13,167	14,530	14,634
Flow Cross Match	526	209	475	599	537
Total	**22,209**	**25,917**	**30,039**	**32,304**	**34,648**

Table: Clinical testing activity of HLA Laboratory 2021-2025.

As part of its mission to support clinical transplantation, the HLA lab faculty and staff are available 24/7/365 to provide assistance and consultation to direct care providers who are deciding if and/or how to proceed with an organ or stem cell transplant. In addition to CAP accreditation, the HLA laboratory also maintains accreditation by the American Society for Histocompatibility and Immunogenetics (ASHI).

Notable highlights for FY25 include:

- Validated and implemented the Nexcelom Bioscience Cellometer Auto 2000, which improved consistency in viability and cell counts, leading to improved flow crossmatch results as well as a cost-saving benefit of technologist time.
- Completed the discrete results project for Ankylosing Spondylitis (HLA-B27) in April 2025.
- Initiated alternative PT assessments for secondary antibody screening panels that will enable reporting data/results from these supplemental assays.
- Captured billable tests by changing the test ordering algorithm for screening assays that are reflexed to more sensitive and specific tests.
- Streamlined living donor virtual crossmatch requests by implementing the use of our existing deceased donor VXM Excel-based tool.

Point-of-Care Testing Section

Point-of-Care Testing (POCT) is clinical laboratory testing performed at or near the patient's bedside by thousands of operators throughout Michigan Medicine in both the inpatient and ambulatory care settings. The operators include nursing staff and other non-traditional laboratory-trained personnel. Testing ranges from the less complex (waived) glucose and urine pregnancy testing to the more complex (non-waived) blood gas and viscoelastic testing in the operating rooms. The POCT team, led by Dr. Lee Schoeder (CP Division Director and POCT Section Medical Director) and Andrew Szczembara (Administrative Manager), supports clinical units with laboratory instruments, reagents, operator training, quality assurance, and regulatory guidance. The POCT mission is to improve patient health by providing access to safe and efficient laboratory testing at the point of care, through technology, service, and education. A significant component of POCT services is the provision of training and quality assurance throughout the enterprise.

In FY25, this consisted of:

- Training hundreds of operators to perform point-of-care testing in blitzes as well as targeted educational sessions to several groups: Nursing, Perfusion, Anesthesia, Radiology, Labor and Delivery, Survival Flight, ECMO, physician offices, Ambulatory Care Units, the Pinckney Student Run Free Clinic, and the Regional Alliance of Healthy Schools program.
- Maintaining the glucometer program, which includes over 600 glucometers, over 15,000 operators, and 531,000 patient tests in FY25.
- Managing over twenty different test systems and over 950 instruments for point-of-care testing.
- Performing over 500 quality assurance rounds and troubleshooting visits at the various supported sites.

Additional notable initiatives for FY25 included the following:

- Completed Hemochron Signature Elite Activated Clotting Time LR and PT/INR Interfaces, permitting the automated transfer of 2,542 tests in FY25.
- Auditing of waived testing at the Main Medical Campus expanded in FY25. Notably, during the triennial Joint Commission survey, there were no citations for waived testing across the entire institution.
- Assisting in the launch of point-of-care testing at the

Lee Schroeder, MD, PhD
Section Director, Point of Care Testing

Ypsilanti Health Center location.

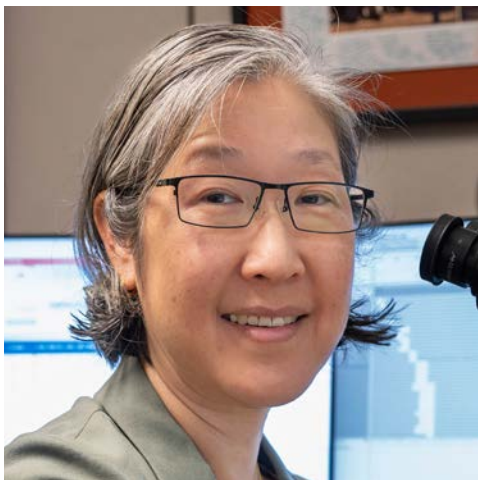
- Continuing to plan for the launch of the D. Dan and Betty Kahn Healthcare Pavilion in FY26.
- Launching of the POCT portion of the Cornerstone Questionnaire to better enable management to assign and maintain POCT Testing Personnel online learning activities in cooperation with HITS and Nursing leaders.
- Completion of the RALS Mirth Conversions and middleware upgrades to comply with the short timeline provided by HITS.
- Launching of the rapid Flu/RSV testing at the Pinckney Student Run Free Clinic.
- Assisting with the successful launches of the Discharge Hospitality Center and MSSU Gold units.

A sampling of test volumes for some Point-of-Care tests is shown below. Most testing has remained relatively stable over the past three years. Notable exceptions include an increased reporting of ACT testing, likely due to interfacing.

FY26 planning includes the replacement of the enterprise POC hemoglobin A1c testing instrumentation with a more accurate device with a shortened analytic time, as well as exploring the replacement of the current Main Campus Blood Gas methodology with the GEM7000, which has hemolysis detection capabilities.

Patient Test Name	FY23	FY24	FY25
POC Glucose (Glucometer)	514,891	516,485	531,043
POC UA (Clinitek)	56,644	54,312	53,320
POC Blood Gas/Electrolytes	39,132	40,031	41,061
POC Activated Clotting Time	16,798	29,991	39,439
POC Hemoglobin A1C	22,423	22,610	23,175
POC Urine Pregnancy	20,645	21,424	21,026
POC PT/INR	21,327	28,628	16,302
POC Strep Antigen	10,789	11,832	9,877
POC Urinalysis Manual	2,387	4,950	4,164
PPM Urinalysis	5,885	4,240	3,843
ROTEM	5,495	3,027	3,509
POC Specific Gravity	2,889	3,633	2,914
POC Sars-Cov-2/Flu/RSV	3,201	2,365	2,246
POC OR CBC	1,553	1,841	1,971
POC Basic Metabolic Panel (i-Stat)	1,643	1,951	1,775
POC Urine Drug Screen	1,386	1,127	1,331
POC Creatinine (i-Stat)	1,042	1,143	1,278
PPM Wet Preparation	1,350	1,162	1,028
POC Creatinine (i-Stat)	1,044	1,042	1,143

Diagnostic Genetics and Genomics



Annette Kim, MD, PhD
Director, Diagnostic Genetics and Genomics (DGG)

Bryan Betz, PhD
Director, DGG Technical

Emily Schwedler
Director, Operations

Genetics and genomics are the sciences that analyze biological markers in the genome, i.e., an individual's genetic code, from nucleotide to chromosome and epigenome levels, to determine how cells express their genes as proteins and how genetic variation and mutation contribute to disease. Several specialized laboratory techniques are employed in clinical genetic tests to diagnose and monitor disease, assess risk stratification, and help determine which therapies will be most effective for individual patients. The Division of Diagnostic Genetics and Genomics (DGG) has made considerable strides toward coordinating the efforts of the various clinical laboratories performing molecular tests within the Department of Pathology.

Strengthening the Team

Over the past year, DGG has prioritized team development, leadership growth, and a collaborative work culture. To maintain focus on mission, culture, and streamlined processes, Annette Kim, MD, PhD, and Emily Schwedler, Director or Operations, facilitate quarterly all-staff meetings to introduce new team members, discuss process improvements, review ongoing projects, and communicate key validation timelines. Additionally, Dr. Kim leads monthly faculty meetings, while Schwedler convenes monthly with staff leadership to ensure alignment across roles. Both leaders also host regular lunch gatherings with team members, providing opportunities to build personal connections and foster stronger working relationships. Finally, Dr. Kim, Bryan Betz, PhD, and Schwedler meet weekly to set priorities and ensure the division's direction.

Mission

Strengthen Leaders, Strengthen the Team
In December 2024, the entire DGG leadership team participated in FISH! for Leaders, a development program based on the well-known FISH! Philosophy inspired by Seattle's Pike Place Fish Market. The program focuses on four core practices: Be There, Play, Make Their Day, and Choose Your Attitude. Applying these concepts helps leaders strengthen relationships, build trust, foster open communication, and create a positive work culture where people feel supported, valued, and inspired to do their best.

Recognizing the need to infuse mission and culture and to reenergize leadership, Emily Schwedler partnered with the Office of Counseling and Workplace Resilience to develop a training series called Mission Culture Process (MCP) for laboratory leaders. This program will provide a framework for the new division, guiding DGG leaders in defining who we are, what we do, why we do it, and how we want to do it, ensuring alignment and cohesion across the team. The training launched in September 2025.

Culture

Social Events
The DGG Social Committee, made up of staff from all three laboratories, has brought our team together throughout the year with a variety of events. Highlights included a Halloween Party, Friendsgiving Potluck, Cookies, Cocoa & Coffee, Valentine's Day Party, Pi Day Celebration, DGG Nerd Out, Instrument Naming, Super Chili Bowl, and the Lab Olympics.

Continuing Education
DGG is supported by Medical Laboratory Scientists (MLS) across all sections. Over the past year, staff have earned 12 CE credits to maintain their certifications. These sessions typically feature MLSs paired with faculty, providing both a deep dive into testing processes and an overview of the associated disease states at the patient level.

Summer Lab Science Immersion
The Molecular Genetics and Diagnostics laboratories partnered with the Pathology Education leaders to create a department-first summer immersion opportunity for college students interested in careers within laboratory medicine.

Process

Harmonization
FFPE FISH (fluorescene *in situ* hybridization), previously divided between MDL and Cytogenetics, has been consolidated into the Cytogenetics laboratory, enabling increased cross-training for depth of bench and a move towards harmonization of FISH methods.

Pre-Authorization Process Improvements
DGG has transitioned the assessment of out-of-pocket payments from within the laboratories, particularly within MGL, to hospital Patient Billing Services. Additionally, several improvements have been made to the pre-authorization process, enabling a more rapid closure of pre-authorization cases. These combined changes allow the laboratories to focus more on testing, providing patients with faster turnaround times for test results.

People

Incremental Staff
In fall 2024, DGG was approved to hire six FTEs: one Bioinformatician, one Software Engineer, two Medical Laboratory Scientists, and two Laboratory Technicians. All positions were successfully filled by the end of the fiscal year, a significant achievement made possible through the dedicated efforts of our teams. In addition, by Q1 of FY25, the division had enlisted the partial efforts of three genetic counselors to assist with variant analysis and clinical correlation.

New Faculty
Suguna Narayan, MD, PhD, and Navin Mahadevan, MD, PhD, joined in September and October 2024, respectively. The division also successfully recruited Drs. Kejian Zhang, Julianne Szczepanski, and Xiaoming Wang to DGG. The addition of these new faculty enables the service weeks of all faculty in DGG to decrease to the maximum for academic faculty, which had been exceeded for many years.

Molecular Genetics Leadership
MGL successfully recruited a new manager, Megen Carlson, filling a leadership gap that had existed since the retirement of a long-time manager. Together with Dr. Kejian Zhang, the new Director of MGL, the laboratory now has a full leadership team to guide it into the future. In addition, Dr. Chen Yang, who previously served as Interim Director, will transition into the role of Associate Director, providing him with greater opportunities for mentorship and growth in his academic career. The laboratory has also welcomed new incremental staff to further support its operations.

Building The Bioinformatics Team
FY25 saw expansion in the Informatics Team. The fiscal year began with approval to hire contractors to fulfill immediate development needs. During Q2 of FY25, DGG finally obtained approval to hire full-time staff. DGG successfully transitioned two of three contractors to full-time staff in Q3-4, leading our software engineering builds, while retaining the third contractor. In that same timeframe, DGG added a full-time bioinformatics staff member to join the one continuing bioinformatician in the division. A part-time clinical bioinformatician was also successfully recruited, thanks to a cost-sharing agreement with Dr. Marcin Cieslik through a research grant.

Research and Education

Research

DGG has similarly transformed its contributions to the academic and educational missions of Michigan Medicine. Over the last year, the division funded approximately $50,000 in research grants and travel awards to its team members, primarily in collaboration with other pathology faculty, thereby elevating the department's overall molecular expertise. In addition, collaborations with Dr. Michael Burns for the use of large language models in genetics and Dr. Thomas Saba on heterotaxy ciliopathies have been developed. Over the course of a year, the

Noah Brown, MD
Director, Molecular Diagnostics Laboratory

Aiko Otsubo, PhD
Program Director, Laboratory Genetics & Genomics Fellowship

Nora Joseph, MD
Program Director, Molecular Genetics Pathology Fellowship

divisional research productivity has increased to 33 publications from clinical faculty, with additional posters and presentations from faculty and trainees.

Michigan Genomics Initiative Collaboration

Following a year of negotiations spearheaded by Dr. Kim, Dr. Steve Kunkel announced in November of 2024 the goal of sequencing 10,000 genomes from the Michigan Genomics Initiative (MGI) cohort within DGG. Proposals were vetted and accepted during Q4 of FY25, and whole genome sequencing was launched shortly thereafter. This project represents the first validated use of the Hamilton liquid handlers, the first validated assay involving sequencing on the NovaSeq, the first application in DGG of bulk accessioning, and the first internally developed software application from the new DGG informatics team. This project will ultimately enable lower costs for our clinical patients by sharing larger flow cells with the MGI samples, and will enable more rapid turnaround times, thanks to the increased frequency of runs due to the volume. This project has increased the visibility of DGG throughout the university and medical center.

Education

FY25 saw the transition of the Molecular Genetics Pathology (MGP) fellowship leadership to Dr. Nora Joseph. In addition, Dr. Aiko Otsubo became the assistant Program Director of the Laboratory Genetics and Genomics (LGG) fellowship (and will become PD in FY26). Both individuals led highly successful recruiting seasons in FY25. DGG graduated Dr. Xiaoming Wang from our LGG fellowship and Dr. Julianne Szczepanski from our MGP fellowship in June, 2025. Both were such stellar trainees that DGG successfully recruited them to stay as faculty. In replacement, Dr. John Murdoch began as the new LGG fellow in July 2025 while Drs. Michael Olp and Corey Post began as MGP fellows at the same time.

FY25 also saw the application of new educational approaches for DGG learners. The educational experience of all trainees in DGG has been updated to include a truly hands-on experience for all levels of learners. Now, trainees receive from our MD faculty a combination of didactic lectures, case sign-out-related education, as well as direct experience with Next Generation Sequencing (NGS) report generation, from day 1 of their first rotation through MDL. They also receive dedicated education in bioinformatics and technical aspects from our PhD faculty. The cytogenetics rotation has been a well-established senior rotation for all trainees. Finally, we aim to expand the education of residents to medical genetics, and are exploring the possibility of adding a second LGG fellow. Dr. Nora Joseph plans to lead the University of Michigan in joining the MGP Fellowship In-Service Exam development team.

Molecular Diagnostics Laboratory

Volume

- The Molecular Diagnostics Laboratory (MDL) performed 25,463 billed tests in FY25, representing a 10.3% increase over FY24 (23,079).

Staffing

- The MDL received approval for three incremental staff members, and was able to hire and train them within 6 months of approval, all while managing the increase in testing volume.

Operational Improvements

- Transitioned the problem log from paper-based to an electronic Microsoft Form, enabling easier problem entry and output review.
- Updated Lymphoma panel outputs (TRGB and IGHK) for improved faculty interpretation; electropherograms now scanned per patient accession in SOFT for accessibility to non-molecular faculty.
- Reduced the rate of inadequate testing of low cellularity body fluids:
  - Validated and launched a protocol for Total DNA extraction (cellular plus cell-free DNA) for various body fluids.
  - Began pooling residual cerebral spinal fluid from other

laboratories for efficiency.

- Improved communication using shared documents and Teams groups (for specimen hand-offs, results, QC, and billing holds).
- Revised and streamlined canned messages and reporting in SoftMol for greater reporting efficiency.
- Modified DNA cleaning and extraction protocols for better digestion, yield, and to reduce re-extractions.
- Enhanced collaboration with Neuropathologists through editable requisitions for special instructions.
- Utilized digital images (Sectra) for solid tumor specimen selection.
- Consolidated FISH FFPE testing and staff into the Cytogenetics Laboratory.
- Gained approval for the Solid Tumor NGS Technical Assessment for Medicare reimbursement.
- Clinical Validations and Evaluations:
  - MiOncoProfile, a comprehensive genomic profiling (CGP) assay.
  - Oncomine Precision Assay as a rapid, fully automated solid tumor panel for small biopsies.
- Evaluating EDTA-based decalcification.
- Joint venture with Anatomic Pathology to integrate Molecular testing into SOFTPathDx for streamlined ordering.

Efficiencies

- Collaborated with HLA and MGL labs to secure a discounted rate for Qiagen DNA extraction kits ($40,000 savings in FY25).
- Reduced turnaround time (TAT) for NGS assays, improving result speed for patients/clinicians:
  - Myeloid NGS by 3 days.
  - Oncomine Focus/Solid Tumor NGS by 1 day.
  - Comprehensive Solid Tumor Fusion NGS by 2 days.
- Automation and informatic solutions:
  - Developing Genexus (automated library preparation/ sequencing) for OPA.
  - Developing Hamilton liquid handlers for automated library preparation.
  - Developing automated DNA/RNA extraction.
  - Developing an electronic solid tumor specimen selection and tracking tool for enhanced workflow and prelab process management (including use of Sectra slide images).
  - Developing the Managers Report Tool Kit (MRT) for real-time case tracking, FFPE block selection/return, and reporting for Molecular Diagnostics cases.
- Creating reflexive testing protocol for NSCLC with Anatomic Pathology/Thoracic Oncology.

Lina Shao, PhD
*Director,*Cytogenetics

Clinical Cytogenetics Laboratory

Volume

- The Clinical Cytogenetics Laboratory performed 19,827 billed tests in FY25, a 0.3% increase versus FY24 (19,777).

Staffing

- Laboratory staffing levels remained stable in FY25, no additional full-time equivalents (FTEs) were added.
- Transition of Molecular Diagnostics FFPE FISH staff and testing to Cytogenetics following the FFPE FISH Supervisor's departure; transition was finalized in July 2025.

Operational Improvements

- Completed transition of FFPE FISH testing and staff from Molecular Diagnostics to Cytogenetics, with collaborative process review.
- Clinical Validations and Evaluations:
  - Began validation and preparation to launch Optical Genome Mapping (OGM), which detects both copy number

Kejian Zhang, PhD
Director, Molecular Genetics Lab

Robert Bell, MD, PhD
Clincal Section Head, Informatics

Marcin Cieslik, PhD
Director, DGG Bioinformatics

and structural abnormalities at high resolution. (Go-live planned for Nov 3, 2025.)

- Acquired and began integrating Metasystems (AI imaging systems) in August 2025 to address workload, improve diagnostic accuracy, and increase efficiency.

- Initiated workflow updates and proficiency testing (CAP and in-house) for FFPE FISH to streamline processes, with completion/review targeted for December 2025.
- Enhanced capacity for digital review: faculty can now review full galleries of FISH assay images digitally, promoting more thorough evaluations.

Efficiencies

- Automation of manual cytogenetic work (Hanabi) helps mitigate staff workload stress and promotes better job satisfaction.
- Future development: Metasystems AI slide scanners will enable significant efficiency gains in chromosome analysis (anticipated 40–50% increase), and reduce physical strain on technologists. Metasystems will be implemented in FY26.

Molecular Genetics Laboratory

Volume

- The Molecular Genetics Laboratory (MGL) performed 1,571 billed tests in FY25, comparable to FY24 (1,534).

Staffing

- The MGL received one incremental staff member to help with specimen processing and administrative work that will inevitably come as this section continues to grow.

Operational Improvements

- Clinical Validations and Evaluations:
  - Validated Whole Genome Sequencing for a major collaboration with the Michigan Genomics Initiative, launching August 2025.
  - Validated new NGS reference files, streamlining analysis time for NGS copy number variants and improving data quality.
  - Validated use of cheek swabs and saliva for MLPA and MS-MLPA testing.
- Implemented preliminary result reporting for STAT newborn testing, enhancing real-time patient care.
- Optimized cord blood ordering in collaboration with the blood bank for more efficient requisition, aliquot, and delivery processes.
- Standardized cancellation codes and messaging to minimize human error.
- Streamlined prior authorization by fully adopting a MiChart work queue and optimizing Michigan Medicine shared resources.

Efficiencies

- Rolled out new saliva-specific test codes that simplify ordering and reduce lab intervention for kit distribution.
- Cost savings realized by validating the existing Kingfisher Flex instrument for high-throughput DNA isolations, reducing the cost per sample from $68 to $6–10, with an estimated annual savings of $27,550 for 475 swab/saliva samples.
- Projects in process for FY26 focus on efficiency and savings:
  - Transition to Whole Genome Sequencing (WGS) for panel and single gene tests, with projected test cost savings of $375,213.
  - Potential in-house rapid WGS for Mott ICU patients, estimated to generate net revenue of $565,020 (FY24 data).
  - Expansion of panel offerings due to WGS validation (planned for Q3–Q4).
  - Comprehensive crosswalk for all MGL tests to standardize naming, link consent forms and handbook entries, and duplicate the remaining 115 tests for saliva ordering.

DGG Informatics Dev/Ops

Staffing

- The Informatics group has expanded significantly with the following individuals: a director of informatics, a director of bioinformatics, 2 staff software engineers, 2.5 bioinformaticists, 2 additional contract software engineers, and 1 contract project manager (two of the latter added after July 2025). This team supports the many informatics efforts of the entire division.

Development Work

- Foundational development work was performed on the database and the pre-sequencing tool for the MiOncoProfile assay.
- Development work for the post-sequencer bioinformatic pipeline for the Oncomine Precision Assay, involving complete modernization and rebuild of the Oncomine Focus Assay pipeline.
- Development work for transferring data from optical genome mapping into SOFT.
- Supported the validation efforts for whole genome sequencing by providing data analytics after each run.
- Supported the validation efforts for MiOncoProfile by providing data analytics and variant calls after each run, including cross-contamination module, new methodology to trim adapter-related artifact specific to the library preparation methods, continuous optimization of the TPO variant calling pipeline
- Supported validation efforts for Oncomine Precision Assay by providing supplemental bioinformatic analysis and refined variant calls.

Operational Work & Production Launches

- Successful transition of infrastructure hosting DGG's solid tumor informatics pipeline from Red Hat Enterprise Linux 7 to Red Hat Enterprise Linux 8.
- Successful transition of MGL data analysis computers to Windows 11, requiring a complete rebuild of the data transfer from various serial software applications and revalidation on the new Windows 11 operating system.
- Successful small enhancements (multiple) to the current TS1E pipeline.
- Successful update of the macro for data export for chromosomal microarray data from the newer version of the software into a form that can be ingested in SOFT.
- Successful full launch of the pre-sequencing application for WGS(R) from batch accessioning, data extraction from SOFT to the pre-sequencing tool, generation of Hamilton sample sheets, generation of NovaSeqX Plus sample sheets, automated transfer of sequencing data to the cloud for the generation of FASTQs, and depositing of the FASTQs into a bucket in the cloud for download by the Michigan Genomics Initiative team.

Michigan Center for Translational Pathology

Arul M. Chinnaiyan, MD, PhD
Director, Michigan Center for Translational Pathology

At the Michigan Center for Translational Pathology (MCTP), we continued our multi-pronged approach to research in cancer biology, shaping how cancers are understood, diagnosed, and treated through the latest applications of precision oncology and therapeutic drug development. A significant milestone in our mission of patient care was achieved last year with Medicare coverage approval for the MCTP-developed MyProstateScore 2.0 (MPS2) test, an 18-gene panel urine-based non-invasive assay for high-grade prostate cancer, designed to reduce unnecessary prostate biopsies. Other notable advances in cancer biology and therapeutics were the functional characterization of CDK12 loss in ovarian and prostate cancer, as well as the two classes of FOXA1 mutations in prostate cancer, using transgenic murine models. Towards the development of precision therapies for currently "undruggable" aggressive cancers, we advanced the characterization of novel synthetic lethal vulnerabilities and targeting of transcriptional drivers, such as orally bioavailable degraders of CDK12/13 and mSWI/SNF ATPases. Additionally, we delineated the mechanistic role of the lipid kinase PIKfyve in pancreatic cancer, and that of histone methyltransferases NSD2/NSD3 in prostate cancer, establishing these as promising precision therapy targets. Among notable technical and analytical breakthroughs were the development of a repository of single cell gene expression data used in multiple studies, deployment of the 10X Visium HD platform for spatial transcriptomics, and computational tools for the analysis of proteomic data. The year was also marked by the discovery of novel biomarkers in renal and other cancers, as well as notable contributions to the Clinical Proteomic Tumor Analysis Consortium (CPTAC) studies. The Center secured renewals of prestigious awards and new funding for groundbreaking investigations, continuing to demonstrate sustained leadership at the forefront of cancer research.

Research

Highlights from major publications in top tier journals led by MCTP Director, Professor Arul Chinnaiyan, and fellow researchers, during the reporting period (July 2024 – June 2025) are summarized below.

CDK12 in Tumor Suppression and Cancer Progression

MCTP studies over the past year have defined the tumor-suppressive role of cyclin-dependent kinase 12 (CDK12), which is lost in 3–7% of metastatic prostate cancers and marked by genomic instability. Using transgenic mouse models of high-grade serous tubo-ovarian carcinoma (Tien et al., *PNAS* 2025), CDK12 loss was shown to accelerate tumor initiation and progression through increased genomic instability and defective DNA repair. Complementary prostate cancer studies revealed that CDK12 deficiency drives transcription-replication conflicts and aggressive tumor behavior (Tien et al., *Cell Rep Med* 2024). The identification of synthetic lethality between CDK12 and its paralog CDK13 highlights a promising therapeutic opportunity.

FOXA1 Mutations in Prostate Carcinogenesis

Building on our 2019 discovery of distinct FOXA1 mutation classes in prostate cancer, our 2025 study (Eyunni et al., *Science* 2025) functionally defined their roles using mouse and organoid models. Class 1 mutations, often with p53 loss, drive AR-positive adenocarcinomas responsive to androgen deprivation, while Class 2 mutations induce a progenitor-like state via KLF5 and AP-1, promoting therapy resistance. These insights highlight AR targeting for Class 1 tumors and stemness pathway inhibition for Class 2 disease, providing preclinical models for therapeutic testing.

Therapeutic Targeting of PIKfyve Lipid Kinase

Research identified PIKfyve, a lipid kinase involved in lysosomal function and autophagy, as a novel cancer therapeutic target. Following the discovery that the PIKfyve inhibitor ESK981 blocks autophagy in tumor cells, subsequent studies revealed its role in tumor metabolism and immunity, supporting clinical trials combining PIKfyve inhibition with immunotherapy. Recent work (Cheng et al., *Nature* 2025) uncovered a synthetic-lethal interaction between PIKfyve and KRAS-MAPK signaling in pancreatic cancer, where dual pathway blockade eliminated tumor burden in preclinical models, highlighting a promising therapeutic strategy.

Therapeutic Targeting of CDK12/13

Targeting of CDK12 and its paralog CDK13 was pursued in CDK12-deficient tumors through development of an irreversible CDK12/13 inhibitor, YJZ5118 (Yang et al., *J Med Chem* 2025), an orally bioavailable CDK12/13 degrader ZLC491 (Zhou et al., *J Med Chem* 2024), and another orally bioavailable CDK12/13 degrader, YJ1206, that showed synthetic lethal synergy with AKT inhibitors (Chang et al., *Cell Rep Med* 2024). Additionally, use of PARP inhibitors and immune checkpoint blockade therapy in CDK12-deficient prostate cancers was tested in preclinical and clinical settings (Chou et al., *Clin Can Res* 2024; Nguyen et al., *Clin Can Res* 2024).

Therapeutic Targeting of mSWI/SNF Chromatin Remodeling Complex

Building on prior work targeting SWI/SNF ATPases in prostate cancer (Xiao et al., *Nature* 2022), MCTP identified a vulnerability in cancers driven by the POU2F-POU2AF complex, including the POU2F3 subtype of small cell lung cancer and multiple myeloma, to PROTAC degraders of mSWI/SNF ATPases (He et al., *Cancer Cell* 2024). The orally bioavailable degrader AU-24118 showed strong anti-tumor activity in preclinical models, extending mSWI/SNF inhibition to transcription factor–driven malignancies.

Therapeutic Targeting of Prostate Enhanceosome Complex

Building on prior work defining the AR/FOXA1 neo-enhanceosome axis, we identified NSD2, a histone H3K36 dimethyltransferase, as a key cofactor maintaining over 65% of the oncogenic AR cistrome in prostate cancer (Parolia et al., *Nat Genet* 2024). NSD2 inactivation disrupted AR enhancer binding and suppressed malignant phenotypes, while dual PROTAC degradation of NSD1/2 inhibited AR-dependent tumor growth. These findings reveal NSD2 as an essential component of the AR/FOXA1 complex and position NSD1/2 as promising therapeutic targets in advanced prostate cancer.

Single-Cell Sequencing, Spatial Sequencing

During FY25, MCTP published multiple studies applying single-cell and spatial transcriptomics. Key work mapped the mouse prostate's cellular response to castration (Cho et al., *PNAS* 2025) and integrated eight scRNA-seq cancer datasets to explore immune checkpoint blockade responses (Gondal et al., *Sci Data* 2025). Additional studies identified biomarkers such as L1CAM in kidney cancer, NSD2 and UBA1 in prostate cancer, and characterized CDK12 and FOXA1-driven cell states. Complementary efforts developed a single-cell reference database and annotation tool (Zhang et al., AACR Annual Meeting 2025) and revealed STING pathway activation in CDK12-deficient prostate cancer via spatial transcriptomics (Bao et al., *JCI* 2025).

Clinical Proteomic Tumor Analysis Consortium (CPTAC) Proteogenomic Data Analysis Center

MCTP, as the University of Michigan Proteogenomic Data Analysis Center, has led the National Institutes of Health (NIH)-CPTAC efforts in multi-omics data processing and discovery. Recent studies identified IGF2BP3 as a lung adenocarcinoma biomarker (Satpathy et al., *Cancer Cell* 2025), developed a proteomic stemness index for therapeutic prediction (Kołodziejczak-Guglas et al., *Cell Genomics* 2025), and linked germline variants to protein abundance and modifications (Rodrigues et al., *Cell* 2025). Methodological advances included FragPipe-Analyst for data visualization and FragPipe/TMT-Integrator for improved

proteomic and PTM quantification.

Patient Care

MyProstateScore 2.0 (MPS2) for High-Grade Prostate Cancer

Following our recent development of the 18-gene MPS2 urine biomarker test to predict the presence of clinically significant prostate cancer, the MPS2 test was approved for coverage from Medicare on September 11, 2024. Marking another technical advance, we reported the development of a simplified MPS2 (sMPS2) test with seven genes, yielding similar accuracy as the 18-gene MPS2, improving accessibility for routine clinical care (Tang et al., *Cancer Biomark* 2025). A further study from our group validated the MPS2 test using first-catch, non-digital rectal exam (DRE) urine (Tosoian et al., *J Urol* 2025), thereby making the test available for at-home collection, as offered now at Lynx Dx.

MCTP Early Detection Research Network (EDRN) Core

MCTP remains a key partner in the National Cancer Institute (NCI) Early Detection Research Network, advancing biomarker translation for early cancer detection. The Michigan-Vanderbilt Biomarker Characterization Center, co-led by Drs. Arul Chinnaiyan and Jeffrey Tosoian, supports biomarker development, testing, and administration. In collaboration with Lynx Dx, it drives prostate cancer biomarker validation, building on MCTP's prior development of the MyProstateScore assay.

Molecular Testing Lab

In partnership with Michigan Medicine's Molecular Testing Lab (MTL), MCTP facilitates PCA3, MPS, and formerly CTC assay testing. Since 2010, over 17,200 PCA3, 1,989 MPS, and 1,780 CTC assays have been processed clinically, along with more than 6,500 research assays. The lab also manages extensive biospecimen collection, including over 3,000 tissue, 7,800 urine, 5,900 serum, and 6,500 plasma samples, as well as 17,000 legacy tissue specimens from the Michigan Legacy Tissue Program (MLTP).

MTL supports the MI-ONCOSEQ program *(discussed more below)* and the Michigan Prostate SPORE Biospecimen Core, contributing to multiple clinical studies and trials. These include the EDRN Prostate MRI Biomarker Study (NCT03784924), radiation therapy trials (UMCC 2021.046), genetic risk detection (HUM00117711), biomarker and tumor atlas studies (HUM00188437, 20CHAL03: PC-REACTR), MPS-NGS assay validation (HUM00197931), and initiatives addressing cancer disparities and molecular profiling in African American men. MTL also supports microRNA biomarker feasibility (KCI 2017-110), and multiple metastatic prostate cancer trials (e.g., ARV-110-mCRPC-101, ARV-766-mCRPC-101).

MI-ONCOSEQ Lab

To leverage rapid advances in high-throughput next-generation sequencing (NGS) for precision cancer medicine, we established the Michigan Oncology Sequencing Program (MI-ONCOSEQ) in 2011. Using an integrative sequencing approach in a CLIA-certified lab (#23D0366712), we comprehensively profile genetic alterations in tumors to identify actionable aberrations, including point mutations, indels, gene fusions, amplifications/deletions, and outlier gene expression, plus relevant germline changes. We continue to innovate clinical sequencing methods, expanding applications to predict immunotherapy response and epigenetic status.

Cohort	Total Patients Enrolled	Patients Enrolled FY25
MO - (MI-ONCOSEQ)	2,014	97
TP - (Tumor Profiling)	1,032	2
PO - (Peds Oncoseq)	1,157	82
VA - (PCF-VA)	339	31
MI - (Circulating RNA)	229	159
Total	4,771	371
Total	**5,397**	**339**

The lab employs multiple NGS technologies—Illumina NovaSeq 6000, MiSeq, NextSeq 500, and Nanopore PromethION 24

(A100)—and is equipped with liquid handling, DNA sizing, cell counting, and bioanalyzer instruments. MI-ONCOSEQ supports various protocols on Illumina and Nanopore platforms, such as transcriptome, targeted panels, whole-exome/genome, ChIP-seq, microRNA, ATAC-seq, CRISPR, cfDNA, RNA liquid biopsy, methylation, single-cell sequencing, spatial transcriptomics, and 10x Genomics. Our analyses cover exon-level monitoring, chimera detection, genomic rearrangements, and epigenetic modifications. To date, we have sequenced samples from over 10,253 adult and pediatric patients. The molecular report cohort includes 4,771 patients from major groups, excluding additional research cohorts like Stand Up to Cancer.

Clinical Trials Supported by MI-ONCOSEQ

Additionally, our sequencing facility supports several specialized programs and clinical studies. We serve as the sequencing center for the Veterans Affairs-Prostate Cancer Foundation Precision Oncology Program for Cancer of the Prostate (VA - PCF POPCAP) program to comprehensively evaluate samples from veterans with metastatic prostate cancer to provide them with access to better and less toxic treatments through targeted therapy. Additionally, MI-ONCOSEQ-supported clinical trials at Michigan Medicine currently recruiting patients include studies led by Dr. Reichert (NCT06616155), Dr. Tsung (NCT06356155), Dr. Alva (VA/PCF), Drs. Franson and Koschmann (NCT05009992, NCT04732065), and Dr. Sahai (NCT05988918).

MI-ONCOSEQ Case Reports, Cohort Studies

We contributed integrative sequencing and analysis of diverse clinical samples in various research settings for collaborators. These studies include: discovery of somatic mutations in MCOLN3-associated with aldosterone producing adenomas (van Rooyen et al., *Hypertension* 2025); identification of PDGFRA alterations in high grade glioma (Mayr et al., *Cancer Cell* 2025), assessment of cases with germline variant AIP p.Arg303Gln (Loughrey et al., *Eur J Endocrinol* 2025); clinical sequencing of advanced biliary track cancers from patients in clinical trials with chemo-immunotherapy (Sahai et al., *Med* 2025); cholangiocarcinoma with IDH1 mutations (Mohan et al., *Oncologist* 2024); undifferentiated carcinomas of pancreas with osteoclast giant cells (Mills et al., *JNCI Cancer Spectr* 2025); a novel pathogenic germline variant in TRAF2 in a patient with medulloblastoma (Vo et al., *Acta Neuropathol Commun* 2024).

MCTP Histopathology Lab

The MCTP Histology Lab features advanced technologies, including the COMET multi-omics multiplexing platform (Lunaphore) and two Roche/Ventana DISCOVERY ULTRA systems for immunohistochemistry (IHC), immunofluorescence (IF), RNA in situ hybridization (RNA-ISH), and fluorescence in situ hybridization (FISH) assays. The lab functions as an independent core with comprehensive histology equipment, slide scanning, and tissue microarray (TMA)-generating systems. The histopathology team supports specimen collection and processing for frozen and formalin-fixed paraffin-embedded (FFPE) samples from primary and metastatic tumors, providing dedicated services for the Michigan Prostate SPORE, MI-ONCOSEQ, and over 25 projects in FY25.

This year, MCTP integrated spatial transcriptomics via the 10x Genomics Visium CytAssist HD platform, enabling spatial gene expression mapping supported by Cell Ranger, Space Ranger, and Loupe Browser analytics. Approximately 48 slides from 50 patient samples have been processed to date. Multiplex IF capabilities allow up to 40-plex IHC and combined 24-plex IHC with 12 RNA-ISH targets, along with DNA-FISH integration. High-resolution Zeiss and EVOS microscopes provide detailed spatial visualization, while software such as QuPath and ImageJ supports quantitative image analysis. Expert staff offer end-to-end project support, fostering innovation in molecular and cellular cancer research at Michigan Medicine.

Salient publications featuring MCTP histopathology group efforts include: analysis of the expression of L1 Cell Adhesion Molecule (L1CAM), a nephronal principal cell marker, in nephrogenic adenoma (Mannan et al., *Mod Pathol* 2024), and TRIM63 overexpression in FISH-negative MiTF family altered renal cell carcinoma (MiTF RCC) (Mannan et al., *Mod Pathol* 2025).

The Michigan Legacy Tissue Program (MLTP)

The Michigan Legacy Tissue Program (MLTP), founded in 1996

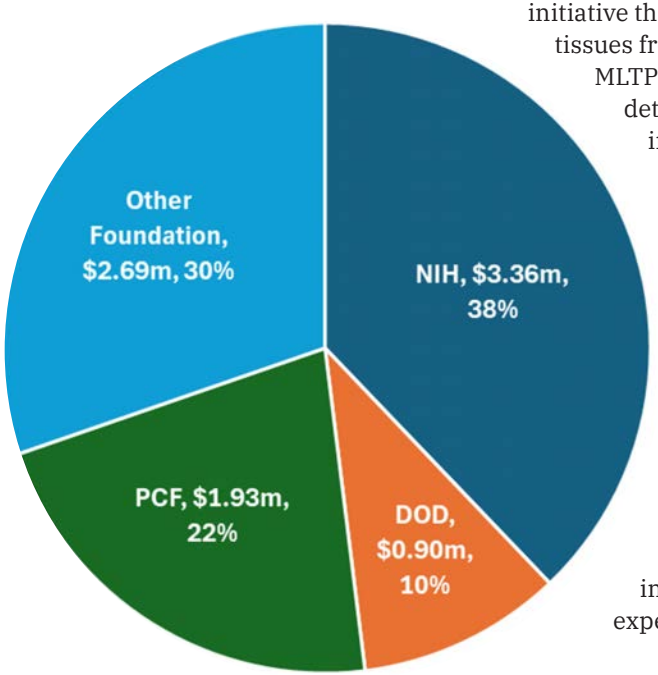


Chart: *Shows the sponsor breakdown of externally funded projects for fiscal year 2025.*

by Drs. Ken Pienta and Arul Chinnaiyan, is a rapid autopsy initiative that collects metastatic prostate and other cancer tissues from sites inaccessible in living patients. Thus far, MLTP has performed over 76 autopsies, producing detailed reports for clinicians and researchers, with images supporting teaching and global research. MCTP uses these samples for organoid, cell line, xenograft, and sequencing studies. A key advance, the osseous protocol by Drs. Chinnaiyan and Mehra, enables DNA/RNA extraction from bone without degradation. Directed by Drs. Zachery Reichert and Rohit Mehra, MLTP has continued to expand. A recent autopsy of metastatic castration-resistant prostate cancer yielded over 1,500 specimens. In FY24–25, two autopsies generated more than 1,200 tissue samples across sites, supporting development of organoids and xenografts from multiple metastases. The MLTP program was recently highlighted in a publication on international rapid autopsy guideline development and experience (Geukens et al., *J Pathol* 2024).

Education, Training, Outreach

MCTP supports education and training across all career stages, offering hands-on experience in genomics, metabolomics, spatial biology, and AI-driven pathology through mentorship and collaboration. These programs lead to fellowships, awards, and career advancement, reflecting the center's commitment to developing future leaders in translational oncology. The center also promotes inclusion, wellness, and community through lab initiatives and outreach, including visiting scientist programs, lectures, and leadership in national consortia, enhancing its impact and visibility in precision oncology.

MCTP's research has gained broad media coverage in outlets such as *Cancer Today*, *Uro Today*, *Medical Xpress*, and *Inside Precision Medicine*. Notable studies include urine-based MPS2 assays for prostate cancer (*JAMA Oncol*, 2025), NSD2's role in the AR/FOXA1 complex (*Nat Genet*, 2024), vulnerabilities in CDK12-deficient cancers (*Cell Rep Med*, 2024), FOXA1 mutations driving prostate tumorigenesis (*Science*, 2025), and targeting PIKfyve-driven lipid metabolism in pancreatic cancer (*Nature*, 2025). These high-impact discoveries have elevated MCTP's visibility and influence in cancer biology and therapeutic innovation.

MCTP investigators are earning national recognition for leadership in cancer research. Dr. Abhijit Parolia presented at the NCI Rising Scholars Seminar on NSD2 and the AR/FOXA1 neo-enhanceosome's role in prostate tumorigenesis, while Dr. Marcin Cieslik was featured in an NIH CPTAC interview for his advances in cancer proteogenomics. These honors underscore MCTP's strength in discovery, mentorship, and translational innovation.

Personnel FY25

Total Faculty: 32 core, 11 affiliate members; Postdoctoral or Clinical Fellows: 13; Graduate Students: 14; Student Temps: 21; UROP Students: 8.

MCTP Core Faculty Highlights:

Arul Chinnaiyan, MD, PhD
HHMI Investigator, Director MCTP

Dr. Chinnaiyan continues to lead transformative research in cancer precision medicine, focusing on oncogenic transcriptional regulation, functional genomics, biomarker development, and targeted therapeutics. His lab remains at the forefront of integrating molecular biology, chemical biology, and computational approaches, including AI/ML, to accelerate discovery and translation.

- Leads the MCTP and MI-ONCOSEQ program, driving institutional precision oncology efforts.
- Published over 40 papers in major journals (*Nature*, *Science*, *Cancer Cell*, *Nature Genetics*, *JAMA Oncology*) on prostate and pancreatic cancer biology, PIKfyve, CDK12/13, SWI/SNF, and FOXA1-driven plasticity.
- Led renewal of the Michigan Prostate SPORE grant and major NIH, PCF, and foundation programs; submitted new R01, Department of Defense (DoD), and industry proposals to expand translational research.
- Chairs the NCI EDRN Executive Committee and co-leads multiple NIH, PCF, and DoD-funded projects in

proteogenomics and biomarker discovery.

- Filed over a dozen patents for novel therapeutics and diagnostics, including CBP/p300, CDK12/13, NSD2, and PIKfyve degraders and liquid biopsy assays.
- Mentors trainees and early-career scientists, fostering professional growth, collaboration, and diversity.
- Contributes to national and international leadership through advisory roles with the American Association for Cancer Research (AACR), MD Anderson Moonshot, Tempus, Aurigene Oncology, and the Royal Swedish Academy of Sciences' Sjöberg Prize Committee.

Rohit Mehra, MD
Director of Michigan Legacy Tissue Program (MLTP), Professor of Pathology

Dr. Rohit Mehra has made significant contributions to genitourinary pathology and oncology during FY25, continuing his leadership role in the MLTP, facilitating research discoveries in prostate, kidney, and bladder cancer.

- Elected Chair of the Genitourinary Pathology Society (GUPS) Education Committee (2025–2027).
- Published multiple papers, including a *Modern Pathology* senior-author study on TRIM63 overexpression in FISH-negative MiTF RCC.
- Developed RNA-ISH and FISH assays for renal and prostate cancer diagnostics at Michigan Medicine.
- Contributed to the development of pathological response criteria for assessing neoadjuvant therapy in RCC.
- Recognized by *Hour Detroit* magazine as one of Detroit's Top Doctors for 2023, 2024, and 2025 for expertise in prostate and kidney cancers.

Marcin Cieslik, PhD
Assistant Professor of Pathology and Bioinformatics

Dr. Cieslik has made significant contributions during FY25, solidifying his role as a leader in bioinformatics, clinical cancer genomics, and cancer proteogenomics. Dr. Cieslik collaborated with MCTP this year in the development of a single-cell transcriptomics database and over multiple CPTAC, among other studies.

- Published several high-profile papers, including co-corresponding author articles in *Cancer Cell*, *Cell Reports Medicine*, and *Cancer Research*.
- Serves as a co-lead for several CPTAC working groups, including Acute Myeloid Leukemia, Prostate Cancer, and Melanoma.
- Serving as Director of Bioinformatics for the Division of Diagnostic Genetics and Genomics.

Abhijit Parolia, PhD
Assistant Professor of Pathology

Dr. Parolia expanded his independent research laboratory at the University of Michigan, recruiting new PhD students and postdoctoral research fellows. He also submitted several manuscripts and grants.

- Published co-corresponding papers in *Nature Genetics* and *Science*, as well as four additional collaborative co-author publications in *Nature*, *Cancer Cell*, and *Molecular Cell* in 2025.
- Recipient of the DoD IDEA Award 2025.
- Served on the MCP and Cancer Biology PIBS Admissions Committees.

Sethu Pitchiaya, PhD
Assistant Professor of Pathology

Dr. Pitchiaya has achieved significant milestones during FY25, including assuming new leadership roles, receiving prestigious awards, and securing notable funding.

- Selected for the Emerging Cancer Scholar Exchange Program of the Cancer Center Consortia.
- Appointed Associate Director of the Graduate Program in Cellular and Molecular Biology (2025–present).
- Invited lectures at the American Society for Andrology (basic science workshop), the American Society for Andrology

annual meeting, University of Colorado, Loyola University Chicago, and Case Western Reserve University.

Matthew Iyer, MD, PhD
Clinical Assistant Professor of Pathology

Dr. Iyer has made important strides as a surgeon-scientist in translational cancer research, focusing on liquid biopsy, spatial transcriptomics, and large-scale cancer transcriptome studies. He has built productive collaborations across Michigan and Duke University and continues to integrate surgical oncology with molecular discovery.

- Published in *Annals of Surgery* and presented invited talks at AACR Pancreas and SSO Annual Meetings.
- Received the NCI Early-Stage Surgeon Scientist Award and the Swim Across America Young Investigator Award.
- Developed a large-scale cancer transcriptome compendium (>100,000 samples) and an RNA liquid biopsy assay advancing toward clinical application.

John Prensner, MD, PhD
Assistant Professor of Pediatrics

Dr. John Prensner is a past trainee of Dr. Arul Chinnaiyan and an emerging leader in cancer research and therapeutics.

- Appointed Barry J. Glick Early Career Professor of Pediatric Oncology, elected Scientific Co-Chair of the Children's Brain Tumor Network, and recognized as an AACR NextGen Star.
- Secured two LindonLight Collective awards (2025–2027) for research on liquid biopsy and the dark proteome in pediatric brain tumors.
- Published a landmark *Nature Communications* paper (2025) defining new standards for non-canonical proteome analysis.

Yuanyuan Qiao, PhD
Research Assistant Professor of Pathology

Dr. Yuanyuan Qiao is an emerging leader in PIKfyve-targeted cancer research that has multiple achievements from this past year in publications and funding.

- Led pioneering studies targeting PIKfyve in neuroendocrine prostate, pancreatic (published in *Nature*), and gastro-enteropancreatic tumors, developing novel degraders and inhibitors.
- Filed three innovation reports resulting in patent applications.
- Secured PI funding from the Department of Defense and J.C. Kennedy Foundation, and co-led grants from the Michigan SPORE, PCF, V Foundation, and DoD.

Dan Robinson, PhD
Research Associate Professor of Pathology

Dr. Robinson continues to be a leader in precision oncology through the MI-ONCOSEQ clinical sequencing laboratory and resulting studies from the program.

- Technical Supervisor of the MI-ONCOSEQ CLIA-certified sequencing program.
- Optimized workflows for Oxford nanopore long-read sequencing for clinical and research use.
- Awarded a 5-year NCI R50 grant.

Mohan Dhanasekaran, PhD
Research Associate Scientist, Department of Pathology

Dr. Mohan Dhanasekaran is a cancer researcher specializing in proteogenomics, multi-omics, and biomarker discovery.

- Served as Co-PI on the NCI-CPTAC grant. Co-led MCTP's single-cell and spatial groups.
- Established a mouse prostate single-cell atlas integrated with human datasets (*PNAS*).
- Identified key biomarkers and molecular signatures in rare and common renal cancers.

Rahul Mannan, MD
Director of MCTP Histopathology Core

Dr. Mannan continues to contribute strong leadership in translational pathology, biomarker discovery, and spatial biology at MCTP.

- Published first-author papers in *Modern Pathology, American Journal of Surgical Pathology*, and *Medical Oncology.*
- Advanced clinical implementation of L1CAM and TRIM63 biomarkers through MLabs.
- Led the MCTP Histology Core, overseeing IHC, multiplex IF, and 10X Visium HD spatial transcriptomics.

Lanbo Xiao, PhD
Research Assistant Professor of Pathology

Dr. Lanbo Xiao has made significant contributions by leading impactful translational studies, securing major funding as PI and Co-I, receiving awards, and publishing key studies in top journals.

- Led research on SWI/SNF chromatin remodeling and developed therapeutics including mSWI/SNF ATPase and MYC degraders.
- Secured major funding as PI and Co-I from DoD, Myeloma Solutions Fund, and Trailsend Foundation.
- Received the 2025 University of Michigan Research Faculty Recognition Award.

Yuping Zhang, PhD
Research Investigator, Department of Pathology

Dr. Yuping Zhang is a key member of MCTP and an expert in bioinformatics, multi-omics data integration, and biomarker discovery.

- Led development and clinical validation of the simplified MyProstate Score 2.0 (MPS2) using first-catch, non-DRE urine.
- Directed a single-cell and multi-omic study of mouse prostate revealing structural organization and mechanisms of castration resistance.
- Provided bioinformatics support for single-cell RNA-seq and ATAC-seq analyses in prostate cancer studies published in *Science* and *PNAS*.

MCTP Affiliated Faculty Highlights:

Annette Kim, MD, PhD
Division Head of Diagnostic Genetics and Genomics

Dr. Annette Kim is a leading expert in hematopathology and molecular diagnostics.

- Serves as Chair of the ASH Subcommittee on Precision Medicine and Program Chair-Elect for the Association for Molecular Pathology.
- Received the 2025 Laboratory Improvement Service Award from the College of American Pathologists.
- Collaborates with MCTP to advance genomic diagnostics and biomarker discovery through next-generation sequencing and molecular pathology integration.

Paul Harms, MD, PhD
Clinical Professor of Pathology and Dermatology

Dr. Paul Harms is a clinician-scientist, leading research in skin cancer and providing clinical care.

- Presented key insights at the 2nd European Merkel Cell Carcinoma Conference in Stockholm.
- Serves as NCI CPTAC Disease Expert for melanoma since 2023.
- Leads the Molecular Dermatopathology service at the University of Michigan.

Sriram Venneti, MD, PhD
Associate Professor of Pathology

Dr. Venneti is a pediatric neuro-oncologist, pioneering research on epigenetic and metabolic vulnerabilities in childhood gliomas.

- Identified DLAT as a metabolic and protein target in Group-3

medulloblastomas (*Cancer Cell*).

- Leads NIH-funded projects developing therapies for diffuse intrinsic pontine gliomas (DIPGs) and ependymomas.
- Featured in media coverage highlighting metabolic drivers of DIPG treatment resistance.

Weiping Zou, MD
Director of Michigan Center of Excellence for Cancer Immunology and Immunotherapy

Dr. Zou is a distinguished leader in tumor immunology.

- Published key studies with MCTP on the tumor-immune microenvironment, immune resistance mechanisms, and strategies to enhance immunotherapy response.
- Led collaborative research studies integrating immunology into work on PIKfyve, CDK12/13 inhibition, and the UBA1-STUB1 immune suppressive axis.
- Directs the Michigan Center of Excellence for Cancer Immunology and Immunotherapy.

Shaomeng Wang, PhD
Warner-Lambert/Parke Davis Professor in Medicine

Dr. Shaomeng Wang is a leader in drug discovery and small-molecule therapeutics to advance cancer research.

- Developed first-in-class CDK12/13 proteolysis targeting chimeras (PROTACs) and oral degraders like YJ1206 with strong anti-tumor activity and synergy with AKT inhibition.
- Co-founded Oncopia Therapeutics Partnership, securing multimillion-dollar agreements to translate BET and PROTAC technologies to the clinic.
- Built a PROTAC platform targeting STAT3, BET, mSWI/SNF, and CDK12/13, supported by NIH and institutional funding, generating lead compounds for precision oncology.

Alexey Nesvizhskii, PhD
Godfrey Dorr Stobbe Professor of Bioinformatics

Dr. Alexey Nesvizhskii is a leader in computational proteomics and multi-omics data integration.

- Served as a key investigator for the NCI's CPTAC and co-leads the University of Michigan Proteogenomics Data Analysis Center (UM-PGDAC), integrating proteogenomics into translational oncology.
- Secured major funding, including a U01 award for immunopeptidogenomics tools and CPTAC-linked research.
- Directs the Proteomics Resource Facility, driving advancements in mass spectrometry and biomarker discovery.

Rajen Mody, MD
Director of Pediatric Oncology

Dr. Rajen Mody is a leading pediatric oncologist and researcher.

- Led research enhancing the safety and efficacy of anti-GD2 immunotherapy for high-risk neuroblastoma, advancing clinical applications to improve survival.
- Co-leads the Precision Medicine Tumor Board, integrating genomics to guide treatment for rare and refractory cancers.
- Expanded national collaborations in pediatric oncology through multi-institutional studies improving outcomes for young patients.

Brent Hollenbeck, MD, MS
Professor of Urology

Dr. Hollenbeck is an eminent urologic oncologist and a leading expert in health services delivery and financial incentives.

- Appointed Director of the Center for Accelerating Research Excellence in Prostate Cancer (CARE-PC) to integrate health services with translational science and mentor physician-scientists.

Todd Morgan, MD
Professor of Urology, Section Head of Urologic Oncology

Dr. Morgan is a prominent leader in urologic oncology and precision medicine, contributing to the advancement of biomarker-driven research and clinical applications for prostate cancer.

- Co-leads the Michigan Prostate SPORE project validating the MPS2 urine biomarker for early prostate cancer detection and risk assessment.
- Advances management of low-risk prostate cancer through the Canary Prostate Active Surveillance Study (PASS).

Simpa Salami, MD, MPH
Associate Professor of Urology

Dr. Salami is a distinguished urologic oncologist and surgeon-scientist specializing in molecular profiling and imaging for prostate and kidney cancer. His FY25 contributions reflect his leadership in translational research and impactful collaborations with MCTP.

- Led NGS studies in kidney cancer, defining a 15-gene signature for improved molecular risk stratification and prognosis.
- Co-leads the Michigan Prostate SPORE project integrating the MPS2 urine biomarker assay for early prostate cancer detection.
- Awarded a $1.14 million NCI MERIT grant to study low-risk prostate cancer biology and enhance active surveillance strategies.

Joshi Alumkal, MD
Wicha Family Professor of Oncology

Dr. Joshi Alumkal is a physician-scientist and expert in molecular mechanisms driving lethal prostate cancer.

- Secured a new NIH R01 grant to target drivers of prostate cancer lineage plasticity.
- Plays a pivotal role in the Michigan Prostate SPORE, focusing on biomarker development for clinical trials and serving as the Director of the Developmental Research Program.

Costas Lyssiotis, PhD
Maisel Research Professor of Oncology

Dr. Lyssiotis is a leading researcher in cancer metabolism and tumor immunology.

- Co-led a *Nature* study with Drs. Chinnaiyan and Qiao on dual KRAS/PIKfyve inhibition in pancreatic cancer, revealing synthetic lethality within the KRAS–MAPK–PIKfyve axis.
- Collaborates with MCTP on ongoing phase 2 clinical trials of PIKfyve inhibitors.

Ulka Vaishampayan, MD
Professor of Medicine

Dr. Ulka Vaishampayan is a leading expert in translational therapeutics and genitourinary oncology.

- Co-leads a Michigan Prostate SPORE project on PIKfyve in neuroendocrine prostate cancer and will serve as Co-Director of the SPORE Developmental Research Program.
- Received the 2024 Castle Connolly Exceptional Women in Medicine Award for contributions to oncology and cancer research.
- Leads clinical trials, including a phase 2 lenvatinib–pembrolizumab study in neuroendocrine prostate cancer and the ESK981 trial in advanced kidney cancer.

Ajjai S. Alva, MD
Clinical Professor of Internal Medicine

Dr. Ajjai Alva is a leader in genitourinary oncology and immunotherapy research, focusing on advancing clinical trials and translational research.

- Leads clinical trials on immunotherapy and targeted therapies, focusing on CDK12 mutations and biomarker-

based treatments in advanced prostate and urothelial cancers.

- Served as Clinical Co-Leader for Michigan Prostate SPORE Projects 1 and 3, driving translational biomarker development.

Vaibhav Sahai, MBBS, MS
Section Head of Gastrointestinal Oncology

Dr. Vaibhav Sahai is a leading clinician-scientist specializing in pancreatic and biliary cancers.

- Oversees the Pancreatic and Liver Cancer Biobanks, advancing biomarker discovery and drug development.
- Expanded MCTP collaborations by launching a blood collection protocol for pancreatic and hepatobiliary pancreatic cancer patients and matched controls using RNA-stabilizing methods.

Zachery Reichert, MD, PhD
Clinical Associate Professor

Dr. Reichert is a distinguished physician-scientist specializing in prostate cancer and genitourinary malignancies.

- Co-leads Michigan Prostate SPORE Project 3, overseeing a Phase I trial of PP2A molecular glues for metastatic prostate cancer with integrated studies on treatment resistance.
- Co-directs the Michigan Legacy Tissue Program, enabling rapid autopsy-based biospecimen collection for translational and xenograft studies in lethal genitourinary tumors.

Newly Recruited Faculty, Promotions, and Retention:

Arvind Rao, PhD
Professor

MCTP recruited Dr. Arvind Rao, Professor of Computational Medicine & Bioinformatics and Radiation Oncology, as affiliated faculty to advance collaborative research in computational pathology, spatial biology, and AI/ML integration of imaging and genomics. He is partnering with MCTP to build pipelines combining histopathology and spatial transcriptomics for prostate and pancreatic cancers. MCTP will support this collaboration through shared infrastructure, joint meetings, and AI/ML platforms driving digital pathology, spatial-omics, and biomarker discovery.

Navin Mahadevan, MD, PhD
Assistant Professor

MCTP mentors Dr. Navin R. Mahadevan, Assistant Professor of Pathology at the University of Michigan. His research on small cell lung cancer integrates multi-omic profiling to uncover immunologic vulnerabilities and microenvironmental drivers. Supported by an NCI K08 award, he applies multiplex proteomics and spatial transcriptomics to discover biomarkers and therapeutic targets. MCTP supports his translational and collaborative research across pathology, immunology, and spatial biology.

New Highlights in Grants/Awards:

Michigan Prostate SPORE

2P50CA186786-11A1 (PI: Chinnaiyan/Palapattu) 09/2025-08/2030

NIH/NCI $7,410,000 direct costs / $4,107,600 indirect costs

Title: *Michigan Prostate SPORE 2025-2030*

Chinnaiyan - Xiao Myeloma Solutions Fund Award

MSF-008 (PI: Chinnaiyan/Xiao) 07/22/2024 - 07/21/2026

Myeloma Solutions Fund / $1,035,010 direct costs / $114,990 indirect costs

Title: *Targeting SWI/SNF in t(4;14) multiple myeloma*

Prensner V Scholar Award

V2024-013 (PI: Prensner) 09/15/2024 – 09/15/2027

The V Foundation for Cancer Research / $600,000 direct costs

Title: *Upstream open reading frames as unique cancer targets in childhood medulloblastoma*

Parolia V Scholar Award

V2024-020 (PI: Parolia) 10/01/2024 – 10/01/2027

The V Foundation for Cancer Research / $600,000 direct costs

Title: *Characterizing NSD2 as a transcriptional co-activator and therapeutic target in prostate cancer*

Robinson R50 Award

R50CA293826 (PI: Robinson) 09/03/2024 – 08/31/2029

NIH/NCI $102,438 direct costs / $57,365 indirect costs

Title: *Integrative Multi-omics and Clinical Laboratory Translation for Advanced, Rare, and Pediatric Cancers*

Cieslik-Chinnaiyan DoD Rare Cancers Award

RA230317 (PIs: Cieslik, Chinnaiyan) 11/2024 – 10/2027

Department of Defense / $800,000 direct costs / $448,000 indirect costs

Title: *Rare-Cancer Commons: a hub for accelerating individualized rare cancer therapy through integration of single-cell and clinical genomics data*

Prensner-Iyer-Koschmann Lindonlight Collective

GR-24-012 (PI: Prensner/Iyer/Koschmann) 12/01/2024-11/30/2026

Lindonlight Collective / $500,000 direct costs

Title: *RNA liquid biopsy for the non-invasive monitoring of low-grade gliomas*

Cheng NCI F30

F30CA28809301A1 (PI: Cheng, Mentors: Chinnaiyan/Lyssiotis) 03/01/2025-02/29/2028

NIH/NCI / $127,635 direct costs

Title: *Targeting the lipid kinase PIKfyve in pancreatic ductal adenocarcinoma*

Parolia PCRP DoD IDEA Award

HT94252510692 (PI: Parolia) 09/01/2025 – 08/31/2028

Department of Defense / $1,182,247 direct costs / $662,059 indirect costs

Title: *Co-targeting NSD1/2 paralogs in AR-driven metastatic castration-resistant prostate cancer*

Nesvizhskii-Dhanasekaran Administrative Supplement

3U24CA271037-04S1 (PI: Nesvizhskii/Dhanasekaran) 06/01/2025-05/31/2026

NIH/NCI: $276,672 direct costs / $145,752 indirect costs

Title: *Michigan Center for Translational Cancer Proteogenomics*

Qiao Neuroendocrine Tumor Research Foundation Investigator Award

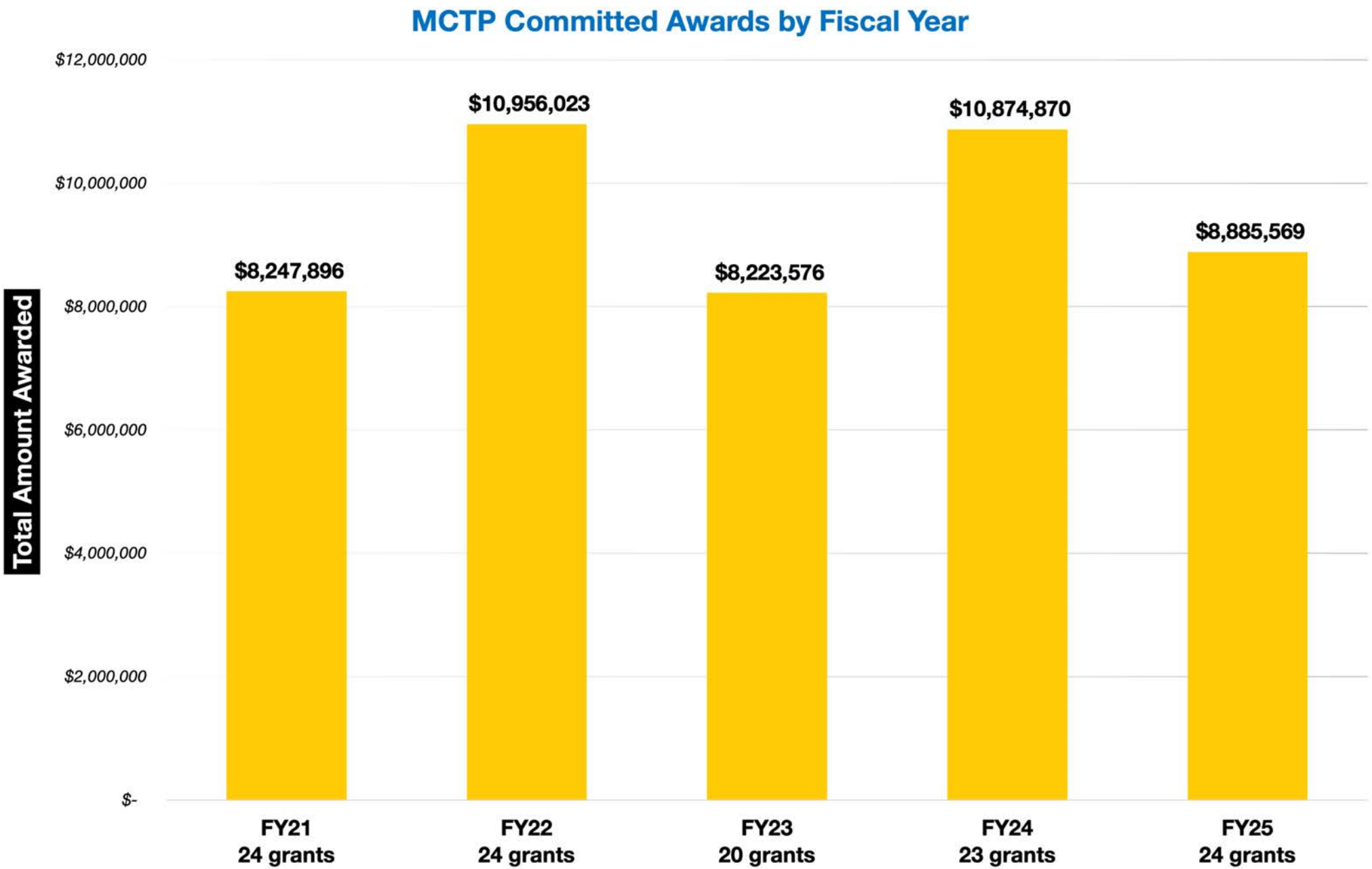
PAF# 25-PAF09173 (PI: Qiao) 02/01/2026 – 01/31/2028

Neuroendocrine Tumor Research Foundation / $245,455 direct costs / $24,545 indirect costs

Title: *Targeting Lipid Metabolism in Gastroenteropancreatic Neuroendocrine Tumors*

The graph below *(Committed Awards by Fiscal Year, pg. 50)*, displays the Center's total grant funding by year. A temporary gap in funding of the Michigan Prostate SPORE Program and completion of several DoD projects contributed to the decrease in funding observed from last year. However, the SPORE has been renewed for the current fiscal year.

The graph *(MCTP Grant Submissions by Fiscal Year, pg. 51)* illustrates the number of grant proposals submitted and awarded each year since 2015. In the past year, the funding success rate was approximately 30%.


MCTP Committed Awards by Fiscal Year
Total Amount Awarded
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$-
$8,247,896
$10,956,023
$8,223,576
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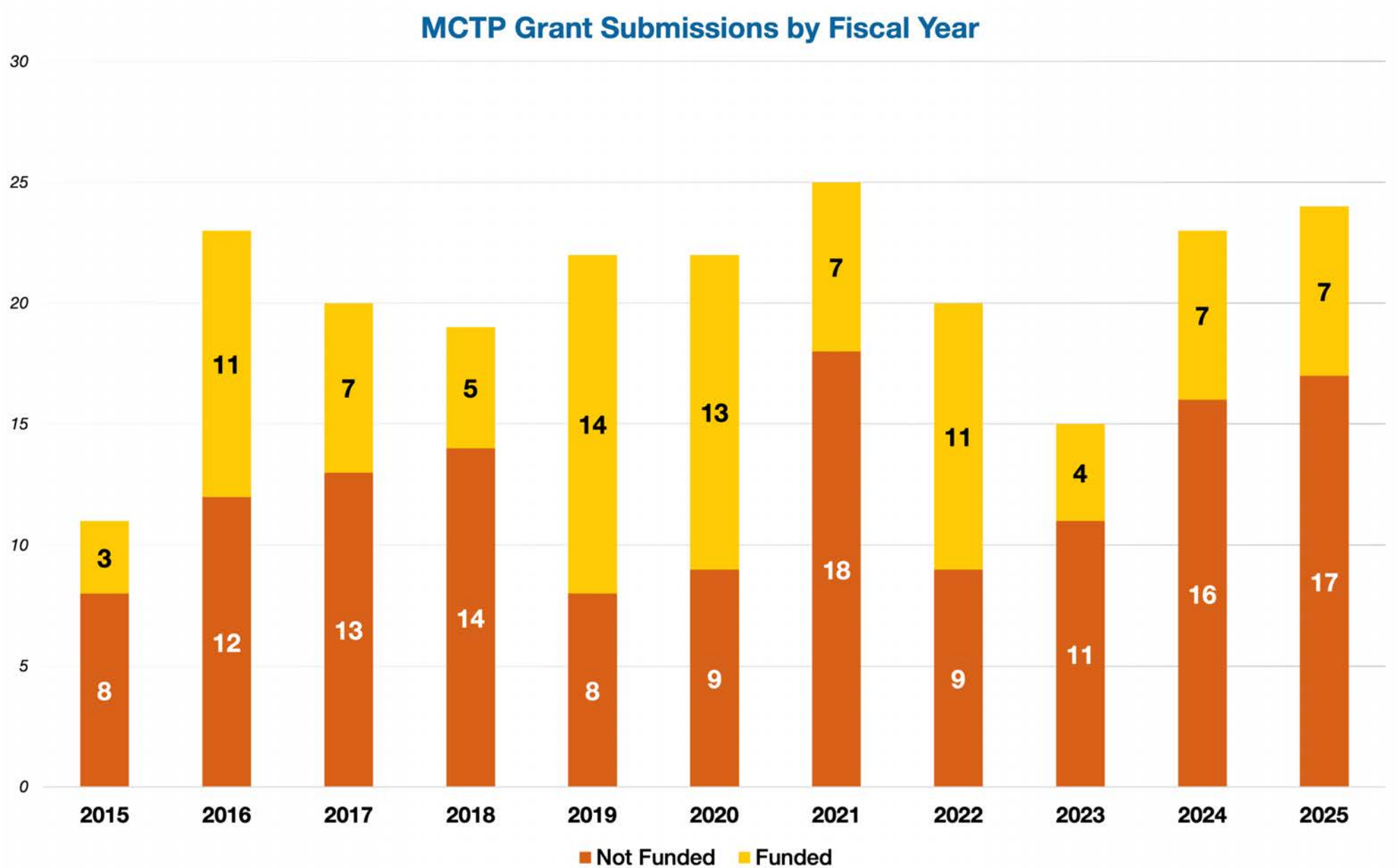
FY25
24 grants


MCTP Grant Submissions by Fiscal Year
30
25
20
15
10
5
0
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
3
8
11
12
7
13
5
14
14
8
13
9
7
18
11
9
4
11
7
16
7
17
Not Funded
Funded

Michigan Medicine Laboratories (MLabs)

Julia Dahl, MD
Director, MLabs Reference Laboratory

Karla Bialk
Business Development Manager

Michigan Medicine Laboratories (MLabs) is the conduit for patients worldwide to access Michigan Medicine's pathology and laboratory medicine expertise. Patients receiving care from physicians and facilities outside of Michigan Medicine can benefit from the combined strengths of our faculty, trainees, staff, and state-of-the-art laboratories. In FY25, 140,552 patients received their laboratory care via MLabs – a nearly 10% increase from FY24.

MLabs is a Michigan Medicine asset. MLabs represents the Michigan Medicine brand and expands our care network in Michigan, the region, throughout the country, and around the world. This vital division is responsible for the pre-analytical and post-analytical processes, connectivity solutions, marketing, business development, and strategy required for full-service reference laboratory and pathology consultation services. As Michigan Medicine advances our statewide network of care to further strengthen programs with UMH-West and UMH-Sparrow, MLabs continues to participate in departmental efforts toward laboratory system integration. MLabs strives to be a trusted partner to a diverse client base, building strong relationships with pathologists, hospital laboratories, skilled nursing facilities, physician offices, and specialty physicians across Michigan and the nation.

Most importantly, our highly effective collaborations put patients' needs at the forefront of all we do, strongly aligning us with Michigan Medicine's mission "To advance health to serve Michigan and the world."

Departmental Alignment and Culture

Focused direction for MLabs was established by Department of Pathology Chair, Dr. Charles Parkos; Brooklyn Khoury, Chief Department Administrator (CDA), and MLabs Director, Dr. Julia Dahl. Monthly MLabs Interdivisional Meetings brought department medical leadership stakeholders from all clinically facing divisions, the Chair, and CDA together to shape MLabs' current and future state. Market opportunities and risks were discussed in the context of the department's strategic initiatives, alongside laboratory capabilities and capacity. Goals established in FY24 were continued during FY25:

1. Maintain services to all current clients, expand services through improved connectivity solutions, particularly to physician offices, and expand regional reference laboratory services.
2. Support Michigan Medicine's efforts for system integration via service on the Department of Pathology System Integration Steering Committee and continued support of UMH-Sparrow and UMH-West laboratory services.
3. Establish a sales and marketing plan to contribute to the success of the Division of Genetics and Genomics.

As FY25 ended, new physician office and local reference laboratory clients were secured and referring patient specimens. MLabs anticipates significant growth in FY26!

Improving Service to Our Customers

Operations FY25

FY25 built upon the many FY24 successes. MLabs experienced very limited personnel turnover and fostered stability of the expanded MLabs team.

The MLabs Client Services Team met several key performance goals for the section on over 95% of days worked. Nearly 40,000 client and patient calls were managed with high degrees of client satisfaction. In addition to excellence in customer service, this hybrid team managed high-acuity returns of materials and assets to ensure continuity of patient care, as well as several manual work processes for the conveyance of patient results and information. In collaboration with MLabs' IT Team, several

improvements to the Salesforce contact resource management application are planned for FY26, including adopting Salesforce Einstein to provide AI support and alleviate client services workload.

MLabs Consultation and Transfer Accessioning (CTA) established a full roster of personnel for the first time in three (3) years. Though there was a small amount of turnover, this dedicated team maintained a high level of same-day package handling on over 90% of workdays. The CTA Supervisor and Operations Manager made significant progress in memorializing procedures for the work unit. Additional materials tracking methods were deployed to ensure the safety of all materials received and returned.

MLabs Trainer Educators worked from newly written procedures (and on the fly) to create and deploy added job aids and training materials for new personnel in CTA. Training materials for Client Services were refreshed with the assistance of the Client Services Supervisor and assistant supervisors.

Additional significant achievements in MLabs this year include:

- Incremental progress on the Michigan Medicine Medical Record Number (MM MRN) project. This initiative ensures that all MLabs patients are registered with an MM MRN. Led by the MLabs Administrative Manager and guided by the MLabs Project Manager, this project assures patient safety and improves clinical information available to laboratorians and faculty. An enormous initiative reaching across pathology informatics, HITS, compliance, and revenue cycle is slated for completion in FY26.
- Launch and near completion of the Standardized Consultation Kit and training brochure; a project to improve materials submission for consultation cases.
- The Additional Materials project, led by MLabs Process Improvement specialist, was nearly completed, with just one outstanding IT-related item. This successful collaboration across Anatomic Pathology, Clinical Pathology, and Pathology Informatics reduces non-value-added work and improves turnaround time for patient consultations.
- Continued engagement to sustain FISH!® Philosophy practices in MLabs and in the department.

MLabs Connectivity and Informatics Teams

The Connectivity Team completed six new electronic orders and results interfaces, enhancing quality, efficiency, and patient safety. The Connectivity Team also provided administrative oversight and development for hc1, and launched the esoteric and Anatomic Pathology order beta-test project with Atlas/ClinisysTM. Electronic orders for consultation cases will support the Department of Pathology's digital pathology initiative, improve the quality of client submissions, reduce data entry in CTA, and enhance materials stewardship.

Daily support for customers and the MLabs IT environment was continued. Enhancements were made to hc1 in collaboration with PI and multiple SMEs.

MLabs Business Development Marketing, Strategy, and Performance

Local, Regional, and National Visibility for our Services and Faculty

FY25 marked the second year of MLabs' territory management program. While recruiting for a National Sales Manager, the account manager team was led by the Business Development Manager. This small, but energetic and capable team completed more than 250 in-person visits locally, regionally, and nationally, building rapport with key stakeholders and solidifying our base business.

The Account Managers and the MLabs Director also attended as exhibitors at conferences relevant to reference laboratory medicine and in support of our faculty.

During FY25, MLabs exhibited at the Association of Molecular Pathology (AMP), College of American Pathologists (CAP), Colorado Society of Pathology (CSP), Florida Society of Pathologists Summer (FSP), American Society of Clinical Oncology (ASCO), American Society of Clinical Pathology Knowledge Lab (ASCP), Florida Society of Pathologists Winter (FSP), Georgia Association of Pathologists (GAP), North Carolina Society of Pathologists (NCSP), Pathology Informatics Summit

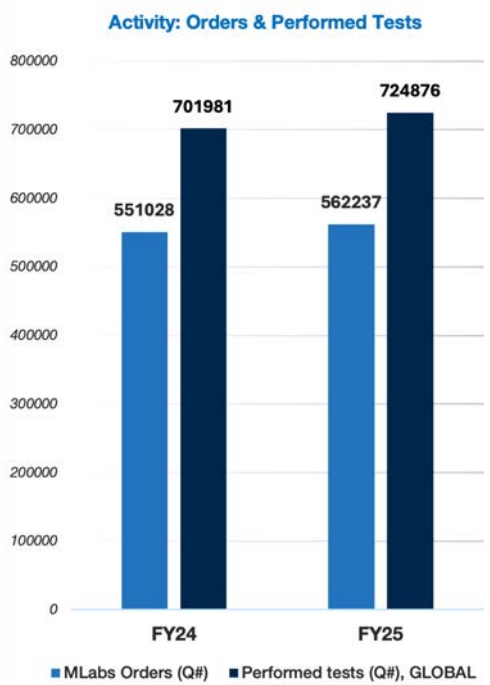


Chart: Orders and Performed Test activity.
See page 54.

(PI), Texas Society of Pathologists (TSP) and United States and Canadian Academy of Pathologists (USCAP). The Big Block M booth remains a mainstay and is frequently attended by our own faculty and many clients.

Business Development Strategy and Landscape

The business development team focused on maintaining current clients, with metered growth in consideration of resource constraints in the laboratories and faculty recruitment. MLabs' historical market segments were evaluated in the context of a changing market landscape.

Physician office referrals faced significant competition from publicly traded national laboratories seeking to capture them locally. Reference Laboratory Services was expected to grow as current clients acquired additional facilities. The consultation practice also noted increasing competition with a nearby academic medical center (AMC) siphoning a significant volume of consultation cases that had previously been referred to MLabs. The driving factor for clients appears to be financial, as this AMC is an approved vendor in group purchasing organizations and is in network with third-party payors across the US. Skilled nursing facilities remained stable.

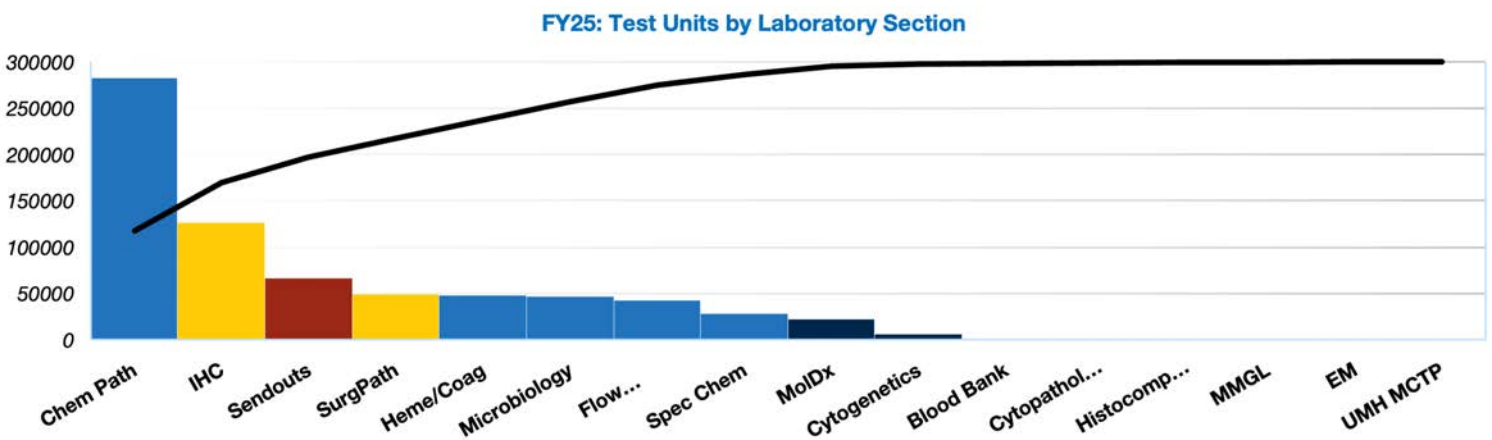
At the conclusion of FY25, a revised market segment strategy was developed, which will launch in FY26 alongside the historical segments. The market segment revisions will foster specific marketing campaigns to drive focused business growth.

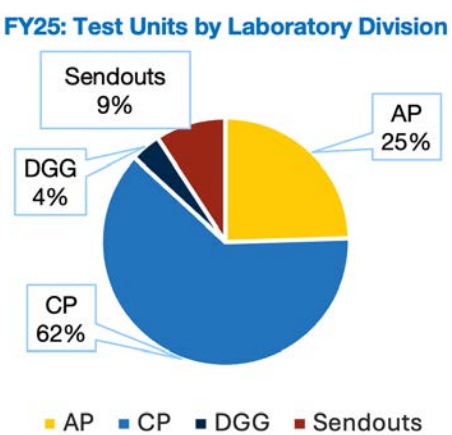
Activity

FY25 total activity showed a 2% increase in test orders (562,237) and 3.3% year-over-year growth in total billable tests (724,876). The rate of growth was down from FY24's 7% growth in billable tests over FY23. *(See pg.53)*

Hospital reference laboratory billed tests (260,842) were the primary contributor to growth and grew by 15% YOY, maintaining its position as the largest market segment. Physician office billed tests (235,223) declined by 4.9%. This is likely due to physician office consolidation directing referrals to alternate laboratories, physician retirements, and increasing competition from national laboratories. Hospital and independent pathology referrals that include consultations, related ancillary stains, and surgical pathology declined by 1.2% (134,862 tests) from FY24. Skilled nursing facilities continued to rebound, increasing by 10.7% (30,508 tests). Independent laboratories (14,083 tests) and Other referrers (49,358 tests) showed minor declines.

MLabs-related referrals influence the clinically facing divisions: Anatomic Pathology (AP), Clinical Pathology (CP), and the Division of Genetics and Genomics (DGG); as well as referred testing (sendouts). CP sections account for 62% of billable test





units, AP 25%, Sendouts 9% and DGG 4%. *(See below)*

Year over year, CP laboratory sections that increased in billable test units included: Chemical Pathology (4.4%), Flow Cytometry (17.9%), and Histocompatibility (13.4%).

AP sections with increasing billable test units included: IHC (5.5%), while all other sections declined. Cytopathology declined by 15.5% related to the adoption of HPV testing in lieu of cytologic examinations for Pap smears. Anatomic and hematopathology consultation cases declined 4.3% in accessions (21,032, down from 21,985) and 13.3% in billable consultation cases (21,910, down from 25,273).

Consultations support the robust subspecialty fellowships offered by the Department of Pathology and support the broad menu of ancillary stains and molecular tests offered in the Department. MLabs will launch the Standardized Consultation Kit initiative in FY26. This initiative will also provide marketing opportunities to prevent further declines in the consultation practice, which could impact education and training programs.

DGG Sections saw increases in Cytogenetics (1.8%) and Molecular Diagnostics (1.1%); while MMGL and MCTP decreased substantially (64.7% and 87.5%, respectively).

Total Gross Charges by Market Segment

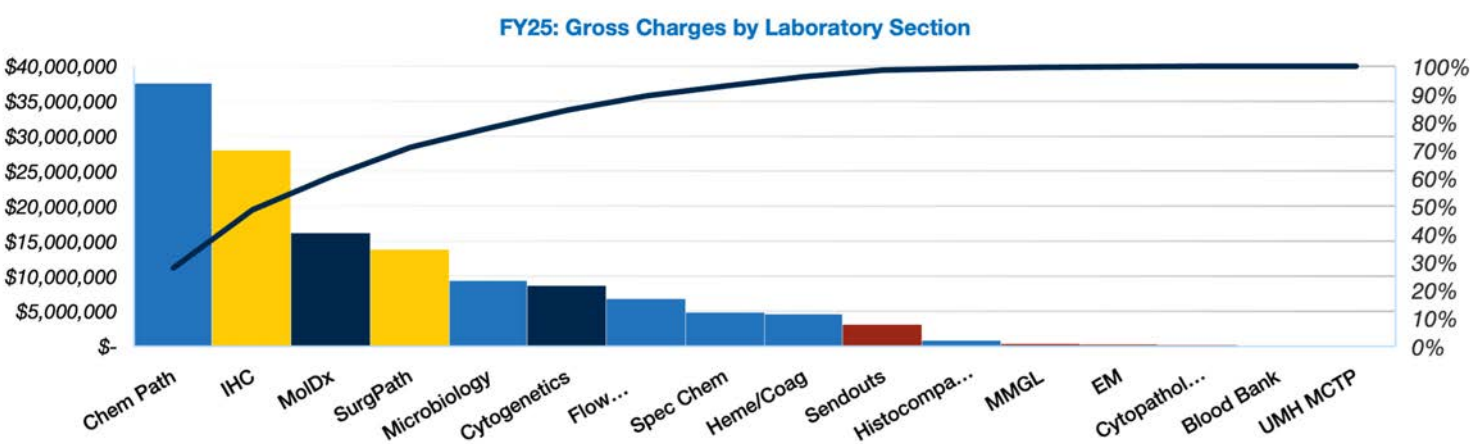
MLabs referred testing generated nearly $135 million in gross charges for billed tests, a 3.5% YOY increase from FY24. Reference laboratory charges increased by 12.9%, consultations and related charges by 3% (despite the volume decline), and skilled nursing facilities charges increased by 8%. Gross charges declined in physician office (3.7%), independent labs and CROs (20.7%), and Other (3.2%). *(See below)*

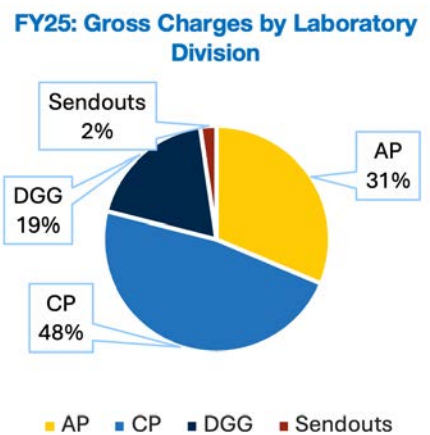
Revenue from MLabs referrals is distributed as follows: CP 48%, AP 31%, DGG 19%, and Sendouts 2% of gross charges.

Forward Looking to FY26

MLabs leadership and other personnel meet three times each year to assess the current state and to plan focused work during the next quarter and fiscal year. Strategic priorities identified for FY26 are:

1. Expand revenue and market presence.
2. Foster synergy and collaborative culture.
3. Streamline processes to drive innovation.





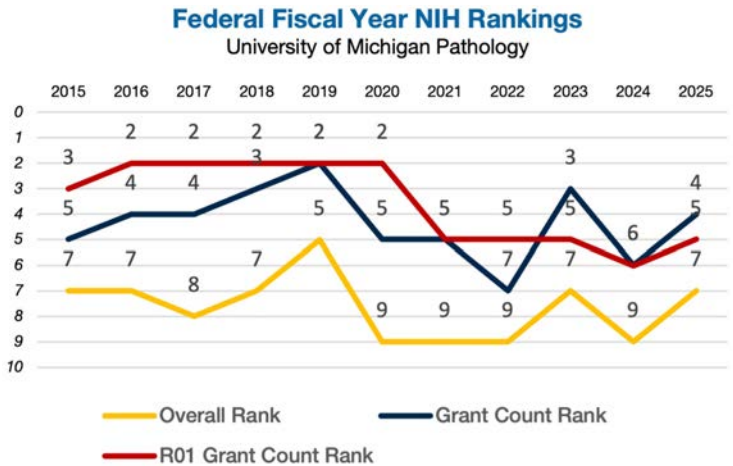
Research Mission

Asma Nusrat, MD
Director, Experimental Pathology

Experimental Pathology (EP) faculty have enjoyed another highly productive and impactful year. Our investigators occupy ~58,700 sq. ft. of research space distributed across multiple buildings on the medical campus. The Division research portfolio is diverse, encompassing cancer biology, inflammation and immune responses, genetics, and aging. Our faculty have led discoveries that continue to advance basic and translational science, effectively bridging fundamental biological insights with the clinical practice of medicine. These studies have yielded significant contributions to understanding disease mechanisms and the development of therapeutic agents. The continued success of experimental pathology is reflected in outstanding extramural funding, high-impact publications, issued patents, and faculty honors and awards.

EP faculty have successfully procured $28,973,805 in research grant funding during the past academic year. Although this amount represents a slight decline from the previous year, overall funding remains strong, despite increasingly competitive federal paylines and challenges. A substantial proportion of our support continues to be awarded from federal agencies, including the National Institutes of Health (NIH) and Department of Defense (DoD), supplemented by awards from foundations and industry partners. These achievements include 46 NIH grants (R01-R37 mechanisms and subcontracts, T32 training grants), 4 DoD research awards (including subcontracts), and 23 foundation and industry-sponsored grants. *(See Appendix, pg. 106)* Importantly, EP faculty also continue to demonstrate a strong commitment to mentorship, as reflected by the numerous research fellowships and career development awards.

Nationally, our division ranks fifth in the number of NIH R01 grants awarded to Experimental Pathology faculty and seventh in total NIH research funding, which is consistent with FY24 performance. These accomplishments contribute to the Division's



consistently high indirect cost returns within the University of Michigan Medical School. Reflecting the strength and efficiency of our research enterprise, several EP faculty maintain an average research space funding density exceeding $149 per square foot. Moreover, close collaboration between anatomic and clinical pathology faculty on multiple grant-funded projects highlights the Division's collegial and integrative research environment, fostering cross-disciplinary advances that strengthen the Department as a whole.

The innovative basic and translational research achievements of EP faculty are further exemplified by a strong record of intellectual property generation, including 37 patent applications, 42 issued patents, 19 new invention disclosures, 19 new license or option agreements, and one U-M startup company. *(See Appendix, pgs. 105, 108-109)* Faculty productivity is also reflected in scientific discoveries and high-impact publications. During the past year, Pathology faculty published 627 manuscripts in leading journals such as *Nature Communications*,

Nature Chemical Biology, *Journal of Clinical Investigation*, *Cell Host & Microbe*, and *Proceedings of the National Academy of Sciences*, which represents a 15% increase in publications compared with the previous year. Notably, 29% of these papers appeared in journals with an impact factor greater than 10, and an additional 22% were published in journals with impact factors between 6 and 10. *(See p. 56)* These accomplishments underscore the exceptional productivity, resilience, and competitiveness of our faculty within an increasingly challenging national funding landscape.

A few selected publication highlights from this year include:

Simon Hogan, PhD: Idelman G, Rizza C, Marella S, Sharma A, Chakraborty S, Tay HL, Tomar S, Ganesan V, Schuler CF 4th, Baker JR, Hogan SP. Inducible pluripotent stem cells to study human mast cell trajectories. *Mucosal Immunology.* 2024 Jul 20:S1933-0219(24)00069-2. PMID: 39038754.

This study developed an *in vitro* model of human mast cell differentiation from induced pluripotent stem cells (iPSC) to study human mast cell differentiation trajectories. This system provides a scalable, reproducible method for generating human mast cells *in vitro*, addressing the longstanding challenge of mast cell scarcity in research. The identification of distinct mast cell subtypes and their transcriptional profiles offers new insights into mast cell heterogeneity and differentiation pathways, with direct applications for studying allergic diseases, drug screening, and therapeutic development.

Russell Ryan, MD: Iyer AR*, Gurumurthy A*, Chu SC A, Kodgule R, Aguilar AR, Saari T, Ramzan A, Rosa J, Gupta J, Emmanuel A, Hall CN, Runge JS, Owczarczyk AB, Cho JW, Weiss MB, Anyoha R, Sikkink K, Gemus S, Fulco CP, Perry AM, Schmitt AD, Engreitz JM, Brown NA, Cieslik MP, Ryan RJ H. Selective Enhancer Dependencies in MYC-Intact and MYC-Rearranged Germinal Center B-cell Diffuse Large B-cell Lymphoma. *Blood Cancer Discovery*. 2025 May 5;6(3): 233-253. PMID 40067173.

A subgroup of diffuse large B-cell lymphomas (DLBCL) with a germinal center B (GCB) phenotype and strong expression of the MYC oncogene is associated with poor clinical outcomes. For this work, the authors used an innovative high-throughput CRISPR-interference strategy to identify diverse genomic elements that activate MYC in a panel of DLBCL cell lines. These studies precisely identified essential "hijacked" enhancers in MYC rearrangement partner loci, and revealed a novel distal regulatory element, "GME-1", that is uniquely required to activate MYC in GCB-DLBCL cell lines without MYC rearrangement and is somatically amplified in a small subset of DLBCL patient biopsies. Further work showed that GME-1 interacts topologically with the MYC promoter in DLBCL biopsies and identified transcription factors required for GME-1 activation. Analysis of single-cell RNA-Seq and ATAC-Seq data in normal human tonsil cells showed that GME-1 accessibility correlates almost exclusively with a rare MYC-active B cell state, which is known to be essential for sustaining the germinal center reaction. These findings suggest a potentially important role of this novel element in normal B cell biology.

Andrew Lieberman, MD, PhD: Lee C, Yu Z, Kuo CJ, Tejwani L, Grijalva RM, Bae E, Zhao HT, Lim J, Lieberman AP. Peripherally administered androgen receptor-targeted antisense oligonucleotide rescues spinal pathology in a murine SBMA model. *Journal of Clinical Investigation*, 2025 Aug 28: PMID 40875460.

Degeneration of the neuromuscular system is a characteristic feature of spinal and bulbar muscular atrophy (SBMA), a CAG/polyglutamine (polyQ) expansion degenerative disorder of the neuromuscular system caused by mutation in the androgen receptor (AR). Using a gene-targeted mouse model of SBMA, the authors demonstrated age-dependent degeneration of the neuromuscular system that initially manifests with muscle weakness and atrophy and progresses to include denervation of neuromuscular junctions and lower motor neuron soma atrophy. Using this model, AR-targeted antisense oligonucleotides were administered subcutaneously to symptomatic AR113Q mice to reduce expression of polyQ AR in peripheral tissues but not in the spinal cord. This intervention rescued muscle atrophy, improved neuromuscular junction innervation, lowered motor neuron soma size, and improved survival in aged AR113Q mice. Single-nucleus RNA sequencing revealed age-dependent transcriptional

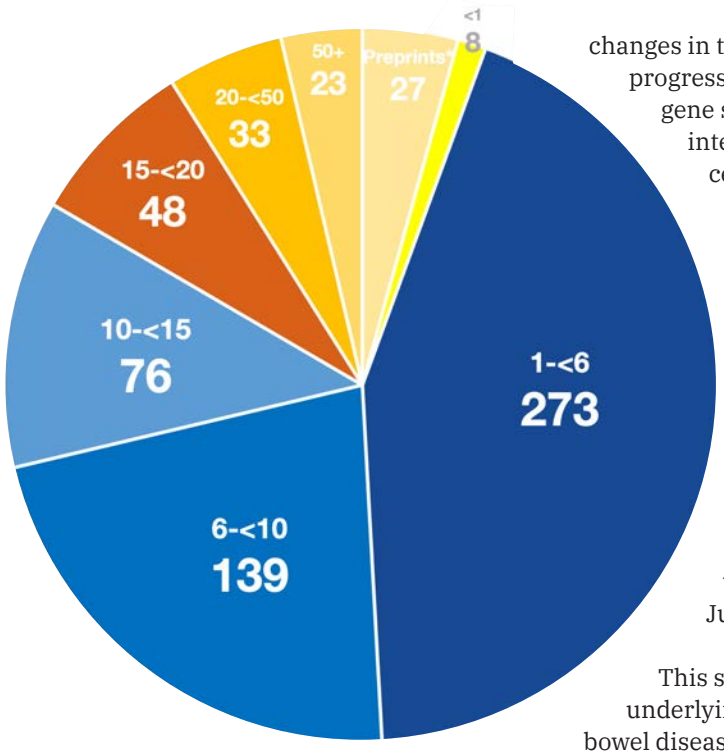


Chart: Manuscripts published in FY25 by journal impact factor.

changes in the AR113Q spinal cord during disease progression, which were mitigated by peripheral AR gene silencing. These findings highlight the intricate interplay between peripheral tissues and the central nervous system in SBMA, underscoring the therapeutic effectiveness of peripheral gene knockdown in symptomatic disease.

Jiaqi Shi, MD, PhD: Huang W, Zhang Y, Das NK, Solanki S, Jain C, El-Derany MO, Koo I, Bell HN, Aabed N, Singhal R, Castillo C, Buscher K, Ying Y, Dimitroff J, Sharma A, Shi J, Hogan SP, Dame MK, Higgins PDR, Colacino JA, Oh TG, Spence JR, Patterson AD, Greenberg AS, Greenson JK, Nusrat A, Shah YM: Fibroblast lipid metabolism through ACSL4 regulates epithelial sensitivity to ferroptosis in IBD. *Nature Metabolomics*. 2025 Jul;7(7):1358-1374. PM40571769.

This study elucidated the metabolic mechanisms underlying epithelial cell death in inflammatory bowel disease (IBD). The authors demonstrated that lipid peroxidation contributes to IBD pathogenesis by promoting ferroptosis- an iron-dependent form of programmed cell death. Acyl-CoA synthetase long-chain family 4 (ACSL4) was overexpressed in fibroblasts derived from IBD tissues, leading to a reprogramming of lipid metabolism that sensitizes intestinal epithelial cells to ferroptosis. Pharmacological inhibition of ACSL4 attenuated colitis in mouse models. These findings highlight ACSL4 as a potential therapeutic target for the treatment of IBD.

Jolanta Grembecka, PhD and Tomasz Cierpicki, PhD: Miao, H., Chen, D., Ropa, J., Purohit, T., Kim, E., Sulis, M-L., Ferrando, A., Cierpicki T*, Grembecka J*. (2024). (*Corresponding author), Combination of menin and kinase inhibitors as an effective treatment for leukemia with NUP98 translocations, *Leukemia*, Aug;38(8):1674-1687. PMID: 38890447.

This study reveals the synergistic effects of combining a menin inhibitor with a CDK6 kinase inhibitor in leukemia models with NUP98 translocations, both *in vitro* and *in vivo*, including Patient-Derived Xenograft models, and uncovers the molecular mechanisms underlying the enhanced anti-leukemic activity of this combination. The study provides a strong rationale for clinical translation of this therapeutic combination as a novel treatment for acute leukemias with NUP98 translocations.

Matthew Iyer, MD, PhD: Iyer M, Fletcher AA, Ogechukwu Okoye, J, Shi C, Chen F, Kanu EN, Eckhoff AM, Bao M, Pasca di Magliano M, Frankel TL, Chinnaiyan AM, Nussbaum DP, Allen PJ. Spatial Transcriptomics of Intraductal Papillary Mucinous Neoplasms Reveals Divergent Indolent and Malignant States, *Clinical Cancer Research*, 2025 May 1;31(9):1796-1808. PMID 39969959.

The existing guidelines for the management of intraductal papillary mucinous neoplasms (IPMN) of the pancreas use clinical and radiographic criteria for risk stratification. Unfortunately, these criteria fail to identify high-risk disease in nearly 15% of patients with IPMN, who later develop pancreatic ductal adenocarcinoma, and overestimate cancer risk in approximately 50% of patients who undergo surgery for benign disease (low-grade dysplasia) on final pathology. Surgical resection can be curative before pancreatic ductal adenocarcinoma develops, but any pathologic evidence of carcinoma carries a high risk of recurrence and poor overall survival. Thus, incorporating molecular diagnostics for IPMN risk classification could improve detection of high-risk patients for surgery while sparing patients with low-risk cysts from invasive procedures. Using digital spatial profiling of IPMN tissues, the authors identified low-risk (indolent) and high-risk (malignant) expression programs that correlate with the activity of exocrine and basal-like PDAC signatures, respectively, and distinguished pathologically low-grade specimens from malignant specimens. These findings contextualize IPMN pathogenesis and have the potential to improve risk stratification.

EP faculty have continued to make valuable contributions to education, mentorship, and professional service. Faculty actively taught and mentored medical and graduate students, while also leading and participating in institutional, national, and

international committees and seminars. Their participation in grant review panels, scientific conferences, editorial boards, and professional societies underscores their commitment to advancing scholarship and academic leadership at both the institutional and national/international levels.

Our department chair, Dr. Charles Parkos, completed his dedicated service as a board member for the Federation of American Societies for Experimental Biology (FASEB) member societies at the end of FY25. As part of his role, he has continued to advocate for the importance of scientific funding to congressional members in Washington, DC. Dr. Gabriel Nuñez is a member of the Biomedical Scholar Program committee and has played an essential role in recruiting highly talented and promising young researchers to the University of Michigan Medical School. Dr. Thomas Wilson, faculty director of the Advanced Genomics Core, plays a vital role in securing and facilitating cutting-edge genomics and single-cell sequencing technology for medical school researchers. In the Rogel Cancer Center, Dr. Kathleen Cho co-leads the Cancer Genetics Program, and Dr. Jolanta Grembecka jointly oversees Development Therapeutics.

In addition to numerous leadership roles held by Experimental Pathology (EP) faculty, a few appointments and awards this year include:

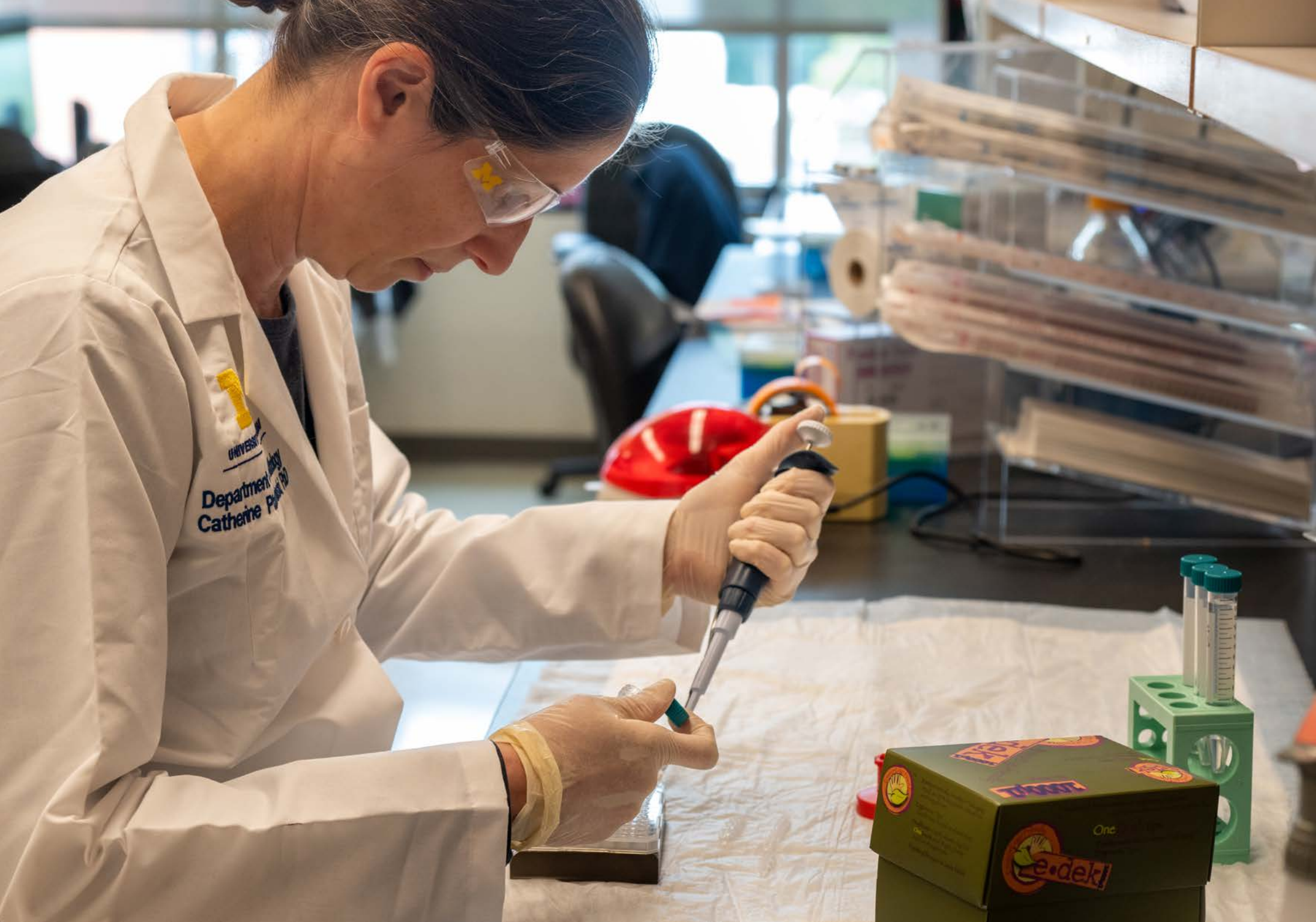
- **Dr. Jolanta Grembecka:** Service as co-leader of the Developmental Therapeutics Program at the Rogel Cancer Center.
- **Dr. Analisa DiFeo:** Recipient of the 2025 MICHR Distinguished Clinical and Translational Research Mentor Award.
- **Dr. Simon Hogan:** Appointed to the American Gastroenterological Association (AGA) Institute Cellular & Molecular Gastroenterology Council and is a member of the Crohn's & Colitis Foundation National Scientific Advisory Committee.
- **Dr. Navin Mahadevan:** Serving as a member of the Pathology in Cancer Research Working Group of the American Association for Cancer Research (AACR).
- **Dr. Jeffrey Rual:** Serving as Chair of the Michigan Medicine Laboratory Safety Executive Committee (LSEC).

Pathology faculty, Drs. Nicholas Lukacs, Simon Hogan, Chang Kim, and Catherine Ptaschinski are members of the Mary H. Weiser Food Allergy Center (MHWFAC) with Dr. Lukacs serving as the scientific director for this Center. The MHWFAC had an outstanding year with the Center extending food allergy investigations into novel areas of translational discovery and patient-oriented research. Evidence of the Center's productivity is illustrated by the high-impact studies that the faculty and their labs have published in top-tier journals, including the *Journal of Clinical Investigation*, *Journal of Allergy and Clinical Immunology*, *Science Advances*, *Mucosal Immunology*, *Allergy*, etc. A cornerstone of MHWFAC success has been the steady and diverse funding supporting these research initiatives. While generous donors provide vital resources for cutting-edge projects at MHWFAC, researchers have also secured numerous grants from the National Institutes of Health (NIH) over the years, along with funding from industry collaborators. Each of the Pathology faculty members has independent R01s. The MHWFAC presently has a cumulative extramural funding of >$13 million. This past year, Drs. James Baker (lead PI), Chase Schuler, and Johann Gudjonsson established the MHWFAC CoFAR Center, a collaborative effort linked to other food allergy centers nationwide. With this latter grant, MHWFAC is now part of a network that coordinates and conducts clinical trials and observational studies in food allergy research. MHWFAC also held its 5th Annual Michigan Food Allergy Research Accelerator (M-FARA) Research Symposium on April 7th and 8th, 2025, entitled "Mechanisms of Immunotolerance for Treating Food Allergy." The invited speakers included scientists from leading academic centers as well as pharmaceutical and biotech companies working on cures for food allergy. With over 150 registered participants from across the US, the 2-day symposium successfully integrated innovative ideas across the food allergy translational research spectrum. We can't be more excited about the future of food allergy research at MHWFAC.

MHWFAC has a growing group of outstanding, leading experts

carving out the future in preventing and treating food allergies. They are committed to building on this momentum by exploring innovative therapeutic approaches, strengthening collaborations with industry partners, and furthering our participation in nationwide clinical trials and research networks. These projects not only expand our understanding but also bring us closer to creating targeted interventions that can improve patient outcomes and, ultimately, save lives.

Dr. Steven Kunkel continues to serve as the Chief Scientific Officer for Michigan Medicine, and he has continued to play an important role in the development and implementation of robust strategic research plans that have facilitated many research programs across Michigan Medicine.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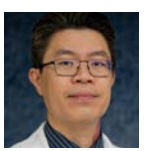
Education Mission

Kamran Mirza, MBBS, PhD
Director, Division of Education Programs



Shih-Hon 'Sean' Li, MD, PhD
Director, Residency Training Program

Sara Abbott, MD
Associate Program Director, Residency Training Program

Davi Manthei, MD, PhD
Associate Program Director, Residency Training Program

Michigan Pathology delivered measurable excellence for learners and patients in FY25. Across the full continuum of education, our faculty, staff, and trainees paired rigorous standards with genuine heart to advance a shared vision.

Outcomes led the way. The residency program sustained top national standing, including #1 in the Midwest and a five-year 97 percent first-attempt ABPath pass rate, while graduates matched to elite fellowships both at Michigan and beyond. Resident Good Catch Awards and Discourse & Digest translated vigilance into system fixes and a stronger culture. In UME, integrated teaching linked cell injury, inflammation, and neoplasia to clinical decisions, and the Pathology Passport gave students flexible, competency-oriented pathways. The Molecular and Cellular Pathology Graduate Program accelerated discovery with high-impact publications and exceptional grant success. Allied Health Education expanded the workforce pipeline and elevated preceptors whose teaching serves patients today.

We built capacity for what is next. Full digital adoption is reshaping how we teach and assess, with whole-slide imaging, analytics, VR, and 3D printing improving feedback and skills acquisition, and AI supporting triage, reflection, and coaching. These tools extend, rather than replace, great teachers.

We told our story with intention as communications unified voice, modernized formats, and amplified scholarship, recruitment, and recognition.

We widened our circle through the Global Pathology program in collaboration with the Center for Global Health Equity, aligning exchanges, digital workflows, and shared curricula to advance health equity and broaden impact.

None of this happens without leaders who teach, teachers who lead, and staff who deliver. Thank you to our program directors, faculty coaches, preceptors, administrators, and communications partners, and to our trainees whose curiosity and kindness define our culture. The charge ahead is clear: keep the bar high, keep the learner at the center, and keep innovating with purpose so that every Michigan Pathology graduate improves lives.

Graduate Medical Education

In FY25, The University of Michigan Pathology Residency Program continued its tradition of excellence, remaining the #1 program in the Midwest, the #1 program among public academic institutions, and #3 overall program nationally, according to the 2024-25 Doximity Residency Navigator. The Pathology Residency Program was among six University of Michigan programs to rank in the top 5 among their specialties. Instrumental to the Program's success, Laura Jacobus, C-TAGME, the Program's administrator, was chosen by the Graduate Medical Education Office at Michigan Medicine to receive the 2025 Michigan Medicine GME Program Administrator Excellence Award for her service, spirit, and initiative. In another testament to the Program's strength, our residents maintained a 5-year 97% first-attempt primary certification pass rate per the American Board of Pathology.

On June 8, 2025, the Pathology Residency Program proudly graduated eight senior residents. All are continuing their clinical training in pathology sub-specialty fellowship programs as follows.

- Ashley Brent, MD (AP/CP) / Bone & Soft Tissue Pathology, Michigan Medicine
- Ryan Cecchi, MD (AP/CP) / Neuropathology, Cleveland Clinic
- Elaina Daniels, MD (AP/CP) / Gastrointestinal Pathology, Michigan Medicine
- Amber Holtz, MD (AP/CP) / Surgical Pathology, Michigan Medicine

- Michael Olp, MD, PhD (AP/CP) / Molecular Genetic Pathology, Michigan Medicine
- Mark Rudolf, MD, PhD (AP-PSTP) / Neuropathology, Michigan Medicine
- Katharina Wiedemeyer, MD (AP-only) / Dermatopathology, Michigan Medicine
- Elizabeth Cline, MD, PhD (AP/CP) / Forensic Pathology, Michigan Medicine

Two notable Pathology Residency Program initiatives include the Resident Good Catch Awards and the Resident Discourse & Digest meetings. Resident Good Catch Awards were started in September 2023 and piloted through June 2025. Residents and clinical faculty are encouraged to share experiences wherein house officers proactively intervene or sound alarms to prevent errors that impact patient safety. During the pilot period, 35 nominations were received, including 13 from residents to one another and 22 from faculty members. Residency vigilance led to changes in diagnoses, workarounds for equipment failures, and prevention of specimen misidentification. Five events led to further investigations, including root cause analyses, and eventually to systematic changes, such as workflow redesigns. These Good Catches are celebrated at monthly Resident & Program Directors meetings and have increased feelings of personal responsibility and engagement in our high-reliability organization, as evident in our annual ACGME Resident Survey. Resident Discourse & Digest meetings began in Spring 2024 to provide residents with a safe space to openly discuss challenges they face during training. These monthly, resident-only meetings allow trainees to gather in person and virtually to raise concerns, share perspectives and solutions, and for senior residents to model professionalism to their peers. Chief Residents escalate issues to the Program Director as needed. In part because of this initiative, residents have reported an overall improvement in morale. The Michigan Medicine GME Office identified the Pathology Resident Discourse & Digest as a Best Practice.

Our residents continued to represent our department well with their professional service work and strong academic productivity in FY25. Our residents were active members of 34 professional societies and served on many departmental, institutional, regional, and national committees. Our residents published 21 peer-reviewed articles in the past academic year, with 15 as first authors. Of note, in total across their entire pathology residency training, the 2025 graduating class authored an astonishing 76 publications, national/regional presentations, and abstracts.

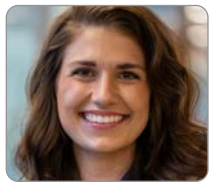
For the FY25 recruiting season, the Residency Program received 578 ERAS applications for nine HO-1 positions and interviewed 92 candidates. The Program filled in The Match and welcomed the following excellent new trainees:

- James (Logan) Ballard, MD / Medical College of Georgia at Augusta University
- Adam Berry, DO / Rocky Vista University College of Osteopathic Medicine
- Nicolas Gomez, MD, PhD / University of Michigan Medical School
- Dowon Kim, MD / Chicago Medical School at Rosalind Franklin University of Medicine & Science
- Gabriel Kramer, MD / Indiana University School of Medicine
- Caleb Vogt, MD / University of Minnesota Medical School
- Alexander Silver, MD, PhD / Vanderbilt University School of Medicine
- Sara Tweedy, MD, PhD / University of Michigan Medical School
- Chelsea Yu, MD / Wayne State University School of Medicine

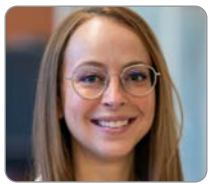
Undergraduate Medical Education

The Department of Pathology has a long history of playing an integral role in pre-clinical medical student education. In Foundations of Medicine 2, one of the first sequences encountered by medical students in the Scientific Trunk, we introduce the foundational principles of pathology—Cell Injury & Death, Inflammation, and Neoplasia. These topics lay the groundwork for students to build on during subsequent organ-based blocks.

Lectures and laboratories are led by many dedicated faculty members, including Madelyn Lew, MD, Kamran Mirza, MD, PhD,



Ashley Brent, MD
Chief / HO IV



Isabella Holmes, DO
Assistant Chief / HO III

Sarah Farran, MD, MPH
Assistant Chief / HO III

Ryan Cecchi, MD
HO IV

Elaina Daniels, MD
HO IV

Amber Holtz, MD
HO IV

Michael Olp, MD
HO IV

Mark Rudolf, MD, PhD
HO IV

Katharina Wiedemeyer, MD
HO IV

Elizabeth Cline, MD
HO IV

Eric Chang, MD
HO III

Jang Cho, MD
HO III

Timothy Dinh, MD, PhD
HO III

Lauren Miller, MD, MJ
HO III

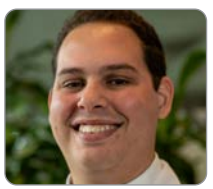
Daniel Alt, MD, PhD
HO II

Chris Henderson, MD, PhD
HO II

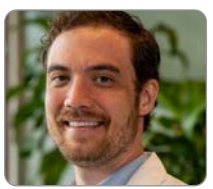
Meredith Herman, DO
HO II

Jenelle Lee, MD
HO II

Nicole Patel, MD
HO II



Orlando Quincoces, MD
HO II



Jacob Sorenson, MD
HO II

Andrew Valesano, MD, PhD
HO II

Nikki Chiang, MD
HO I

Chia-Ming Lee, DO
HO I

Jared Neeley, MD
HO I

Zemplen Pataki, MD, PhD
HO I

Benjamin Telford, DO
HO I

Camille Van Neste, MD, PhD
HO I

James Ballard, MD
Incoming HO I

Adam Berry, DO
Incoming HO I

Nicolas Gomez, MD, PhD
Incoming HO I

Dowon Kim, MD
Incoming HO I

Gabriel Kramer MD
Incoming HO I

Alexander Silver, MD, PhD
Incoming HO I

Sara Tweedy, MD, PhD
Incoming HO I

Caleb Vogt, MD, PhD
Incoming HO I

Chelsea Yu, MD
Incoming HO I

2024-2025

Pathology Residents

Madelyn Lew, MD
Director, Medical School Pathology Education Curriculum

Scott Owens, MD, Evan Farkash, MD, PhD, Allecia Wilson, MD, Heather Chen-Yost, MD, Will Perry, MD, Paul Killen, MD, PhD, Aaron Udager, MD, PhD, Karen Choi,MD, Shula Schecter, MD, Nora Joseph, MD, Thomas Giordano, MD, PhD, Angela Wu, MD, Richard Cantley, MD, Sara Bailey, MD, David Chapel, MD, Caroline (Libby) Simon, MD, May Chan, MD, Steven Pipe, MD, Laura Cooling, MD, Kyle Conway, MD, JD, Sean Ferris, MD, PhD, Stephanie Skala, MD, and Scott Bresler, MD, PhD. Under the direction of Dr. Madelyn Lew, Director of Medical Student Education, our faculty continues to integrate pathology content with clinical and basic science elements while incorporating new, interactive methods for delivering educational material.

In the Surgery & Applied Sciences Clerkship, students participate in a week-long pathology rotation that exposes them to various aspects of the field. The curriculum includes grossing and microscopic sessions specifically designed for medical students. Through these sessions, alongside case-based small group discussions focused on clinical pathology and supplemental electronic resources, students reinforce the foundational principles learned in the Scientific Trunk, deepen their understanding of clinicopathologic correlations, and improve lab stewardship.

In their third and fourth years, students enroll in the Branches curriculum, where pathology faculty serve as mentors and career advisors within the Diagnostics & Therapeutics Branch. Faculty also act as science consultants for students preparing their Patient-Based Scientific Inquiry (PBSI) projects. Branch students can participate in a variety of integrated electives that span multiple disciplines, enhancing their understanding of disease processes, presentations, and management within the pathology department. The General Pathology Elective, under the direction of Dr. Madelyn Lew, offers students an in-depth look at the daily practice of academic pathologists across multiple subspecialties. In 2022, Dr. Lew and her team redesigned the elective into the highly successful Pathology Passport. This approach allows students to tailor their experience to their personal interests by completing required and optional rotation-specific activities. These activities are assigned point values based on difficulty and effort, accumulating toward Pass, High Pass, or Honor grades.

Activities include observing and participating in the macroscopic evaluation of specimens, independently previewing active clinical cases, and leading group discussions on case-related ancillary studies and clinicopathologic correlations. While many students in the elective may ultimately pursue other fields, a distinct subset uses this experience to evaluate pathology as a potential career choice. Our faculty provides individualized mentoring to guide these students through their decision-making process.

Additionally, subspecialty electives in Dermatopathology and Neuropathology offer further learning opportunities for those interested in specific fields of pathology.

Simon P. Hogan, PhD
Co-Director, Molecular and Cellular Pathology Graduate Program

Jean-Francois Rual, PhD
Co-Director, Molecular and Cellular Pathology Graduate Program

Molecular and Cellular Pathology Graduate Program

The mission of the Molecular and Cellular Pathology (MCP) Graduate Program is to train the next generation of "Bench to Bedside" scientists with a focus on the study of the molecular and cellular mechanisms underlying the pathogenesis of human diseases. Inaugurated in 1992, the MCP program is hosted by the Department of Pathology and leverages its position within a department that bridges basic and clinical sciences to perform transformative research, ranging from basic to translational research. Our goal is to recruit a broadly diverse group of talented MCP students and to provide them with the best educational environment to train and prepare for the next stage of their careers in academia, the biotech/pharma industry, teaching, scientific publishing, clinical research, or governmental/ regulatory agencies.

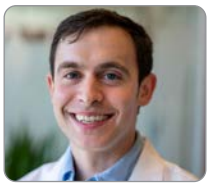
Recruitment, Candidacy, and Graduations

Students join the MCP program either through the Program in Biomedical Sciences (PIBS) for PhD students or the Medical Scientist Training Program (MSTP) for MD/PhD students. With a dramatic increase in both the number (63 domestic, a 91% increase; 67 internationals, a 19% increase) and the quality of the applications, as well as an increase in the take rate (2022-2024 take rate is 47%, which is increased from ~40% for the previous years), the 2024-2025 recruitment season was a success. Six incoming students were accepted into the PIBS program by the

Mayyadah Al-Nuaimi, MBChB
Clinical Instructor
Pathology Fellow

Haley Amoth, MD
Associate Pathologist

Nicole Becker, MD
Assistant Professor



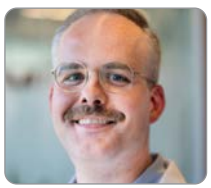
Daniel Cole, MD
Private Practice

Juanita Ferreira, MD
Hematopathology
Fellowship

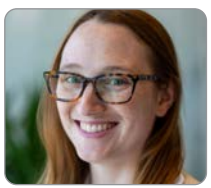
Alexander Gross, MD
Pathologist

Geoffrey Halling, MD
Pathologist

Thomas Herb, MD
Forensic Pathologist

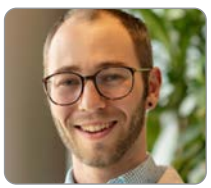


Robert Humble, MD
Clinical Assistant Professor



Kelsey Hummel, DO
Clinical Assistant Professor

Jesse Kinner, DO
Head & Neck Fellowship



Ryan Landvater, MD
Pathology Informatics
Fellow

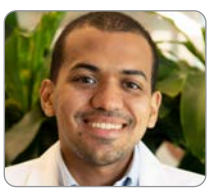
Vincent Laufer, MD, PhD
Clinical Instructor

Nathan McCammon, MD
Pathologist

Michael Mertz, DO
Gynecologic Fellowship

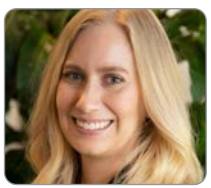
Taylor Novice, MD
Private Practice

Corey Post, MD
Molecular Genetic Fellow



Fysal Shennib, MD

Julianne Szczepanski, MD
Clinical Assistant Professor



Nicole Tomm, MD
Assistant Professor

Xiaoming (Mindy) Wang, MD
Clinical Assistant Professor

Graduating Fellows	Institution
Haley Amoth, MD	Associate Pathologist, Pathology Specialists of SE Michigan
Daniel Cole, MD	Private Practice, Hamzavi Dermatology, Dermatology Specialists of Dexter, MI
Juanita Ferreira, MD	Hematopathology Fellow, University of Pittsburgh Medical Center
Thomas Herb, MD	Forensic Pathologist, Medical Examiner's Office, City of Philadelphia
Jesse Kinner, DO	Head and Neck Path Fellowship, Michigan Medicine
Taylor Novice, MD	Private Practice, Dermatopathologist/Dermatologist, Novice Group Dermatology, West Bloomfield, MI
Corey Post, MD	Molecular Genetic Pathology Fellow, Michigan Medicine
Julianne Szczepanski, MD	Clinical Assistant Professor, Michigan Medicine

Graduating Clinical Instructors	Institution
Mayyadah Al-Nuaimi, MBChB	Clinical Instructor, Michigan Medicine
Nicole Becker, MD	Assistant Professor, University of Iowa
Alexander Gross, MD	Pathologist, University of New Mexico
Geoffrey Halling, MD	Pathologist, Mayo Clinic, Rochester, MN
Robert Humble, MD	Clinical Assistant Professor, Michigan Medicine
Kelsey Hummel, DO	Clinical Assistant Professor, Ann Arbor VA
Ryan Landvater, MD	Clinical Informatics Fellowship, Michigan Medicine
Vincent Laufer, MD, PhD	Clinical Instructor, Michigan Medicine
Nathan McCammon, MD	Pathologist, MD Pathology, Texas Health Resources, Plano, TX
Michael Mertz, DO	Gynecologic Pathology Fellowship, Cleveland Clinic
Fysal Shennib, MD	-
Nicole Tomm, MD	Assistant Professor, University of Colorado
Xiaoming (Mindy) Wang, PhD	Clinical Assistant Professor, Michigan Medicine

MCP Admissions Committee (co-chaired by Drs. Andrew Muntean and Jeff Rual); they will be starting rotations in Experimental Pathology Labs this coming fall term:

- Abduselam Kedir (Abdul) Awol / Earlham College
- Alyssa Chow / Oberlin College
- Amanda Dowdican / University of Michigan
- Tatiana Rodriguez Rivera / Loyola University Maryland
- Elise Trost / Michigan State University
- Alexandra (Lexi) Walker / Plymouth State University

Out of the six first-year students who were accepted into PIBS by the MCP Admissions Committee in FY24, four of them committed to the MCP program in FY25: Colter Giem (Lieberman Lab), Cameron Vasquez (Parolia Lab), Uyemura Madison (DiFeo Lab), and Heizel Acosta (Shi Lab). The other two students joined labs outside of Pathology and, accordingly, transferred to other graduate programs under the PIBS umbrella to which these labs are affiliated.

The preliminary examination ("prelim") tests the student's ability to identify a novel scientific hypothesis and develop a research plan to test it. In FY25, all four second-year students successfully passed their preliminary examination and advanced to candidacy, allowing them to focus on their thesis dissertation research: Bretton Badenoch (Miller Lab), Paula Reichel (Hogan Lab), Thandiwe-Kesi Robins (Fisher Lab), and Neil Zhao (Sexton/Keller Lab).

Five students graduated from the MCP program in FY25 (*Appendix pg. 107)*:

- Jessica Teitel (DiFeo Lab) / Continuing education: PMP Certification
- Noah Puleo (DiFeo Lab) / Research Fellow at University of Chicago
- Alexander Monovich (Ryan Lab) / Development Scientist I at New England Biolabs
- Shih-Chun "Alec" Chu (Marcin Lab) / Computational Biologist at TRexBio
- Kristen Lozada Soto (Nusrat-Parkos Labs) / MD/PhD student returning to medical school to complete MD training at U-M

As of June 2025, 94 students have graduated from the MCP program.

The average length of training for the 94 MCP graduates is 5.1 years, which is very close to our target (5 years). For the last 10 MCP graduates, the average length of training was 5.5 years; the longer training observed for recent graduates is likely a consequence of the research shutdown during the COVID-19 pandemic in 2020.

As of June 2025, 22 students were enrolled in the MCP program.

Peer-Reviewed Publications by MCP Students

In FY25, MCP students contributed to 29 peer-reviewed publications, including 13 first-author publications. Many of these manuscripts were published in high-impact journals.

First-author publications:

- Avelar R, *Cell Death Differ.* PMID: 39349971
- Basinski BW, *Stem Cell Reports*. PMID: 40409260
- Campbell K, *J Clin Invest*. PMID: 39744945
- Dang D, *Cancer Cell.* PMID: 40378837
- Eyunni S, *Science*. PMID: 40570057
- Iyer AR, *Blood Cancer Discov*. PMID: 40067173
- McIntyre G, *Expert Opin Ther Targets*. PMID: 39648331
- Mire MM, *Eur J Immunol*. PMID: 40417973
- Monovich AC, *Adv Exp Med Biol*. PMID: 39017849
- Puleo N, *Mol Cancer Ther*. PMID: 39873147
- Rizza CF*, Marella S*, *Mucosal Immunol.* PMID: 39038754
- Sangotra A, *Expert Opin Ther Targets*. PMID: 39915972; *Stem Cell Res*. PMID: 39353357
- Sivakumar C*, *Biochem Biophys Res Commun*. PMID: 39278095

**Co-First Author*

Co-author publications:

- Cabrera-Silva RI, *FASEB J*. PMID: 39139033; *JCI Insight*. PMID: 39576011
- Campbell K, *Hum Mol Genet.* PMID: 38888340
- Chu A, *Cancer Discov*. PMID: 39540840
- Dang D, Front Oncol. PMID: 40556679; *Nat Commun*. PMID: 39419964
- Eyunni S, *Cancer Cell*. PMID: 39029462; *Nat Genet*. PMID: 39251788; *Cell Rep Med*. PMID: 39368479
- Kunkel TJ, *iScience*. PMID: 38846003
- Lum J, *Cancer Cell*. PMID: 40378837
- Marella S, *JCI Insight*. PMID: 39576011; *J Allergy Clin Immunol*. PMID: 38777155
- Natarajan SK, *Cancer Cell*. PMID: 40378837
- Pitter M, *Cancer Cell*. PMID: 39515327
- Reichel PE, *JCI Insight*. PMID: 39576011
- Teitel J, *Cell Death Differ.* PMID: 39349971, *Mol Cancer Ther*. PMID: 39873147
- Sivakumar CD, *Stem Cell Reports*. PMID: 40409260
- Sykes MM, *MicroPubl Biol*. PMID: 39867229; *J Nutr.* PMID: 40216295

Publications associated with the dissertations of the 94 students who have graduated from the MCP program:

Publication Type	
First-Author Papers (#, Average)	2.4
First-Author (IF, Average)	11
Co-Author Papers (#, Average)	3.9
Co-Author Papers (IF, Average)	14.3
All Papers (#, Average)	6.4
All Papers (IF, Average)	13.5

Financial Support and Awards

Students in good standing receive full support for tuition, healthcare benefits, and a stipend throughout their graduate studies (current stipend: $43,786). MCP students also have access to numerous grant opportunities, fellowship awards, and financial aid from MCP, the Department of Pathology, the U-M Rackham Graduate School, the U-M Office of Graduate & Postdoctoral Studies (OGPS), and external institutions.

Institutional Awards

Internal U-M awards and fellowships (e.g., from Rackham or OGPS, not including MCP-sponsored awards) supporting MCP students in FY25 include:

Rackham Merit Fellowship (RMF)

- Joanna Lum (Venneti Lab): Rackham Merit Fellowship (2021 - 2025)
- Thandiwe-Kesi Robins (Fisher Lab): Rackham Merit Fellowship (2023 - 2027)
- Heizel Acosta (incoming student): Rackham Merit Fellowship (2024 - 2028)
- Cameron Vasquez (incoming student): Rackham Merit Fellowship (2024 - 2028)

MCP students who are RMF fellows: 16% (versus ~10% for all Rackham Graduate School students).

Other Rackham Awards (pre-candidate / candidate)

- Charukesi Sivakumar (Rao Lab): Rackham Graduate Student Research Grant (2024)
- Grace McIntyre (DiFeo Lab): Rackham Graduate Student Research Grant (2024)
- Franchesca Fonseca-Lanza (Muntean Lab): Rackham Graduate Student Research Grant (2024)
- Brian Basinski (Rao Lab): Rackham Graduate Student Research Grant (2025)
- Jessica Teitel (DiFeo Lab): Rackham Professional Development Grant (2025)

- Neil Zhao (Sexton/Keller Labs): Rackham International Travel Grant (June 2024)
- Noah Puleo (DiFeo Lab): Rackham Conference Travel Grant (2024)
- Agamjot Sangotra (Lieberman Lab): Rackham Conference Travel Grant (2024)
- Grace McIntyre (DiFeo Lab): Rackham Conference Travel Grant (2025)
- Sanjana Eyunni (Parolia/Chinnaiyan Labs): Rackham Conference Travel Grant (2025)

Other Grants / Scholarship

- Joanna Lum (Venneti Lab): ChadTough Defeat DIPG Fellowship Grant (2024 - 2026)
- Koral Cambell (Li Lab): Rogel Cancer Center Graduate Student Scholarship (2024)
- Sanjana Eyunni (Parolia/Chinnaiyan Labs): MCTP Team Science Award (2024)
- Grace McIntyre (DiFeo Lab): Rogel Cancer Center Graduate Student Scholarship (2025)

Extramural Awards

MCP students continue to be successful in obtaining prestigious extramural research awards and fellowships during their graduate studies. Fifteen MCP students were supported by external fellowships or awards during FY25:

NIH F31/F30 Fellowship

- Jessica McAnulty (DiFeo Lab): NIH F31 Fellowship (2022 - 2024)
- Kristen Lozada Soto (Parkos-Nusrat Lab): NIH F30 Fellowship (2022 - 2024)
- Koral Cambell (Li Lab): NIH F31 Fellowship (2025 - 2027)

NIH T32 Training Grants

- Noah Puleo (DiFeo Lab): TPTR, NIH T32 Predoctoral Fellowship (2022 -2024)
- Joanna Lum (Venneti Lab): TPTR, NIH T32 Predoctoral Fellowship (2022 -2024)
- Shih-Chun Chu (Cieslik Lab): Proteogenomics of Cancer Training Program, NIH T32 Predoctoral Fellowship (2023-2024)
- Gabrielle M. Rozumek (Prasov Lab): Vision Research, NIH T32 Predoctoral Fellowship (2023 -2025)
- Sydney Musser (Grembecka/Cierpicki Lab): TPTR, NIH T32 Predoctoral Fellowship (2023 -2025)
- Franchesca Fonseca-Lanza (Muntean Lab): MICHR, NIH T32 Predoctoral Fellowship (2023 -2025)
- Neil Zhao (Sexton/Keller Lab): Biomedical Informatics and Data Science Training Program (BIDS-TP), NIH T32 (2024-2026)
- Bretton Badenoch (Miller Lab): Biology of Aging Training Grant (2025-2027)
- Charukesi Sivakumar (Rao Lab): Vision Research, NIH T32 Predoctoral Fellowship (2025 -2027)
- Colter Giem (Lieberman Lab): TPTR, NIH T32 Predoctoral Fellowship (2025 -2025)

NSF GRFP

- Grace McIntyre (DiFeo Lab): National Science Foundation (NSF) Graduate Research Fellowship (2022-2025)

Foundations / Professional Societies / Others

- Kristen Lozada Soto (Parkos-Nusrat Lab): A.D. Sobel Trainee Scholar Award (2024)
- Charukesi Sivakumar (Rao Lab): ARVO Science Communication Training Fellowship (2024)
- Grace McIntyre (DiFeo Lab): Barbra Ann Robson Ovarian Cancer Research Fellow Award (2024)
- Joanna Lum (Venneti Lab): ChadTough Defeat DIPG Fellowship Grant (2024 - 2026)
- Sanjana Eyunni (Parolia/Chinnaiyan Labs): AACR Scholar in Training Award (2024)

- Sydney Musser (Grembecka/Cierpicki Lab): FASEB Hematologic Malignancies Conference, North American Travel Award (2025)

As of June 2025, 63% of current MCP students (excluding incoming and internationals) have been awarded a major fellowship/grant. Major fellowships or grants were awarded to 80% (12/15) MCP graduates who graduated in the last five years, 2020-2024 (excluding internationals).

The MCP program and the Department of Pathology further supports graduate students through the MCP Student Research Grant, a competitive internal award designed to fund student-initiated research projects by providing support for novel or high-risk ideas and to advance students' progress toward their degree. In FY25, Sydney Musser (Grembecka/Cierpicki Lab) was the recipient of the $5,000 MCP Student Research Grant.

Student Life, Community Service, and Social Events

Student Council

The MCP Student Council, which is currently led by MCP student Charukesi Sivakumar, hosts monthly meetings and coordinates multiple social events throughout the year, including student/faculty mixers, camping trips, ice cream socials, and community outreach projects. An MCP Student representative selected by the MCP Student Council serves on the MCP Steering Committee to provide students' perspectives, feedback, and suggestions on the program.

Current Members of the MCP Student Council are:

- President: Charukesi Sivakumar
- Vice-President: Paula Reichel
- Secretary: Franchesca Fonseca-Lanza
- Treasurer: Colter Giem

Community Service

Many MCP students give back to the community through educational and outreach programs, and they have a long history of being impactful benefactors in their communities. The selfless dedication of our students to service is recognized annually, with one student receiving the MCP Outstanding Service Award at the Annual MCP Research Symposium. Last November, at the 23rd Annual Pathology Research Symposium, Noah Puleo (DiFeo Lab) was honored with the 2024 MCP Outstanding Service Award for his high level of commitment to the next generation of cancer research trainees in the Rogel Cancer Center, as well as for his outstanding service to our community as MCP Student Council president in 2022-2023.

Several MCP students (Koral Campbell, Joanna Lum, Heizel Acosta, Jessica Teitel, and Gabrielle Rozumek) serve or have served as instructors for the Developing Future Biologists (DFB) program. This educational outreach initiative trains the next generation of biologists. In May 2023, the Department of Pathology and MCP jointly committed to contributing $2,000 per year for five years (2023-2027) to support the DFB program (totaling $10,000). MCP is grateful for the department's support in advancing our students' outreach efforts.

MCP students are actively involved in various student organizations, including F.E.M.M.E.S, SACNAS, and SEEK (education), ESPA and BGSG (professional development), MISciWriters (science communication), and miLEAD (business consulting). These organizations provide students with opportunities to engage in campus issues, connect with like-minded peers, and develop leadership and mentoring skills.

Social Events

The MCP community meets regularly to socialize. In FY25, these included: icecream social to welcome first-year MCP students into our community (August 2024), upscale dinner at the Gandy Dancer restaurant to kick off the 23rd Annual MCP Research Symposium (November 2024), bowling party with trainees in Clinical Pathology (November 2024), multicultural potluck to celebrate the holiday season (December 2024), Darts/Cornhole/Disc Golf tournament at HOMES Campus (May 2025). Upcoming events include the "Path Pétanque Tournament" (September 19, 2025) and a "Chai & Chill Potluck" on Saturday, October 4, 2025, hosted by Dr. Mirza. MCP students value spending fun bonding time together. Every summer, students organize an

Karen Barron
Program Manager, Allied Health Education

MCP-sponsored camping trip. The 2024 trip upheld this beloved tradition and was a great success as everyone carpooled up to the Pinckney Recreational Area for a weekend.

Allied Health Education

In FY25, the Allied Health Education program, led by manager Karen Barron, MLS (ASCP), continued to champion the education and workforce development of medical laboratory professionals by supporting interns and other learners, employees, and the community. An Administrative Specialist was added to the team to support Allied Health Education and Medical Education.

Clinical internship programs thrived. The Medical Laboratory Scientist Internship program graduated 13 interns from six different university affiliates. The Histotechnology internship program affiliated with Indiana University graduated three employees/interns, and the Technologist in Microbiology program affiliated with Weber State University graduated two employees/interns. Eighteen phlebotomy externs gained proficiency in completing clinicals in our off-site health center draw sites. A Summer Medical Laboratory Immersion program was piloted for two undergrads. These graduates are board-certified, and many of the interns and externs are hired for permanent positions in Pathology. A new "Outstanding Preceptor Award" was presented to 16 preceptors in allied health programs, selected through nominations from learners. *(Appendix, pg. 106)*

Katie McGraw, an intern from Michigan State University, received a Fulbright Foreign Scholarship to study the relationship between blood type and the severity of malarial illness in Malawi in 2025. Marlena Pinelli, an intern from Grand Valley State University and now a Medical Laboratory Scientist in the Core Hematology Laboratory, received a 2025 Alpha Mu Tau Fraternity undergraduate scholarship (Alpha Mu Tau's mission is to recognize people who have made outstanding professional contributions to the field of clinical laboratory science and to enhance the profession by providing scholarships to support educational endeavors).

Pathology employees enjoyed robust educational resources and individual career counseling as well as Pathology New Employee Orientation and FiSH! Philosophy® workshops. Pathology management received quarterly PACE® accredited continuing education tailored to their needs as leaders. The Allied Health Education team also facilitated the disbursement of funds from the Suzanne Butch Pathology Staff Professional Enhancement Fund, established in 2023 through charitable donations. Funds are used to reimburse allied health staff for educational activities and professional certifications that are not funded by departmental or organizational programs.

Partnerships with community groups were deepened in FY25. A lasting impression was made on students, teachers, parents, and community members by creating multiple interactions of increasing intensity that convey the nature of medical laboratory work and the contributions of medical laboratory professionals to patient care. Approximately 25 guest-speaking visits, career fairs, and community events at middle schools, high schools, and colleges were completed. Combined with exhibits and presentations at four teacher and medical laboratory professional conferences, these interactions engage participants with hands-on demonstrations and establish connections, learning, and understanding. Pathology participated in the Youth Summit at the Big House, the Parkridge Community Festival, the Michigan Science Teachers Association conference, the Michigan Health Science Educators conference, and the Michigan Career Education conference.

Conferences and Symposia

The 23rd Annual Pathology Research Symposium
November 8, 2024

One of the marquee events in the Department of Pathology is the Annual Pathology Research Symposium, which is co-organized by third-year MCP students and Jeff Rual, PhD. The symposium showcases our faculty and trainees' oral and poster presentations, highlighting the department's innovative research. The symposium has a long tradition of hosting internationally renowned external keynote speakers, such as Dr. Ralph Steinman, the 2011 Nobel Prize in Medicine Laureate. At the 23rd Annual MCP Research Symposium, our Keynote Speaker,

Dr. Humsa Venkatesh, PhD, Assistant Professor of Neurology, Brigham and Women's Hospital, Harvard Medical School, presented: "The Neural Regulation of Cancer". The symposium provides numerous opportunities for stimulating interactions between students and faculty, fostering discussions, idea sharing, and collaboration.

New in 2024, to bridge the Clinical and Experimental Pathology communities of trainees in the Department of Pathology, the organization committee invited clinical trainees to present their work and recognized Medical Resident Dr. Andrew Valesano with the inaugural Best Clinical Trainee Poster award. For the upcoming 2025 symposium, Neuropathology Clinical Instructor Dr. Emile Pinarbasi will present orally.

The event concludes with an awards ceremony, presenting the MCP Outstanding Research and Service Awards and recognition for the best oral and poster presentations:

- Best Undergraduate Student Poster: Rijul Mehta (Mentors: Siva Kumar Natarajan and Sriram Venneti)
- Best Research Fellow Poster: Navyateja Korimerla (Mentor: Daniel Wahl)
- Best Non-MCP Graduate Student Poster: Nicole Jerome (Mentor: Phillip Palmbos)
- Best MCP Graduate Student Poster: Kristen Lozada Soto (Mentors: Asma Nusrat and Charles Parkos)
- Best Clinical Trainee Poster: Andrew Valesano (Mentor: Stephanie Skala)
- Best Oral Presentation: Joanna Lum (Mentor: Sriram Venneti)
- MCP Outstanding Service Award: Noah Puleo (Mentor: Analisa Difeo)
- MCP Outstanding Research Award: Sanjana Eyunni (Mentors: Arul Chinnaiyan and Abhijit Parolia)

The 13th Annual Clinical Pathology Symposium
April 22, 2025

Themed "Science and Sustainability" was held at the Towsley Dow Auditorium. This "Zero-Waste" event featured 3 PACE® accredited talks. "Sustainability in Laboratories and Beyond" highlighted the role laboratories play in achieving university-wide goals focused on reducing carbon impact and fostering a culture of sustainability. In "Elemental Toxicity: Case Files from the Heavy Metals Lab," a Mayo Medical Laboratories speaker energized participants. And in "Square Peg, Round Hole: The FDA and You!", Annette Kim, MD, PhD, Director of DGG, walked us through the history of the FDA's claims to authority to regulate laboratory-developed procedures and analyzed recent rulings. About 120 attendees enjoyed networking and celebrating Lab Week at exhibits from 11 labs and committees.

The 9th Annual T32 TPTR Retreat
May 22, 2025

At this event, the trainees presented their translational research projects. The keynote speaker was Brian Blagg, PhD, Charles Huisking Professor of Chemistry and Biochemistry, Director of the Warren Center for Drug Discovery and Development at the University of Notre Dame, who presented a lecture entitled "Turning Lemons into Lemonade: Rediscovery of Hsp90 Inhibitors." In addition, three trainees presented their research, including Sydney Musser (MCP Graduate Student), Daniel Magaoay (Molecular & Integrative Physiology Graduate Student), and Martin Fernandez (Biophysics Graduate Student), as did one MICHR trainee, Holly Attebury. The symposium also included a presentation by Dr. Zhen Xu, who discussed "Non-invasive Histotripsy Cancer Treatment." The event was rounded out by a panel discussion on translating research findings into innovation and clinical practice, led by Zaneta Nikolovska-Coleska, PhD and that included Drs. Blagg and Xu along with Sarah Jameson-Valencia, Associate Director of Ventures for Life Sciences, Innovation Partnerships. The TPTR holds a monthly research seminar series and highlights research from our own faculty and trainees as well as research conducted by invited guest lecturers. The TPTR T32 also sponsors monthly workshops covering topics of relevance to translational research and showcases the work being done by our trainees.

Anastazia Hartman, MBA, MS
Communications Specialist Senior

Communications

The Communications group within the Division of Training Programs and Communication serves as the conduit between internal and external communication for the Department of Pathology. The current team includes one full-time staff member, Anastazia Hartman, MBA, MS, Communications Specialist Senior and communications team lead (effective May 1, 2025), along with one part-time contributor: Brent Temple, Web Developer and Graphic Designer from Pathology Informatics, and two communications assistants (student interns), Beth Light and Yining Chen.

Previously, the team was led by Lynn McCain, MSHA, in her role as Director of Communications and included two full-time staff members (McCain and Hartman) and one part-time contributor (Temple). As of May 1, 2025, McCain transitioned to the role of Senior Project Manager, and Hartman assumed leadership of the team.

"We are so grateful to Lynn for her many years of service and dedication to the department through her communications role. She continues to be an integral part of our team in her project manager role, applying her expertise and vision to advance our work," said Kamran Mirza, MBBS, PhD, Assistant Chair of Education and Director of the Division of Training Programs and Communication. "In this dynamic and evolving landscape, we are excited about Anastazia's leadership and look forward to seeing our communications efforts continue to grow."

The communications team focuses on strategic initiatives that showcase the department's breadth and depth through news articles, social media, photography, videography, symposia, print materials, and major annual publications. These efforts are designed to support each division within the department and are tailored to meet their specific needs.

Symposium and Event Support

In FY25, the Communications group supported four department-led symposia: New Frontiers in Pathology, the Pathology Research Symposium, the Global Pathology Summit (new event), and the Clinical Pathology Symposium. The annual Advances in Forensic Medicine conference was not held during this fiscal year. Support for these events included but was not limited to graphic design, poster printing, social media and email marketing, photography and videography, and the development of supporting articles.

Additionally, the Communications group facilitated a one-hour workshop session for incoming trainees, focusing on the importance of personal branding, social media presence, and engagement beyond their formal training. This workshop has become a standard component of onboarding for each new trainee class, and the team is now exploring ways to expand the session to engage a broader audience within the department.

Photography and Videography

Photography and videography are essential components of the Department of Pathology's communications efforts and play a key role in shaping the department's external image. In FY25, the communications teams made a strategic decision to end photographers' travel for headshots and passport photography, moving everything to the communications suite in the North Campus Research Complex. This decision allowed the team to create a more well-rounded studio space, where a plethora of photo and video content can be created with ease.

Our communications specialist and assistants support photography through headshot and passport photography, group and event photography, and journalistic photography for articles. In FY25, the team captured a total of 11,680 photos, a 6.2% increase from FY24. This included 1,583 headshot and passport photos, 200 group photos, 8,569 event and symposia photos, and 1,328 journalistic photos. This increase can be attributed in part to additional time and personnel allocated to photography efforts.

Videography is another vital component of the Communications group's work. The team produces both long-form and short-form videos, which are distributed across various platforms to support departmental initiatives and outreach.

In FY25, the team captured a total of 16 videos, an increase from FY24 and an 11% decrease from FY23, including six long-form videos (YouTube) and 10 short-form videos (Instagram Reels).

Publications

The Communications team writes, designs, and publishes the annual *Inside Pathology* magazine, and now supports only the design and web publishing of the department's Annual Report.

Inside Pathology, released each summer, is an externally shared publication that features compelling stories highlighting the people, labs, facilities, and achievements throughout the department. To date, 11 issues have been published. The FY25 edition focused on themes of building bridges, fostering community, and strengthening connections, both within our department and across the broader Michigan Medicine health system, as well as in the state of Michigan. Issues from 2014 through 2025 are available on the pathology website, in the upper right-hand corner under "Inside Pathology."

The Annual Report, previously written and produced entirely by the communications team, is now led by Project Manager Lynn McCain. McCain is responsible for writing and developing all content, while the Communications team continues to support its design efforts and web publication.

Additionally, the team oversees the writing and publication of external content for the department's website. In FY25, 90 articles were published online and shared via social media, covering a variety of topics across the department. This was a 1% decrease from FY24.

This fiscal year (FY25), the team launched a rebranded pilot of their internal newsletter, Pathology Connections. During this pilot period, 14 newsletters were sent (monthly). During the transition of McCain and Hartman, the decision to pause and strategize a new plan for internal communication went into effect.

Social Media

The Department of Pathology utilizes multiple social media platforms to communicate with external audiences: X (formerly Twitter), Instagram, Facebook, and YouTube. The communications team creates, shares, and engages with different audiences through many varieties of content, including but not limited to news and feature articles, information about pathology and training opportunities, events, conferences, and more.

At the beginning of FY25, the communications team paused its Case of the Week efforts to develop a renewed, energized plan to further engage external pathology audiences in more educational and equitable ways. Also in FY25, the communications team concluded its work on the Michigan Medicine Laboratories social media, returning complete control to the MLabs team.

Platform: *X (@UMichPath)*

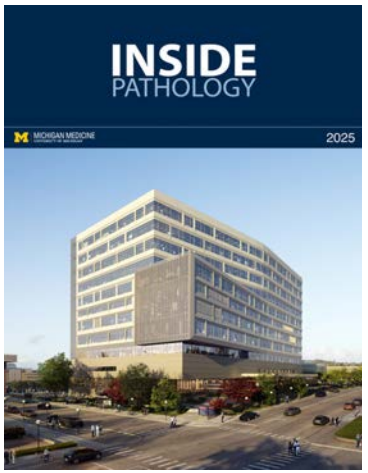
X is the largest platform run by the communications team and provides a gateway to external audiences to share news, research, cases, events, and more. In FY25, the account grew to 12,432 followers, an increase from FY24 (~12,000 followers). In FY25, the team posted 180 times, gathering more than 273,970 impressions (-62%), 9,466 post engagements (-67%), 570 shares (-58%), 1,927 likes (+56%), 3,719 video views (+98%), 725 link clicks (-57%), and gained about 500 followers (+4.2%). While there could be a multitude of reasons for the decreases, such as algorithms, audience shifts, and strategy decisions, these data prove that video is a superior form of content creation and would likely boost areas such as impressions, engagement, shares, and likes.

Platform: *Facebook (University of Michigan Department of Pathology)*

Facebook is the platform utilized for most interactions with alumni and family. In FY25, the team posted 89 times (-30%), gathering 80,981 impressions, 8,975 engagements (-50%), 108 shares, 2,327 likes, 2,869 video views, and 406 link clicks. Platform fatigue, demographic shifts, platform content, and algorithm prioritization may be the cause of this decline.

Platform: *Instagram (@UMichPath)*

Instagram is an ever-growing platform for the department of pathology. In FY25, there were 27 posts, 12 reels, and 41 stories. Followers increased by 13.3% (2,113 to 2,393). Related to Instagram posts, impressions increased by 134%, engagement increased by 141%, shares increased by 78%, and likes increased by 30%. The communications team rationalizes this increase by understanding that the target age demographic for Instagram and those interested in pathology are younger and more likely to utilize this platform compared to Facebook or X.



Above Image:

The 2025 issue of the annually published, *Inside Pathology*.

Platform: *YouTube (@UMichPath)*

The Department of Pathology YouTube will sunset at the end of FY25, allowing the department's long-form video content to now be shared with a broader audience on the Michigan Medicine YouTube channel. While the Pathology page will still be live for people to enjoy previously posted content, this strategic move to the Michigan Medicine YouTube page will allow for stronger brand recognition and presence, larger audience engagement, better visibility of the department's work, and offer more opportunities for interdepartmental collaboration and possible external collaboration efforts.

Alongside long-form video content, transitioning to the Michigan Medicine YouTube page, allows the team to dive into the world of YouTube shorts. YouTube Shorts, similar to Instagram Reels or TikTok, will allow for quicker, more dynamic content creation and sharing. Due to the flagship recognition of the Michigan Medicine name, these YouTube Shorts will reach a broader audience and strengthen the communications team's strategy for short-form video content, which currently only utilizes Instagram.

In FY25, six videos were shared on the departmental YouTube channel, a 14% decrease from FY24. These six videos garnered a staggeringly low number of impressions, engagements, shares, likes, and views. This solidified the team's decision to sunset its efforts on the departmental page.

While FY25 was a year for change and pilot programs in a multitude of areas, the team accomplished many of its goals. In FY26, the communications team is working to increase the amount of content posted, post engagements, and followers across all platforms by 5%. In addition to this 5% increase across social media, the communications team will also work toward a renewed partnership with Michigan Medicine to leverage the brand name and showcase the breadth and depth of the clinical and research work being completed within the department. Alongside this renewed partnership, the communications team will continue to strategize new internal communications efforts and initiatives, educate faculty, staff, and trainees on the importance of communication, and successfully launch a pilot for a new pathology blog and podcast series.

Conclusion

Looking to the future, we are excited to build upon this foundation as we fully embrace the complete digitization of our department. This transformation opens the door to visionary changes in pedagogy and curricular execution. We are exploring innovative ways to expand our global pathology footprint, with a focus on reaching junior learners and those in low-resource settings. By leveraging U-M resources like the Center for Academic Innovation and integrating novel technologies such as virtual reality (VR) and 3D printing, we aim to revolutionize the way we assess and teach competence in pathology. These technologies hold the potential to enhance interactive learning and bring previously unimaginable educational experiences to our trainees. Stay tuned for more exciting developments as we continue to push the boundaries of what's possible in pathology education.

I am confident that our collective efforts will continue to inspire, innovate, and lead the way forward. Together, we are redefining pathology education and pushing the boundaries of what is possible in healthcare. It is an honor to be part of this transformative journey, and I look forward to working alongside each of you as we chart new territory, inspire future generations, and expand our reach across the globe. Our shared dedication to excellence and innovation will ensure that Michigan Pathology remains a leader in shaping the future of medicine for years to come.


FiSH!
Join Us for an Upcoming Session
1st Wednesday of the month
11:00 am - 2:00 pm
NCRC Superior Room
or
June 16, 2025
1:00 pm - 3:30 pm
Towsley G1320
Register for FiSH! Today!
FiSH!

Pathology Informatics

Ulysses Balis, MD
Director, Pathology Informatics

In FY25, the Division of Pathology Informatics (PI) translated FY24's activation milestones into scaled, reliable, and auditable clinical practice. Our embedded informatics teams—aligned with Michigan Medicine HITS governance—executed platform upgrades (P10, Oracle/Linux), stabilized critical interfaces, and expanded digital pathology (DP) from initial activation to broad subspecialty coverage. The October Sectra Pathology upgrade improved case management synchronization with SCC SoftLab, delivered advanced annotation tools, and illuminated case state with a new status dashboard—minimizing the historic "black hole" risk where cases could be delayed or lost to tracking. Scanning reliability improved (Olympus VS200 error rates <1%, comparable to Leica GT 450), and 100% manual slide QC continued while we readied an approved, GPU backed Barco AI pipeline for autonomous image quality certification.

Reliability engineering remained central: the late December 2024 P10 cutover completed smoothly and preserved 100% IBM warranty coverage; concurrent OS/database modernization (Oracle→Linux) improved supportability and mitigated prior memory leak related incidents. Interoperability advances reduced downstream rework. Community interfaces (Corner Health, Packard Health) cut help desk tickets for manual patient merges by enforcing identity via electronic messaging, and HLA discrete results now render cleanly in the clinical chart. Pathology Informatics resident education further modernized with hands on LLM assisted analytics in the resident rotation. Global partnerships matured to publications and a joint CGHE submission, and the Lab 2.0 ecosystem benefited from substantive contributions by our current informatics fellow. Headcount remained stable at 34.5 FTE, and the joint governance model with HITS was unchanged.

Note on Quantitative IHC vendor strategy: Following verification that Roche Ventana's represented feature set and cloud only model were not aligned with departmental requirements, the vendor was removed from consideration for ER/PR/HER2 quantification; alternative solutions are now under active review.

Clinical Operations

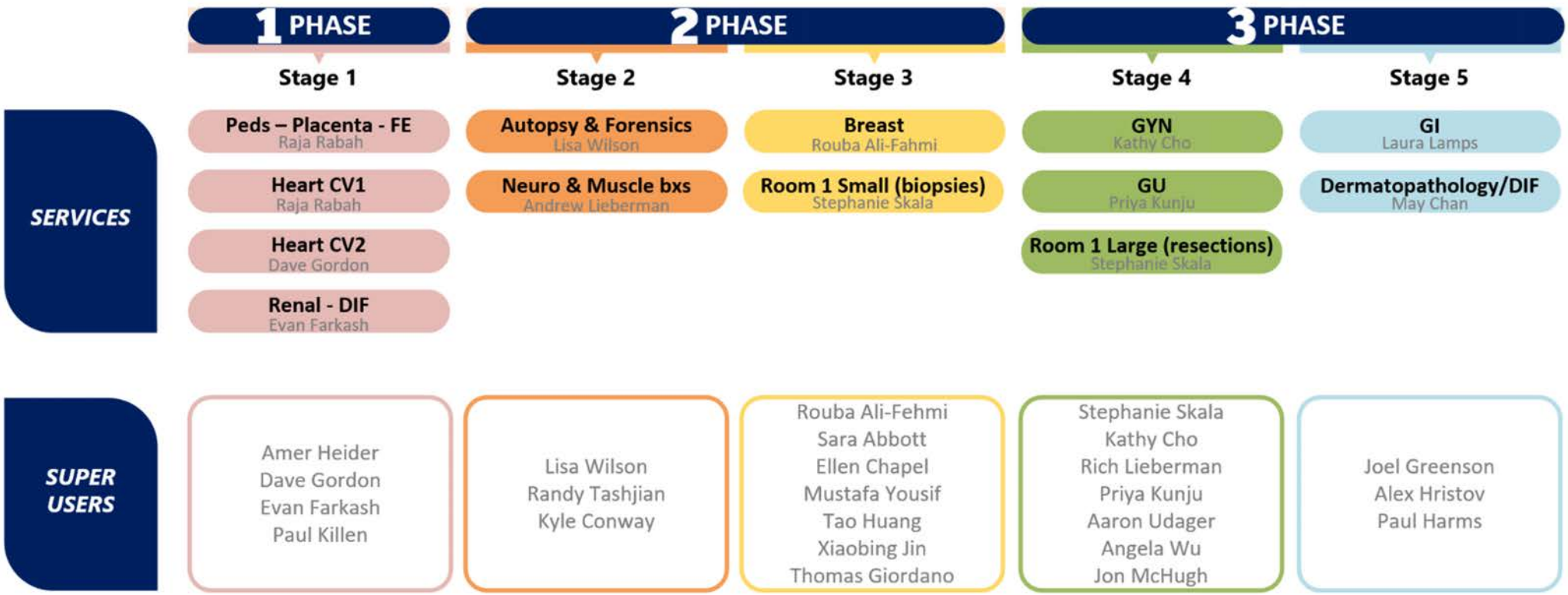
Digital Pathology Scale-Up *(Phased Activation)*

- FY25 continued staged go-lives *(See Appendix A, pg. 109)* with Phase 2–4 expansions; Phase 4 (Breast, GU) is active/ongoing. Final activation (Phase 5) targeting late FY25 Q4 will bring GI and Dermatopathology online.
- Sectra Pathology (Oct upgrade): advanced annotations; tighter SCC-Soft↔Sectra case synchronization; case-status dashboard to prevent case tracking loss and reduce sign-out delays.
- Scanning reliability: Olympus VS200 validated with scan-error rates <1%, comparable to Leica GT-450 (~1%); iScan networking broadened capacity.
- Slide QC: 100% manual QC maintained; Barco AI IQA pipeline pilot successful; GPU-based autonomous QC funded for implementation.

Platform Modernization & Reliability

- P10 upgrade cutover late Dec 2024; validation and deployment-gate completed; continuity retained with IBM warranty.
- Oracle→Linux migration (FY26 Q1 start): Oracle is the primary DB engine target; improved platform stability and supportability.
- ADM/Oracle upgrades: resolved memory-leak issues implicated in prior major incidents; new stack is more stable

SERVICE ROLL OUT & SUPER USERS



and HITS-supportable.

- ICU printers: wireless→wired conversion reduced trouble tickets, consistent with prior wired conversions.

Interoperability & Interfaces

- Corner Health & Packard Health: activated interfaces; reduction in help-desk tickets for manual patient merges via electronic identity confirmation.
- ROTEM/Inheret PDFs → OnBase (HL7): Inheret (non-profit archive for inborn errors of metabolism) documents now searchable; genetic disorder content indexable.
- HLA discrete results + PDF: discrete molecular results visible in the clinical chart for simplified review.
- OHS/MIE Phases 1–2: completed (not expanded by request).
- VentanaConnect→Navify: decommissioned from roadmap; vendor disinvited; alternatives under evaluation.

Operational Tooling & Standardization

- Case assignment tracker: used by AP faculty to track assigned cases; eliminated the prior generic-queue "black hole," improving on-time sign-out.
- AOE standardization: advanced (details not expanded by request).
- CellaVision upgrade, Alloantibody→Transfusion Reaction Repository: delivered (details not expanded by request).
- Phlebotomy handhelds (phone option): validated (details not expanded by request).
- Coreo reports: legacy Roche ER/PR reporting tool deprecated.

Education

- Resident/Fellow rotation (Spring): introduced structured LLM-assisted development, enabling residents to generate original programmatic content for laboratory analytics (Python/R + safe LLM use), with competency in prompt-driven code generation and validation.
- National engagement: delivered 2 SNUG presentations (Soft Network Users Group).
- Governance/assessment: completed 6 MMIARs (Michigan Medicine Information Assurance Reviews) across the last six months to support secure adoption of new software/hardware.
- Knowledge platform: internal site migrated to Laravel (modules and metrics withheld by request); MLabs MRN prep staged.

Research

- Computational imaging and Digital Pathology: continued validation of WSI-driven analytics as DP phases expanded; ongoing preparation for autonomous slide IQA using GPU-accelerated Barco pipeline.
- Diagnostic Genetics and Genomics (DGG): Initial DGG pipeline assay established; Genexus installation completed; SCC .245/.250 gene module upgrades deployed (details withheld by request).
- Quality and data marts: transfusion reaction repository incorporates alloantibody data; operational analytics extended via case assignment tracking.

Global Reach

- AKU (Nairobi) / AUB collaborations: matured to publications and a joint Center for Global Health Equity (CGHE) grant submission; continued deployment of cloud-based WSI/AI training content.
- Lab 2.0 (DMC ecosystem): current informatics fellow contributes materially to a Lab 2.0 development project that will soon emerge as an education 501(c)(3) non-profit organization.

Division of Quality and Health Improvement

Scott Owens, MD
Director, Division of Quality and Health Improvement

During FY25, the Division of Quality and Health Improvement (DQHI) continued to make significant contributions in support of clinical operations and innovative practice developments with partners in and out of the Department of Pathology. DQHI's guiding principles continue to include an emphasis on practice efficiency and high reliability, the expectation that changes and results will be solidly focused on adding value and as generalizable as possible throughout the department and institution, a commitment to scoping projects for achievable results, and a focus on obtaining a mixture of subjective and objective measurements that allow for both assessment of impact and sharing of results in an academic format. Highlights of these efforts and other DQHI news from FY25 are provided below.

Personnel Changes

One of the most significant events from DQHI during FY25 was the departure of Brian Tolle as the division's manager. After a decade in the position, Brian made the decision to retire at the end of calendar year 2024. Tolle's contributions to the DQHI team were extensive, leveraging his prior experience as a career coach and organizational culture consultant to influence the strategy and tactics of the division and to constantly look for opportunities to make an impact on patient care both within the Department of Pathology and beyond.

After Tolle's departure, Eleanor (Ellie) Mills stepped into an interim role managing the team. After some adjustments to job titles in cooperation with Chief Departmental Administrator Brooklyn Khoury, Mills continues in a management role permanently as FY26 gets underway. Finally, the departure of one of DQHI's project managers at the end of FY25 leaves DQHI with a vacancy in that role that continues into FY26.

Operational Support and Process Improvement

DQHI personnel continue to focus on several important support and improvement projects throughout the department. DQHI is in an ideal position to cross boundaries between clinical labs and other clinical divisions – allowing for the creation and support of cross-functional teams sustained by our project managers, process improvement specialists, and data scientist – and to provide the appropriate staff bandwidth and expertise to shoulder this type of effort, allowing laboratory leadership and personnel to concentrate on their clinical work. In addition, our connections with like-minded people and groups in other departments throughout the institution provide crucial networks for broad and far-reaching impacts on patient care.

During FY25, DQHI personnel continued their work with operational colleagues throughout the department. Additional projects over FY25 in this vein include:

- Work with partners in the healthcare system to improve the secure storage and stewardship of Sexual Assault Nurse Examiner (SANE) kits.
- Work with partners within and outside the Department of Pathology to support expansion of pathology services to the new D. Dan and Betty Kahn Health Care Pavilion.
- Continued partnership with Phlebotomy Services and Specimen Processing to streamline hospital specimen pick-up and delivery. This work aimed at providing more phlebotomist bandwidth for blood draws by reducing the burden of specimen transport currently handled by phlebotomists.
- Partnership with phlebotomy to ensure efficient and integrated documentation of blood draws from indwelling ports and catheters to ensure patient safety and streamline blood draws.

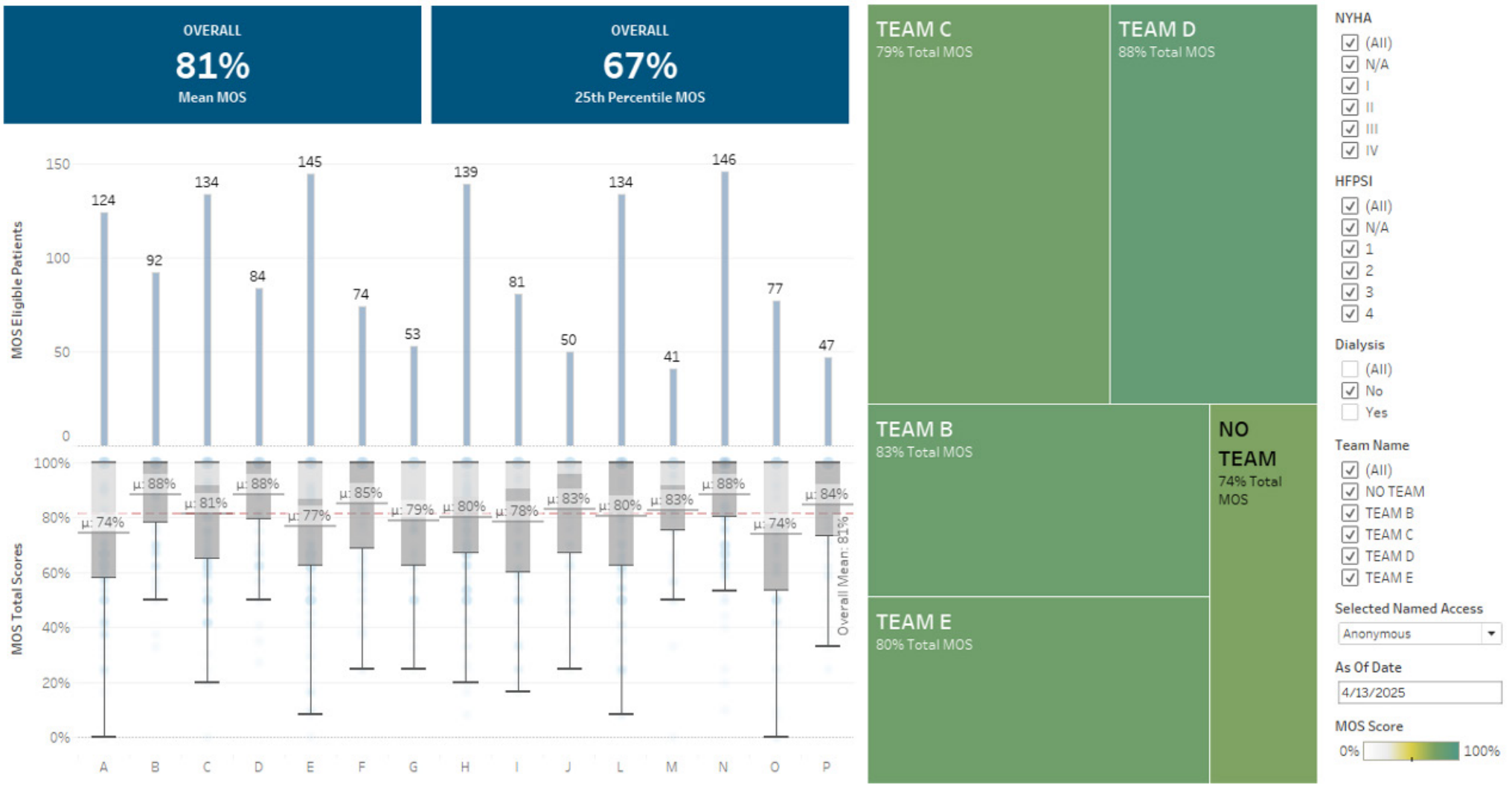


Figure 1: *Medication Optimization Score (MOS) visualization ("scorecard") for cardiology providers with heart failure patients. The box-and-whisker plot on the left indicates the number of eligible patients for each of 15 cardiology providers (designated A-P), with each provider's individual MOS average overlaid on the box. The boxes on the right indicate the team scores for teams of providers and provide a color scale for easy visualization of how each team is performing (deeper green = higher score). "NYHA" and "HFPSI" on the right are two different ways to measure clinical severity of heart failure.*

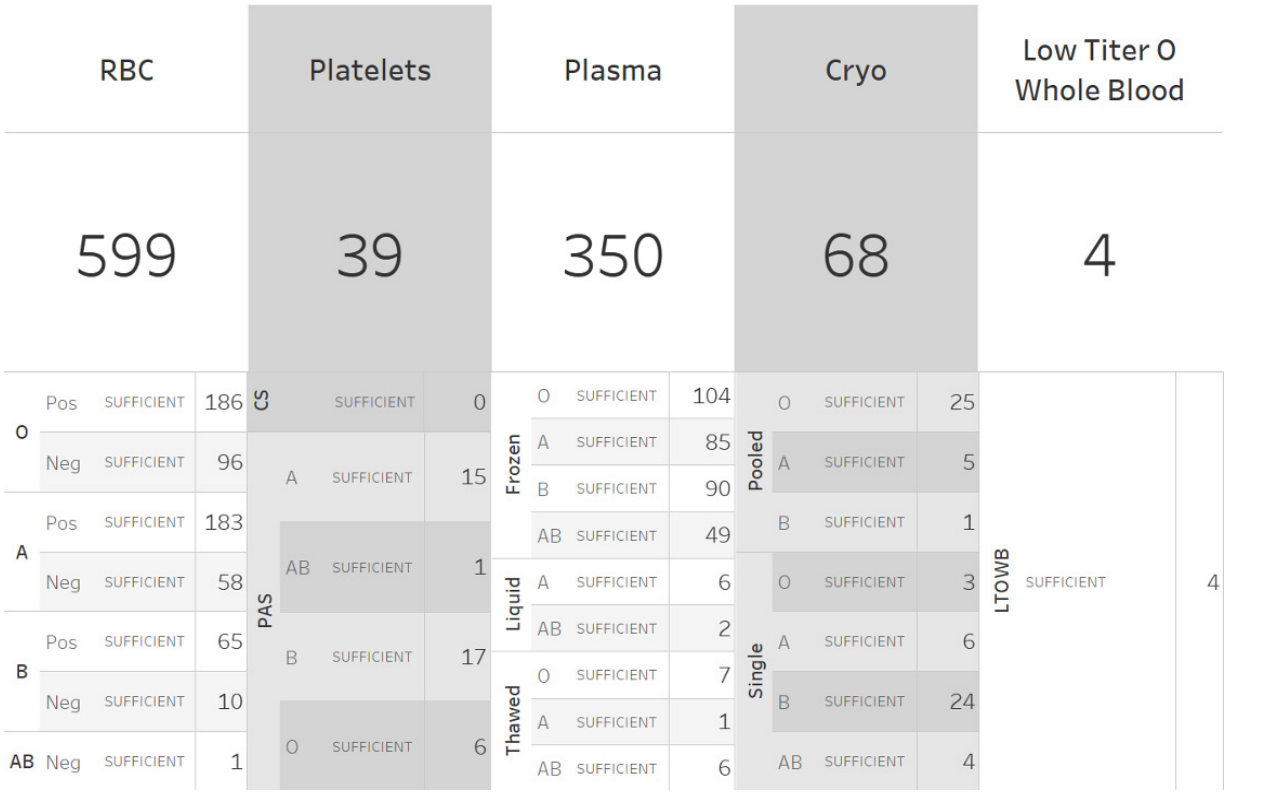


Figure 2: *Blood Bank inventory dashboard. One DQHI project from FY25 centered on providing a real-time "heads-up" dashboard for visualization of the inventory in Michigan Medicine's blood bank. The dashboard gives the ability for a quick assessment of the number of units of packed red blood cells (RBC), platelets, plasma, and cryoprecipitate (cryo), along with an assessment of sufficiency of the supply of each based on usage patterns.*

- Continued partnership with laboratory managers to design and implement an integrated information and data solution to assist with efficient practice assessment and management decisions. This work is underway with partners in the Microbiology laboratory and is planned for others.
- Design of a comprehensive data analytics platform for Core Laboratory management based on interviews with laboratory personnel and leadership.
- Upgrading and streamlining "canned comments" in Soft to document and track the various reasons for delays in blood draws. This work aims to make the comments more valuable, specific, and leverageable for identification of further improvement projects in our phlebotomy services.
- Continued work on improving the utilization of the information gleaned from patient safety incident reports entered by and about the clinical laboratories in the institutional patient safety reporting system with the goal of better identifying and using the most beneficial data available in these reports that could potentially be utilized for process analysis and improvement projects.
- Continued monitoring of daily data on lost pathology specimens to identify patterns that may help minimize the loss or misplacement of specimens in the future.

Laboratory Utilization

A key project for FY25 that entered its final phases continued a collaboration with colleagues in the Cardiology division of Internal Medicine, aimed at helping leadership in that group understand how their practitioners use laboratory testing within the context of analytic and treatment protocols for patients with clinically significant heart failure. This collaborative quality initiative-like project has allowed DQHI personnel to provide project management, data science, data visualization, and clinical expertise, resulting in the development of a provider dashboard that is in early use to monitor provider behavior and ordering patterns in comparison to published and local care guidelines. This part of the project aims to provide Cardiology leadership with the tools needed to provide direct feedback to practitioners and encourage standard practice. This platform is generalizable across clinical practices and could easily serve a similar purpose throughout the institution in other clinical areas.

The project's second phase centered on the use of laboratory testing and data science to provide practitioners with ongoing information about the optimal titration of medications to treat heart failure. Providing a "medication optimization score" (MOS) to clinical caregivers will give up-to-date therapeutic and patient health data that will allow more focused medication adjustments and, it is anticipated, better patient outcomes. This kind of direct connection between optimal, cost-effective laboratory usage and patient outcomes has been a goal of DQHI since its inception. The product was deployed during FY25 in a step-wise fashion, leveraging expertise from members of DQHI, the Department

of Pharmacy, and the Michigan Institute for Clinical and Health Research (MICHR), to begin a prospective, stepped-wedge trial of the tool with sufficient statistical power to assess the impact on patient outcomes, including the time to achievement of optimized treatment goals (based on MOS), number and length of hospitalizations, and optimization of laboratory utilization (reduced inappropriate testing) for heart failure patients. Early feedback has been positive, and the trial will conclude in FY26. After data analysis, this should result in publication(s).

Future Directions

Discussions are underway with partners in the Division of Anatomic Pathology (AP) to take a holistic and data-driven view of AP workflow to identify opportunities for process improvement aimed at serving our patients and their clinical providers even more effectively than we already do. While much of the actual work will not commence until after the new hospital pavilion has been fully opened, the groundwork is in place for it to begin. The ability to take on new endeavors has been somewhat slowed since mid-FY25 due to the personnel changes already discussed, but interests and opportunities remain, continue to be identified, and can be readdressed or started in the future. These include:

- Analysis of the ordering system for the Division of Genetics and Genomics, aiming to map and analyze the current state for ordering molecular diagnostics testing on anatomic pathology specimens to identify opportunities for process improvement.
- Assessment of departmental needs for data-centered information on test pre-authorization and reimbursement to develop a data analytics tool to leverage data in the Clarity (MiChart) database for optimizing these aspects of testing.
- Development and implementation of an inventory management system for shared inventory space at University Hospital and to gather information on requirements for a unified department-wide inventory management system.

In addition to these opportunities, DQHI leadership and personnel have discussed the development of a pathology data "gateway" that could serve to provide easier and comprehensive access to data and analytics for process improvement, as well as the facilitation of a departmental quality management system supporting standardized quality assurance, patient safety, and process improvement activities throughout the department. Given the extensive need for data science support throughout the department as evidenced by the contributions of DQHI's current data scientist to all the activities mentioned in this report, we are also in the process of requesting at least one more data science position. This will allow us to continue to build a repertoire of data-driven tools and approaches to process improvement that will expand our impact on Michigan Medicine's patients.

Well-Being

Maria Westerhoff, MD
Assistant Chair, Well-Being

At the start of fiscal year 2023, Dr. Maria Westerhoff began her leadership role as Assistant Chair for Well-Being in the Pathology Department. The Pathology Well-Being Committee members providing support to Dr. Westerhoff for the department's well-being initiatives for faculty and staff include Yvonne Beadle, Regina Ferguson, Tracy Rocco, Erin Pauley, Dr. Meredith Herman, Dr. Nora Joseph, Tammy Kutter and Anastazia Hartman. Well-being continues to be a priority in the Department of Pathology as demonstrated by the numerous well-being activities, initiatives and events planned and arranged each year in an effort to promote well-being for the members of our department.

Pathology Department Well-Being Painting Events

During February and May of 2025, the Department of Pathology held well-being painting events at UH and NCRC, including afternoon and midnight shift employees, to provide an opportunity for employees to drop in and spend some time relaxing and socializing with their colleagues while painting a beautiful succulent planter or window suncatcher for some art therapy! All supplies and materials were provided to employees.

Pathology Well-Being Grant Pilot Project

In mid-March 2025, staff and faculty members within Pathology were invited to submit a proposal application for an opportunity to be awarded a well-being grant up to $1000 with the purpose of improving the workplace well-being of their lab or group. Submitted applications were reviewed by the Well-Being Committee members and were received from the following Pathology units: Autopsy Forensic Service/Postmortem Care Team, Transfusion Medicine, Clinical Core Laboratory Chemistry, Center for Translational Pathology, Cytopathology, Immunology/ Special Chemistry, MLabs and Pathology Administration.

Well-Being Grant Awardee Responsibilities

Application Title	Submitter	Proposal	Awarded
Well-Being to UH CORE Lab	Dr. Gherasim	Team Building Activities	$1,000
Pawthology Pups for Peace (Cytopathology)	Brian Smola	One-Day Event (Open to all Pathology employees)	$550
Quarterly Health & Wellness Guest Speaker Series (MLABS)	Melina Adler	Speakers with Hosting	$1,000

Pathology Department Art Competition

The first Pathology Department Art Competition was held in 2024 themed, "We are U of M Pathology." In June 2025, Pathology employees submitted their artwork for our second Art Competition themed, "The Art of Pathology." The purpose of this competition is to showcase the artistic talents of our employees while also promoting numerous benefits such as building community efforts within the Pathology Department, increasing employee well-being through creating art and appreciating artwork done by others, creating an outlet to share and explore faculty, learners, and staff creativity and share it with others. All faculty, learners, and staff were invited to participate to submit paintings, drawings, sculptures, digital art, collages or other multi-media pieces and also had the option to collaborate within their labs to work as a team, making murals or lab-material based designs. Participants were granted the creative freedom to interpret the given theme and represent the unique aspects of pathology and their lab work in their art. Well-Being Committee members and designated delegates reviewed the art submissions to select the competition winners: First-Place, Second Place and Honorable Mention. Special gratitude to our Trainee Wellness Committee, especially Dr. Herman, for helping craft this initiative!

Participants artwork is currently on display in Building 35 at NCRC.

Football and Basketball Ticket Giveaways

Since 2022, the Pathology Department has been holding athletic ticket giveaways for University of Michigan home football and basketball games, thanks to Dr. Parkos, as part of the department's Well-Being Initiative. Two sets of home game season tickets for football and Men's basketball are given away to Pathology staff, residents, fellows and faculty who submit their names in the drawing to be randomly selected. Ticket winners include Pathology employees from various units/areas from across the department.

Free Fresh Farm Produce Deliveries

Since the Summer of 2023, fresh seasonal farm produce has been delivered, free of charge, for Pathology employees with weekly deliveries beginning in August and running through October. Fresh produce is provided from two local farms: Baker's Acres of Dexter (Christine Baker) and A & B Acres (Jodi Mullet). This initiative has been well-received as employees eagerly line up in advance awaiting their turn to select some delicious fresh produce while also sharing recipe ideas with each other. Special thanks to Tracy Rocco for proposing the Fresh Farm Produce Distribution initiative for our department!

Produce items delivered: Tomatoes, Tomatillos, Green Beans, Zucchini, Eggplant, Peppers (sweet, mild, hot and Paprika), Kale, Chard, Collards, Edamame, Cabbage, Carrots, Garlic, Yellow Wax Beans, Beets, Basil, Cucumbers, Kohlrabi, Lettuce, Potatoes, Okra, Sweet Peas, Onions, Squash (Patty Pan, Spaghetti, Delicata, Butternut, Summer and Winter) and Watermelon.

Yoga Classes for Pathology Department Members

Weekly 30-minute Yoga classes, organized through MHealthy, continue to be held and are taught by Christine Baker, who has been teaching Yoga classes to Pathology Department employees since 2022. Classes are paid for by the Pathology Department and specifically open only to Pathology Department members. Employees must complete the liability and health form in order to register for classes.

Below: *"Histoflora" by Dr. Sandhya Padmanabhan from the 2025 department art competition.*

Engagement and Belonging

Angela Wu, MD
Assistant Chair, Engagement and Belonging.

The Department of Pathology established the Department of Engagement and Belonging in summer 2025 when the Offices of Diversity, Equity, and Inclusion and Health Equity and Inclusion closed.

FY25 was an unprecedented and challenging year for the office with the current changing climate. Our redirection towards the future will likely focus on community outreach and engagement within our department. We continued with participation in residency recruitment events, such as the SimFest event at the SNMA Annual Meeting. To reach younger students who may be interested in a career in Pathology, Karen Barron, pathology allied health education manager, spearheaded departmental participation in events such as the Youth Summit at the Big House as well as other community outreach events, including the Ann Arbor/Saline High School College and Career Fair and the Parkridge Festival, geared towards high school students. The department also hosted a field trip for South Redford High School Center Tech Students to visit our laboratories to raise awareness about medical laboratory professions.


University of Michigan
Department of Pathology
David Gordon, MD
I GOT MY COVID-19 VACCINE
DAVID GORDON
PATHOLOGY
at the
2024
and Graduate Medical Education

Faculty and Staff Development

Laura Lamps, MD
Assistant Chair, Faculty Development

The Assistant Chair for Faculty Development is responsible for the ongoing professional development of faculty in the Department of Pathology and for managing faculty appointments, promotions, and tenure.

In FY25, the promotions committee consisted of Drs. Laura Lamps (Chair), Doug Fullen, and Nick Lukacs. Sixteen faculty (see right) were identified as meeting the criteria for promotion and approved by the medical school, effective September 1, 2025. In addition, 13 faculty members were identified for the FY25 cycle, and their promotion packets are currently being completed and submitted to the medical school for review. With Dr. Fullen's retirement, Dr. Madelyn Lew has rotated onto the committee in his place.

Additional activities included hosting a junior faculty lunch to get feedback on the mentoring catalog, partnering with the Assistant Chair for Education to raise money for an endowed fellowship program, updating the Faculty Onboarding Document, hiring a full-time person onto the HR staff to support faculty in completing their Elements CVs, and hosting many well received lectures through the PRICE (Program for Learning, Innovation, and Career Enhancement) program led by Dr. Lew. The PRICE objectives are to provide mentorship and guidance to medical educators, create a learning plan for educators at all levels, and provide faculty development opportunities around medical education and other topics such as leadership, quality/safety, and career development.

Faculty Promoted effective September 1, 2025:

- **Muhammad Nadeem Aslam, MBBS**
  Associate Research Scientist
- **Michael Bachman, MD, PhD**
  Clinical Professor
- **Jennifer Brazil, PhD**
  Research Associate Professor
- **Noah Brown, MD**
  Clinical Professor
- **Kyle Conway, MD, JD**
  Clinical Associate Professor
- **Patricia De Assis, PhD**
  Research Assistant Professor
- **Sean Ferris, MD, PhD**
  Clinical Associate Professor
- **Amer Heider, MD**
  Clinical Professor
- **Rahul Mannan, MD**
  Research Assistant Professor
- **David Manthei, MD, PhD**
  Clinical Associate Professor
- **Judy Pang, MD**
  Clinical Professor
- **Daniel Polasky, PhD**
  Research Assistant Professor
- **Lee Schroeder, MD, PhD**
  Clinical Professor
- **Jiaqi Shi, MD, PhD**
  Clinical Professor
- **Yuting Yang, PhD**
  Research Assistant Professor
- **Fengchao Yu, PhD**
  Research Assistant Professor

Veterans Affairs Pathology and Lab Medicine

Darius Amjadi, MD, JD
Chief of Pathology and Laboratory Services,
Veteran's Administration Hospital Laboratories, VA

In FY2024 (October 1, 2023 to September 30, 2024) the Ann Arbor VA Healthcare System Department of Pathology and Laboratory Medical Services was preparing for a major analyzer and automation line transition, which would not take place until FY25. That did not mean that major changes weren't happening. In the pathology staff, Dr. Seema Sethi left to become the chief of pathology at the Detroit VA. We were lucky enough to recruit a University of Michigan GI Pathology Fellow, Dr. Margaret Fang, to replace her. Dr. Fang immediately began work to validate new IHC stains to bring more capability in-house. She and her pathologist colleagues produced the highest number of AP RVUs of any 1b VA facility and were 4th in overall RVUs regardless of facility size.

For the last 10 years, the Ann Arbor VA provided consultation, confirmation, and peer review for the Northern Indianapolis VAMC, using a legacy Aperio digital pathology system. In FY24 we were able to upgrade our system to the second generation Philips digital pathology platform, with Ann Arbor receiving an SG300 as part of a national VA digital and telepathology pilot program. Our site has been responsible for writing SOPs and setting workflows for the rest of the VAs in the country.

Finally, the Ann Arbor VA has expanded support for facilities throughout the region, providing cytopathology and microbiology testing to all three other Michigan VA medical centers and Point of Care testing services for new VA clinics in Canton, MI and Findlay, OH.

CAP Proficiency Testing Results (FY24)

Department	% Success
Blood Bank	100.00%
Chemistry	99.00%
Hematology	99.35%
Microbiology	99.52%
Ancillary Test Sites	99.60%
Molecular	100.00%
Jackson CBOC	100.00%
Flint CBOC	100.00%
Adrian CBOC	100.00%
Canton CBOC	100.00%
Howell CBOC	100.00%
Green Rd (DERM)	100.00%

Phlebotomy Wait Times: Goal 90%< 10 Min Per National Standard

Total Number of Patients Seen	62,754
Total Number of Patients seen within 10 minutes	28,980
% of Patients Seen Meeting National Standard Target of < 10 minutes	**46.18%**

Aspect of Care: Accuracy of Anatomic Pathology Diagnosis

Case	FY23	FY24
Total number of cases with frozen sections	92	117
Total number of frozen sections	259	275
Frozen sections in agreement with permanent sections	255	275
Diagnosis deferred on frozen section	2	0
Frozen sections in disagreement with permanent sections	2	0
% Concordance	**97.8%**	**100.0%**

Finance and Administration

Brooklyn Khoury, MBA, MHSA, MS
Director, Finance and Administration

The Division of Finance and Administration, under the auspices of the Office of the Chair, is responsible for the business, operational, and fiscal affairs of the Department of Pathology, as mandated by the policies of the Chair, Michigan Medicine, and the University. In this section, key achievements of the Finance and Administration team are highlighted as well as the supporting services provided by this division led by Ms. Brooklyn Khoury, MS, MHA, MBA, who administratively oversees a combined annual expense budget of $312 Million and $1.2 Billion in annual gross charges.

Some key divisional highlights for this academic year include:

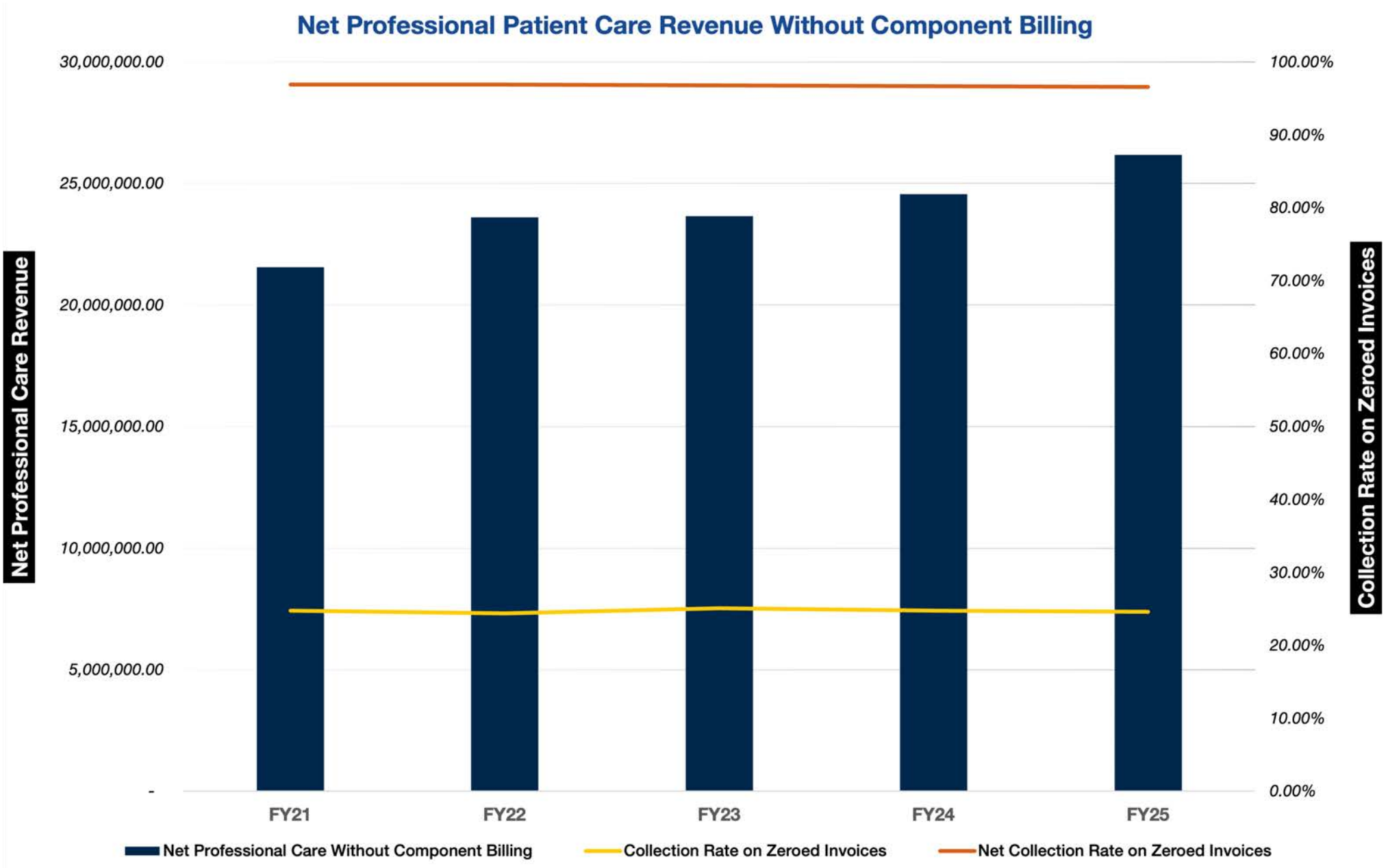
- Execute the financial commitment for digital pathology, including acquiring and installing 8 digital slide scanners and hiring a team of slide scanning technologists.
- Labor market adjustments for phlebotomy staff.
- Pathologists' Assistant labor market adjustments (first in 14 years).
- Implement a new position request workflow, including a live, electronic position tracker.
- Reclassify Pathology Informatics staff to appropriate positions aligned with MM HITS.
- Integrate Pathology Informatics administrative structure with MM HITS by creating a dotted line reporting relationship between the PI administrative director and HITS leadership.
- Overhaul clinical administrative assistant support services, including equity adjustments, market adjustments, and approval of 2 incremental FTEs and 1 incremental supervisor, resulting in a vacancy rate reduction from 35% to 0%.
- Reorganize the administrative structure in the Division of Clinical Pathology by creating an incremental Associate Operations Director.
- Achieve FY24 budget targets for Medical School and Hospital budgets.
- Establish a formal Pathology Space Committee.

The Division of Finance and Administration is divided into support services for the pathology laboratories; academic and business affairs; and human resources, faculty affairs, and education.

Pathology Laboratories

The administrative support center team for Pathology is responsible for preparing and monitoring all hospital laboratories' revenue, expense, capital budgets, and personnel and payroll systems. During this period, total laboratory operating expenditures were $219 million. Staffing levels in the laboratories remained largely flat at 893 paid FTEs. In part, this is a result of the nationwide trend in technical staffing shortages. We developed several incentives to attract new hires and retain existing staff during the year. We are also looking at ways to develop staffing pipelines by partnering with local schools. Pathology is responsible for 9.0% of total hospital gross revenue and 3.7% of total expense. Gross revenue was up 6.4% when compared to FY24. Billed tests in FY25 were 7.8 million vs. 7.5 million in FY24, an increase of 4.6%. (See pgs. 73 & 77)

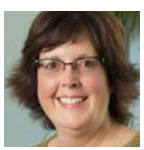
The administrative support center team worked diligently in FY24 as we remodeled the University Hospital clinical laboratories. Throughout FY24, our facilities managers and the PRR team successfully completed the final portions of the renovations while actively addressing issues as they arose. The administrative support center team members served as departmental liaisons with nursing, the office of clinical affairs, the office of clinical safety, biomedical engineering, and hospital finance. They served on the quality month committee, pathology diversity, equity, and inclusion committee, pathology patient


Net Professional Patient Care Revenue Without Component Billing
30,000,000.00
25,000,000.00
20,000,000.00
15,000,000.00
10,000,000.00
5,000,000.00
-
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Net Professional Care Revenue
Collection Rate on Zeroed Invoices
FY21
FY22
FY23
FY24
FY25
Net Professional Care Without Component Billing
Collection Rate on Zeroed Invoices
Net Collection Rate on Zeroed Invoices

Mike McVicker
Administrative Manager, Clinical Operations

David Golden
Financial Director, Healthcare

Kristina Andoni
Financial Analyst Senior, Medical School



Christine Shaneyfelt
Financial Analyst Senior, Hospital

and family advisory council, pathology social media committee, pathology space committee, and others. The team addressed patient safety issues and cooperated on process improvement initiatives with partners such as the Rogel Cancer Center, UH operating rooms, and various medical procedure units.

Office of Academic and Business Affairs – Medical School

The Office of Academic and Business Affairs – Medical School, is responsible for all administrative and academic operations associated with the Department, including management of department finances (budgets, contracts, research grants, forecasts, and analyses), as well as clinical billing (professional and technical front-end operations). In collaboration with the Chair, Ms. Brooklyn Khoury implemented and directed strategic goals for Medical School operations including the development of policy and business plans, management of faculty compensation and departmental funds, and use of departmental facilities, including modifications, renovations, and reassignment of department space.

The office also manages the Michigan Medicine and All Funds expenditures and forecast processes. Key departmental metrics include:

- Total Medical School All Funds expenditures including the MCTP for FY25 were $93.5 million and Hospital expenditures were $218.7 million.
- Hospital technical gross revenue for FY25 was $1.16 billion, compared to $1.04 billion in FY24, an increase of 11.5%.
- Professional fee gross charges were $105.7 million in FY25 compared to $95.3 million in FY24, an increase of 10.9%.

In FY24, our faculty received 46 awards from the NIH and ranked 7th in the nation in funding by the NIH, up from our 9th place in FY24, and 4th in the nation when considering the number of awards received. Total committed grants in FY25 was $29.0 million, an 8.8% decrease from FY24. Our total sponsored research spending in FY25 was $31.7 million, down from $34.6 million in FY24, an 8.4% decrease.

Business Affairs

Business Affairs is responsible for oversight of all accounting and financial transactions for the Department as well as ensuring appropriate hospital and medical school funds flow. Our billing office handles all send-out, component, and Michigan Medicine Laboratories (MLabs) billing, and any interdepartmental, MLabs, or Hospital patient billing error corrections. The grants management office handles the day-to-day management of research funds to ensure compliance with funder requirements and to ensure the funds are distributed appropriately both within Pathology as well as across internal and external research groups. Business Affairs is also responsible for Hospital and Medical School financial reporting and budget preparation for the Department as well as administering numerous contracts. As part of the budgeting process, they develop and maintain the capital equipment process, prepare financial analyses, and produce numerous ad hoc reports. In addition, all faculty and staff effort and funding changes are processed through this unit.

Finance

The Department of Pathology is in a strong financial position and continues to thrive under the leadership of Dr. Charles Parkos, Ms. Brooklyn Khoury, and Mr. David Golden, with endowments and FFAE to support our clinical, research, and educational missions exceeding $144.1 million. In FY25, we experienced a larger gap between our revenues and expenses, with Revenues at $71.6 million, up 2.2% from FY24 and expenses at $93.5 million, up 7.1% from FY24, mostly due to investments in our strategic priorities. This resulted in an operating loss of $21.9 million. The loss was offset by non-operating income (investments, dean's contributions, and other institutional support payments). Including our non-operating income, FY25 ended with a net loss of $8,617,918. In contrast, in FY24, we experienced a loss of $5,562,126.

Michigan Medicine has long-range expansion and upgrades planned that require greater-than-average net budget increases as compared to those seen over the past decade. As a result, there is significant pressure on Departments to reduce expenses and increase revenues. Our professional patient care revenues

continue to be stable as evidenced by our FY25 collection rate at 24.6% of gross charges as compared to 24.8% in FY24. Our group practice net collection rate on zeroed balances remains strong at 96.6%. Pathology faculty and staff paid FTEs have grown slightly to 1,262.6 in FY25 versus 1,216.1 in FY24. Economic constraints have forced us to do more with less staffing. As a result, filling vacant staff positions has become more difficult. We are grateful to our staff, who have stepped up to the plate to take on additional duties to ensure the missions of Pathology continue to meet and exceed expectations.

We have outstanding faculty and staff who continue to support exceptional scholarship and clinical care. Our clinical services continue to grow and maintain the highest quality. New educational opportunities continue to attract top trainees, and our future looks bright as we move forward into our newest facilities, designed for the future. Overall, FY25 has been a tremendous year for our department.

Human Resources, Faculty Affairs, and Education

Our Staff Human Resources Team provides support for Pathology's hospital laboratories (approximately 892.5 FTEs) and Medical School support staff, including our research programs (approximately 219.6 FTEs). This includes processing all new hires, promotions, merit increases, orientations, as well as transfers when staff move to other departments, or terminations for those who leave our institution. They also help to coordinate employee recognition events and awards.

Faculty Affairs is responsible for coordinating appointments, reappointments, and promotions for our 181 active faculty and the 17 supplemental appointments in the Department. In FY25, eighteen new faculty joined the Department of Pathology while we bid farewell to eleven faculty members. Fifteen of our faculty successfully completed the promotion process. *(See Appendix pg. 104)*

Our faculty received numerous awards in recognition of their achievements in academics, research, and clinical service. *(See Appendix on pg. 102)*

The Education Office includes the Residency and Fellowship Training Programs (29 residents and 24 fellows in 10 ACGME and 8 non-ACGME programs), the Medical Student Education Teaching Programs for the M1 and M2 laboratories, and the M4 Clerkship Program, as well as the Molecular and Cellular Pathology PhD program with 25 students actively pursuing their doctoral degrees. Management responsibilities are focused on curriculum management (including the Research Seminar Series), academic records, budget planning and financial operations, recruitment, and program activities, such as the annual departmental research symposium. The department also holds two NIH training grants (PIs Nicholas Lukacs, PhD; Andrew Lieberman, MD, PhD, Zaneta Nikolovska-Coleska, PhD) which support four pre- and six postdoctoral trainees.

Office of the Chair

The staff in the Office of the Chair coordinates the Advances in Forensic Medicine and Pathology conference, which was not held in FY25. They also reconcile departmental procurement cards, renew medical licenses, and process CME requests for faculty. In addition, they provide support to the Chair and Chief Department Administrator, including scheduling, travel arrangements, data collection, event planning, correspondence, committee support, and faculty recruitment.

Community Service

In support of our mission as a non-profit healthcare provider, our faculty and staff engage in numerous service activities throughout the year. Some of the activities our faculty and staff engaged in this year included:

Local Activities (UM, Ann Arbor, Michigan)

- Relay for Life Teams to raise funds for cancer treatment
- Assisted MetroHealth in validating the Verify-Now assay for aspirin and Plavix-specific platelet aggregation
- Gift of Life Michigan board and committee memberships
- Patient and Families Advocacy Committee (PFAC)
- Numerous Medical School and Health System committee leadership/membership (see our list of new leadership positions)

John Harris
Manager, Research Administration

Catherine Berrigan
Manager, Faculty Affairs

FY25 Pathology Income Statement		
Revenue	**FY25**	**FY24**
Patient Care Revenues	$29,420,853	$27,655,238
UMHS Service Payments	$11,365,651	$10,330,701
Net Total Research (Directs & Indirects)	$27,681,963	$28,193,389
Gifts and Other Income (Wayne/Washtenaw ME, etc.)	$3,111,353	$3,874,334
Total Revenue	**$71,579,820**	**$70,053,662**
Expenses		
Total Salaries	$68,676,407	$63,398,286
Total Non-Payroll Expense	$24,791,045	$23,883,960
Total Operating Expenses	$93,467,452	$87,282,246
Operating Margin (Loss)	**$(21,887,632)**	**$(17,228,584)**
Non-Operating Income and Expense	$13,269,714	$11,666,458
(Includes Investment Income, UMHS Margin Sharing, Departmental Commitments, etc.)		
Total Margin	**$(8,617,918)**	**$(5,562,126)**

- High school genetics, ethics, Doctors of the Future and other programs, as well as volunteering to coach or direct athletic programs
- High School Ethics Bowl judge
- Service on multiple non-profit boards of directors

National

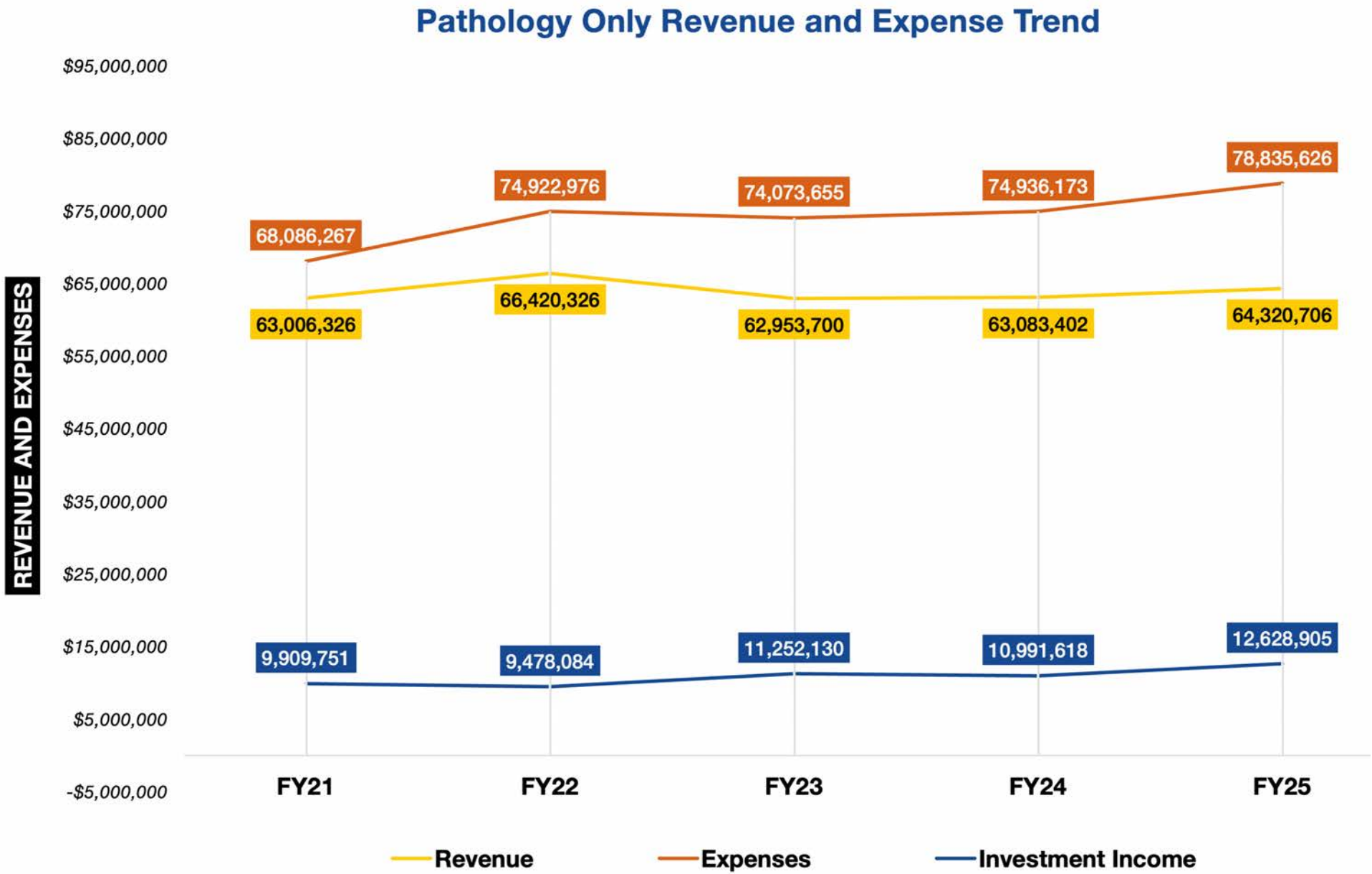
- Assisted in multiple inspections for College of American Pathologists (CAP), American Association of Blood Banks (AABB), American Society for Histocompatibility and Immunogenetics (ASHI)
- Serving on multiple national and international professional organization boards and committees. *(See Appendix pg. 104)*

International

- Inauguration of Global Pathology and Laboratory Medicine Program (GPALM) advancing global collaboration, education, and digital transformation in pathology and laboratory medicine
- Presented in Cairo and Dublin as a member of the GPALM team (Balis)
- GPALM weekly lecture series with participants from Lebanon, Egypt Ghana, Peru, Nepal, Nigeria, Kenya, India, Ethiopia, Rwanda, Romania, Mauritania, and Sudan.
- GPALM Summit planned for November 13, 2026.
- Partnering with Aga Khan University to deploy AI solutions in the cloud for cancer diagnosis, on an NIH/NCI U01 Grant (Balis).
- Member of the Pathology Digital Workflow Implementation Team for Aga Khan University to select primary IMS vendor (Balis). Collaboration has led to $850,000 in savings compared to original vendor quotes.
- Digital transformation project to transition American University of Beirut's pathology services to a fully digital platform. Assisted them in obtaining a donated Leica-Aperio AT2-DX scanner.

Employee Recognition

The Department of Pathology recognizes the valuable contributions made by our faculty and staff alike. In FY25, we recognized the years of service for faculty and staff who have served for 10, 20, 30, and even 40 years, as well as those who received Above and Beyond Awards, as nominated by their peers. *(Appendix pg. 112)* The number of employees who have been in the department for over 20 years speaks to the dedication of the employees as well as to the collegial atmosphere of our Pathology Department. This year we also honored our retirees. *(See Appendix pg. 111)*


Pathology Only Revenue and Expense Trend
REVENUE AND EXPENSES
$95,000,000
$85,000,000
$75,000,000
$65,000,000
$55,000,000
$45,000,000
$35,000,000
$25,000,000
$15,000,000
$5,000,000
-$5,000,000
68,086,267
74,922,976
74,073,655
74,936,173
78,835,626
63,006,326
66,420,326
62,953,700
63,083,402
64,320,706
9,909,751
9,478,084
11,252,130
10,991,618
12,628,905
FY21
FY22
FY23
FY24
FY25
Revenue
Expenses
Investment Income

Anatomic Pathology Case Volumes	FY21	FY22	FY23	FY24	FY25	1-YR	5-YR
Cytopathology							
FNA by Pathologist with ROSE[1]	134	114	138	161	111	-31.06%	-17.16%
FNA, No ROSE[1]	871	837	727	724	1,202	66.02%	38.00%
FNA, with ROSE[1]	2,048	2,243	2,509	2,733	2,586	-5.38%	26.27%
Gyn Case1	24,384	24,630	23,810	22,164	21,200	-4.35%	-13.06%
Non-Gyn Case	7,868	8,118	8,207	8,163	8,236	0.89%	4.68%
Total / 1 ROSE is Rapid On-Site Assessment	**35,305**	**35,942**	**35,391**	**33,945**	**33,335**	**-1.80%**	**-5.58%**
Dermatopathology							
Derm In-House	15,715	15,016	15,594	15,345	14,208	-7.41%	-9.59%
Derm Outside	6,377	6,757	6,421	6,657	6,786	1.94%	6.41%
MLabs Derm	7,971	8,636	8,291	6,667	6,946	4.18%	-12.86%
Total	**30,063**	**30,409**	**30,306**	**28,669**	**27,940**	**-2.54%**	**-7.06%**
Hematopathology							
Hemepath In-House	3,674	3,598	3,647	3,864	4,309	11.52%	17.28%
Hemepath Outside	2,400	2,713	2,783	2,851	2,716	-4.74%	13.17%
Total	**6,074**	**6,311**	**6,430**	**6,715**	**7,025**	**4.62%**	**15.66%**
Neuropathology							
MLabs Muscle	167	162	138	167	163	-2.40%	-2.40%
Muscle In-House	98	102	93	101	221	118.81%	125.51%
Muscle Outside	22	34	25	16	23	43.75%	4.55%
Neuro In-House	785	761	817	1,071	1,130	5.51%	43.95%
Neuro Outside	879	1,144	1,536	1,336	1,475	10.40%	67.80%
Total	**1,951**	**2,203**	**2,609**	**2,691**	**3,012**	**11.93%**	**54.38%**
Ophthalmic							
Ophthalmic In-House	1,397	1,462	1,451	1,604	1,520	-5.24%	8.80%
Ophthalmic Outside	75	83	92	92	83	-9.78%	10.67%
Total	**1,472**	**1,545**	**1,543**	**1,696**	**1,603**	**-5.48%**	**8.90%**
Pediatric and Perinatal Pathology							
Fetal Exams	256	257	240	285	301	5.61%	17.58%
Peds Autopsy	24	28	23	33	20	-39.39%	-16.67%
Peds In-House	3,677	3,615	3,971	4,086	4,141	1.35%	12.62%
Peds Outside	408	456	445	652	551	-15.49%	35.05%
Placentas	1,825	2,149	2,066	2,326	2,343	0.73%	28.38%
Total	**6,190**	**6,505**	**6,745**	**7,382**	**7,356**	**-0.35%**	**18.84%**

Anatomic Pathology Case Volumes Continued...							
Renal							
Renal In-House	809	856	1,158	1,127	897	-20.41%	10.88%
Renal Outside	34	52	87	39	28	-28.21%	-17.65%
Total	**843**	**908**	**1,245**	**1,166**	**925**	**-20.67%**	**9.73%**
Technical Only							
Technical Only	340	568	1,054	1,828	1,605	-12.20%	372.06%
Technical with Interpretation	398	283	333	343	357	4.08%	-10.30%
Total	**738**	**851**	**1,387**	**2,171**	**1,962**	**-9.63%**	**165.85%**
Outside							
Breast	1,508	1,768	1,911	1,901	1,817	-4.42%	20.49%
Cardiac	24	15	39	41	55	34.15%	129.17%
Cytology	1,076	1,223	1,193	1,412	1,181	-16.36%	9.76%
Dermatopathology	6,377	6,757	6,421	6,657	6,786	1.94%	6.41%
Endocrinology	539	655	788	825	864	4.73%	60.30%
Gastrointestinal	5,108	5,548	5,873	5,910	5,334	-9.75%	4.42%
Genitourinary	1,845	2,252	2,346	2,369	2,449	3.38%	32.74%
Gynecologic	1,520	1,735	1,914	2,012	1,881	-6.51%	23.75%
Head & Neck	1,303	1,403	1,552	1,631	1,745	6.99%	33.92%
Hematopathology	2,400	2,713	2,783	2,851	2,716	-4.74%	13.17%
InterDepartmental Consult	608	296	394	281	396	40.93%	-34.87%
Misc. Outside Case	6	1	5	4	13	225.00%	116.67%
Muscle	22	34	25	16	23	43.75%	4.55%
Neuropathology	879	1,144	1,536	1,336	1,475	10.40%	67.80%
Ophthalmic	75	83	92	92	83	-9.78%	10.67%
Pediatric	408	456	445	652	551	-15.49%	35.05%
Pulmonary	2,563	2,961	2,960	3,100	2,860	-7.74%	11.59%
Renal	34	52	87	39	28	-28.21%	-17.65%
Soft Tissue	1,696	1,827	2,109	2,022	1,862	-7.91%	9.79%
Total	**27,991**	**30,923**	**32,473**	**33,151**	**32,119**	**-3.11%**	**14.75%**

Table 1: *Anatomic Pathology Case Volumes 2021-2025 (From pg. 10)*

Clinical Pathology Billed Test Volumes	FY21	FY22	FY23	FY24	FY25	1-YR	5-YR
Clinical Chemistry and Toxicology							
Chemical Pathology	3,277,102	3,177,933	3,297,181	3,425,770	3,831,148	11.83%	16.91%
Special Chemistry	771,761	771,761	855,411	931,522	-	-100.00%	-100.00%
Total	**4,048,863**	**3,949,694**	**4,152,592**	**4,357,292**	**3,831,148**	**-12.08%**	**-5.38%**
Transfusion Medicine							
Blood Bank Bone Marrow	1,353	1,426	1,609	1,304	1,078	-17.33%	-20.33%
MM Pathology Blood Bank	335,100	323,820	330,983	367,958	380,435	3.39%	13.53%
Blood Procurement	66,279	60,800	59,254	61,940	64,311	3.83%	-2.97%
Transfusion/Apheresis	1,238	2,015	2,057	2,018	1,774	-12.09%	43.30%
Total	**403,970**	**388,061**	**393,903**	**433,220**	**447,598**	**3.32%**	**10.80%**
Other Clinical Laboratories							
Path Hemo/Coag Unit UH	1,293,850	1,319,143	1,348,313	1,293,549	1,336,310	3.31%	3.28%
Flow Cytometry Lab	101,981	101,563	103,741	110,751	124,991	12.86%	22.56%
Histocompatibility	22,209	22,209	30,039	32,304	34,648	7.26%	56.01%
Microbiology & Virology	963,936	752,319	624,378	591,523	616,584	4.24%	-36.03%
Path Reference Tests	145,234	164,397	172,953	203,431	215,344	5.86%	48.27%
Total	**2,527,210**	**2,359,631**	**2,279,424**	**2,231,558**	**2,327,877**	**4.32%**	**-7.89%**

Table 2 (Above): *Clinical Pathology Billed Test Volumes from 2021-2025 (From pg. 20)*

Tranfusion Medicine	FY21	FY22	FY23	FY24	FY25	1-YR	5-YR
Blood Bank Main Laboratory							
Red Blood Cells	34,340	31,838	32,248	30,992	34,249	10.51%	-0.26%
Whole Blood	-	-	-	125	122	-2.40%	-2.40%
Random/Pooled Platelets	-	-	-	-	-	-	-100.00%
Apheresis Platelets	16,193	15,992	15,984	16,428	19,598	19.30%	21.03%
Plasma	8,144	5,974	5,275	6,031	6,029	-0.03%	-25.97%
Cryoprecipitate	4,504	7,090	7,205	7,886	7,893	0.09%	75.24%
Total Components Transfused	**63,181**	**60,894**	**60,712**	**61,462**	**67,891**	**10.46%**	**7.45%**
Immunohematology Reference Lab							
Antibody Identifications	1,685	1,613	1,520	1,652	1,666	0.85%	-1.13%
ABO Resolution	258	262	301	290	272	-6.21%	5.43%
BMT	298	246	615	883	399	-54.81%	33.89%
Eulates	326	226	258	237	197	-16.88%	-39.57%
Adsorptions	318	388	252	293	265	-9.56%	-16.67%
Titers	616	568	616	726	753	3.72%	22.24%
Special Antigen Typing	7,097	6,948	6,420	7,121	7,563	6.21%	6.57%
Total Activity / *Includes procedures not listed above	**12,619**	**11,920**	**12,647**	**13,416**	**12,813**	**-4.49%**	**1.54%**
Cellular Therapies Laboratory							
Collections Processed	482	487	538	461	447	-3.04%	-7.26%
Bags Frozen	813	807	997	769	622	-19.12%	-23.49%
Transplants, Autologous	130	116	138	134	132	-1.49%	1.54%
Transplants, Allogeneic	51	48	46	43	24	-44.19%	-52.94%
Transplants, Unrelated	58	57	46	85	98	15.29%	68.97%
CAR-T Products	38	44	51	47	97	106.38%	155.26%
Total Transplants	**239**	**221**	**230**	**262**	**254**	**-3.05%**	**6.28%**
Apheresis Service							
Therapeutic Plasmapheresis	1,334	1,302	1,324	1,332	917	-31.16%	-31.26%
HPC Collections	347	331	410	301	196	-34.88%	-43.52%
Donor Pre-Evaluations	202	253	298	302	336	11.26%	66.34%
LDL Apheresis	62	76	52	55	42	-23.64%	-32.26%
RBC Exchange	199	244	243	257	319	24.12%	60.30%
CAR-T Collections	40	44	52	62	131	111.29%	227.50%
Total Procedures	**2,184**	**2,250**	**2,379**	**2,309**	**1,941**	**-15.94%**	**-11.13%**

Table 3 (Above): *Transfusion Medicine data from 2021-2025 (From pg. 25)*

Faculty Awards FY25

Faculty	Award Name	Organization
Rouba Ali-Fehmi	• Co-Editor • Merit Medal Award	• Gynecologic Pathology • International Academy of Pathology
Thomas Annesley	Outstanding Lifetime Achievement Award in Chemistry	Association for Diagnostics and Laboratory Medicine
Sara Bailey	Medical Education Scholars Program	Michigan Medicine
Ul Balis	• Outstanding Service Award • Distinguished Service Award	• American Board of Preventive Medicine • Association for Pathology Informatics
Arul Chinnaiyan	• HHMI Investigator Appointment Renewal • Elected Member	• Howard Hughes Medical Investigator • American Academy of Arts and Sciences
Eun-Young (Karen) Choi	Undergraduate Medical Educator in Anatomic Pathology Award	Department of Pathology, Michigan Medicine
Jensyn Cone Sullivan	• 40 Under Forty Award • Annual Meeting Highlights, Education Session • Trainees' Favorite Lectures	• American Society for Clinical Pathology • Association for the Advancement of Blood and Biotherapies • University of Michigan School of Nursing
Julia Dahl	ELAM/ELH Fellow	Drexel University
Analisa DiFeo	• Outstanding Journal Article Award • MICHR 2025 Distinguished Clinical and Translational Research Mentor Award	• Molecular Cancer Therapeutics • Michigan Medicine
Victor Elner	Richard K. Dortzbach Lecture and Teaching Awards	Society of Academic Orbital Surgeons and Society for Eye Plastic and Reconstructive Survery
Carmen Gherasim	Health Equity/Health Disparity Scholars Program	Michigan Medicine
Mark Girton	Medical Education Scholars Program	Michigan Medicine
Guang Huang	Leading Guest Editor	Molecules, Special Edition
Xin Jing	Making a Difference Award	Department of Pathology, Michigan Medicine
Celina Kleer	Elected Fellow	Association of American Physicians
Paul Lephart	Fellow	Michigan Medicine Leadership Academy
Andrew Lieberman	Elected Member	Association of American Physicians
Rohit Mehra	• Best Paper Award • Detroit's 2024 Top Docs	• Asian Journal of Urology • Hour Detroit
Kamran Mirza	• Keitges Grant for Medical Ethics • Resident Teaching Award	• College of American Pathology Foundation • Department of Pathology, Michigan Medicine
Jeffry Myers	Lifetime Achievement Award	Pulmonary Pathology Society
Abhijit Parolia	• NextGen Star • V Foundation Award	• American Association for Cancer Research • V Foundation
Virginia Pierce	Undergraduate Medical Educator in Clinical Pathology Award	Department of Pathology, Michigan Medicine
Sethu Pitchiaya	Early Career Service Award	University of Michigan Medical School
Rajesh Rao	Achievement Award	American Academy of Ophthalmology
Lanbo Xiao	2025 Research Faculty Recognition Award	Office of Vice President of Research, University of Michigan Medical School

New National Leadership Positions FY25

Faculty	Role	Organization
Sara Bailey	Surgical Pathology Committee	College of American Pathologists
Ul Balis, MD	• Co-Chair, Pathology Informatics & AI Committee • Pathology Advisory Board Member	• Project Sanata Fe Foundation • Mopec
Robert Bell	Informatics Representative, Training and Education Committee	Association for Molecular Pathology
Thomas Brenn	Chair, Membership Committee	United States and Canadian Academy of Pathology
Noah Brown	• Chair, Molecular Genetics Program	• Association of Molecular Pathology
Sandra Camelo-Piragua	• Vice President • Test Development and Advisory Committee, Neuropathology	• American Association of Neuropathologists • American Board of Pathology
May Chan	Test Development and Advisory Committee, Dermatopathology	American Board of Pathology
Arul Chinnaiyan	• Sjoberg Prize Committee • Chair, Executive Committee • Member,Pathology in Cancer Research Working Group Steering Committee	• The Royal Swedish Academy of Sciences • Early Detection Research Network • American Association of Cancer Research
Kathleen Cho	Chair, Membership Committee, Section 4	National Academy of Medicine
Marcin Cieslik	• Co-Leader, Genomics Working Group	• Prostate Cancer Foundation Young Investigator Network

Jensyn Cone Sullivan	• Member, Curriculum, Educational Resource Scientific Advisory Committee • Chair, Transfusion Medicine/ Blood Bank Scientific Interest Group • Michigan Chair, Community Organizers • Member, Current and Emerging Topics Subsection, Cellular Therapies Section • Member, Quality, Regulatory, and Management Topics Subsection, Cellular Therapies Section • Chief Education Planner, Annual Meeting Planning Committee	• American Society for Clinical Pathology • Alloantibody Exchange • Association for the Advancement of Blood and Biotherapies • Association for the Advancement of Blood and Biotherapies • Michigan Association of Blood Banks
Evan Farkash	Past Chair, Diagnostics Community of Practice Executive Committee	American Society of Transplantation
Thomas Giordano	Chair, Adrenal Cancer	International Collaboration on Cancer Reporting
Mark Girton	• Membership Committee • Outreach and Advocacy Officer, Hematology and Coagulation Division	• Academy of Clinical Laboratory Physicians and Scientists • Association of Diagnostics and Laboratory Medicine
Simon Hogan	Member, Cellular and Molecular Gastroenterology Council	AGA Institute
Alexandra Hristov	Member, Program Committee and Lead, Lymphoproliferative Subgroup, Appropriate Use Committee	American Society of Dermatopathology
Matthew Iyer	Sarcoma Disease Committee	Society of Surgical Oncology
Annette Kim	• Program Chair-elect, Board of Directors • Chair, Subcommittee on Precision Medicine	• Association of Molecular Pathology • American Society of Hematology
Celina Kleer	• Member, External Advisory Board • Deputy Editor	• Mayo Clinic Breast Cancer SPORE • Breast Cancer Research Journal
L. Priya Kunju	• Member, Ramzi S. Cotran Young Investigator Award Committee • Member, Foundation Committee	• United States and Canadian Academy of Pathology
Rohit Mehra	• Member • Standing Member, Kidney Cancer Analysis Working Group and Prostate Cancer Analysis Working Group	• Editor's Academy of Modern Pathology • NCI Clinical Proteomic Tumor Analysis Consortium
Gabriel Nunez	Professor	Osaka University Center for Infectious Disease Education and Research, Japan
Aiko Otsubo	Co-Chair, Communications Committee	Cancer Genomics Consortium
Abhijit Parolia	Planning Committee	Coffey-Holden Prostate Cancer Academy Meeting
Lina Shao	Vice Chair, Laboratory Quality Assurance Committee	American College of Medical Genetics
Jiaqi Shi	• Standing Member, Mechanisms of Cancer Therapeutics Study Section • Special Emphasis Panel, Scientific Review Group, 10 ZRG1 HSS-N (91) S Meeting • Chair and Invited Speaker, and Clinical Therapeutics Section, 56th Annual Meeting • Mentor, Mentoring Academy • Expert Reviewer (ad hoc)	• National Institutes of Health • Society for Leukocyte Biology • United States and Canadian Academy of Pathology • UK Research and Innovation
Maria Westerhoff	• Chair, Nominations Committee • Past President • Board of Directors	• Rodger Haggitt GI Pathology Society • United States and Canadian Academy of Pathology
Lanbo Xiao	Grant Review Committee, Cancer Research Program	Department of Defense

Table 4-6: *Faculty Awards FY25, New National Leadership Positions FY25, and New Department Leadership Appointments FY25* *from pg. 95.*

New Department/Institutional Leadership Appointments FY25

Faculty	Role	Area/Specialty
Ul Balis	Associate Chief Medical Officer	Michigan Medicine
Scott Bresler	Director	Dermatopathology Fellowship Program
May Chan	Interim Section Head	Dermatopathology
Marcin Cieslik	Director of Bioinformatics	Division of Diagnostic Genetics and Genomics
Jensyn Cone Sullivan	• Director • Director • Voting Member, Cellular Therapy Scientific Review Committee • Member, Cellular Therapies Internal and External Review Committee • Member, Clinical Competency Committee, Pathology Residency Program • Member, Clinical Competency Committee, Transfusion Medicine Fellowship Program	• Blood Bank • Transfusion Medicine Fellowship Program • University of Michigan • Department of Pathology, Michigan Medicine
Julia Dahl	Division Director	MLabs
Paul Harms	Program Director	Dermatopathology Fellowship Program
Simon Hogan	Co-Director	Molecular and Cellular Pathology Graduate Program
Xin Jing	Member of CLINACAPS	U-M Medical School
Evan Keller	Director of Research Cores	Office of the Vice President of Research, UMMS
Kristine Konopka	Service Director	Thoracic Pathology
L. Priya Kunju	Division Director	Division of Anatomic Pathology
Shih Hon (Sean) Li	• Interim Section Head • Medical Director	• Transfusion Medicine • Coagulation Laboratory
Rahul Mannan	Director	MCTP Histopathology Lab
Rohit Mehra	• Co-Director • Chair	• Biospecimen Core • GUPS Education Committee
Kamran Mirza	• Division Director • Assistant Chair	• Division of Training and Communications • Education
Charles Parkos	Member, Working Group Integration Committee	FASEB
Sethu Pitchiaya	• Assistant Director of Shared Resources • Chair of Graduate Admissions	• Rogel Cancer Center • Program in Cell and Molecular Biology
Rajesh Rao	Executive Committee	Taubman Research Institute
Jeff Rual	• Co-Director • Chair, Lab Safety Executive Committee	• Molecular and Cellular Pathology Graduate Program • University of Michigan Medical School
Lee Schroeder	• Clinical Practice Committee • Interim Division Director	• Michigan Medicine • Clinical Pathology
Jiaqi Shi	Member, Review Committee, UM-PKU Joint Institute RFP Study Section	University of Michigan
Stephanie Skala	Director	Surgical Pathology and Histology and Frozen Section Laboratories
Lauren Smith	• Committee on Oversight of Administrative Action, Faculty Senate • GME Special Review Committee	Michigan Medicine
Riccardo Valdez	• Voting Member, Ambulatory Care Oversight Committee • Voting Member, Executive Committee on Clinical Affairs	• Michigan Medicine • U-M Medical School

Comm Agreement FY25

Agreement Type	Organization Name	UM Start Up	Inventors
EULA(>$5000)-Non-Exclusive	ModernaTX, Inc.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(<$5000)-Non-Exclusive	For Metrics	No	Aleksey Nesvizhskiy
EULA(>$5000)-Non-Exclusive	Hyku Biosciences, Inc.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Promega Corporation	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
Copyright>Non-Exclusive	Promise Bio Ltd.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Boehringer Ingelheim RCV GmbH & Co KG	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	IDEXX Laboratories	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	BioNTech US, Inc.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
License Amendment>w/ Technology	LynxDx	Yes	Arul Chinnaiyan, Daniel Rhodes, Rohit Mehra, Scott Tomlins, Yuping Zhang
EULA(>$5000)-Non-Exclusive	BioNTech SE	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Promega Corporation	No	Aleksey Nesvizhskiy, Fengchao Yu

EULA(<$5000)-Non-Exclusive	Hyku Biosciences, Inc.	No	Aleksey Nesvizhskiy, Fengchao Yu
EULA(>$5000)-Non-Exclusive	ImmuneSpec., BV.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
SRA>Option	Medsyn Biopharma, LLC	Yes	Arul Chinnaiyan, Jie Luo
Software Dist>Exclusive	Fragmatics, LLC	Yes	Aleksey Nesvizhskiy, Andy Kong, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Immunocore Limited	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Rezo Therapeutics, Inc.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Calico Life Sciences LLC	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
EULA(>$5000)-Non-Exclusive	Regeneron Pharmaceuticals, Inc.	No	Aleksey Nesvizhskiy, Daniel Polasky, Fengchao Yu
Patents>Exclusive	NuLynx Therapeutics LLC	Yes	Jean Tien, Xiaoju Wang, Yu Chang, Arul Chinnaiyan
Patents>Exclusive	NuLynx Therapeutics LLC	Yes	Arul Chinnaiyan, Xiaoju Wang, Yu Chang, Arul Chinnaiyan

Start Ups

Organization	Type	Year	Location	Inventions	Inventors
Fragmatics, LLC	UM Start-Up	2025	Ann Arbor, MI United States	• 2022-301 • 2022-302 • 2022-303 • 2022-304 • 2022-305 • 2024-015 • 2024-417 • 2025-051 • 2025-326 • 7143	Aleksey Nesvizhskiy, Andy Kong, Daniel Polasky, Fengchao Yu, Kai Li

Inventions FY25

Invention Title	Inventors
MSFragger-DDA+	Aleksey Nesvizhskiy, Fengchao Yu
L3mbtl3 floxed mouse - Exon 6v2	Jean-Francois Rual
Prevention of acute kidney injury by targeting Pax8	Gregory Dressler
A small molecule that disrupts stress-induced condensates for the treatment of stress-associated pathologies	Sethuramasundaram Pitchiaya
Radiation Exposure Estimator via Quantitative Thymidine Dimer Measurement with Nanopore Technology	Ulysses Balis, Vincent Laufer
Cognitive Enhancers for Normal Aging and Alzheimer's	Richard Miller
Pepcentric: computational method and system for indexing and querying large mass spectrometry data	Aleksey Nesvizhskiy, Andy Kong, Fengchao Yu
A photoacoustic needle imaging probe for in vivo biopsy	Aaron Udager
High-Throughput Identification of Small Molecule Inhibitors Targeting OncoMiR-181a for Cancer Therapy	Analisa DiFeo
STING-mediated anti-tumor immunity following CDK12/13 inactivation	Arul Chinnaiyan, Yi Bao, Yu Chang
Bifunctional inhibitors of CBP/p300 proteins and androgen receptor	Arul Chinnaiyan, Jie Luo
Iris File Extension	Ulysses Balis
Iris Digital Pathology Deterministic Network Image Compression	Ulysses Balis
Methods and compositions for inhibiting the Polycomb Repressive Complex 1	Alyssa Winkler, Florian Braun, Haiqing He, Hongzhi Miao, Jolanta Grembecka, Miranda Simes, Sera Park, Tomasz Cierpicki, Trupta Purohit, Yiwu Yao
Disruption of PIKfyve-Mediated Lipid Homeostasis Potentiates mTOR Inhibitor Response in Gastroenteropancreatic Neuroendocrine Tumors	Arul Chinnaiyan, Yizhi Cao, Yuanyuan Qiao
NPP-2-21,ÄîA Novel UBA1 inhibitor with therapeutic potential	Arul Chinnaiyan, Yi Bao
Stress-Induced Dependency on PIKfyve Reveals a Therapeutic Vulnerability and Synthetic Lethality in Prostate Cancer	Arul Chinnaiyan, Yang Zheng, Yuanyuan Qiao
WhatsApp Study Buddy	Kamran Mirza
V5-tagged and mutant AŒ±-subunit HEK293T cells	Analisa DiFeo

National Institute of Health (NIH)	
Type of Grant	**Faculty Name**
R56	Brazil, Jennifer
R56	Fonseca Aguilar, Wendy
U54 Sub from Baylor University	Hummel, Kelsey
U19 Sub from TGen	Miller, Richard
R01	Nunez, Gabriel
R50	Robinson, Dan
R01	Ryan, Russell
NIH - Sub	Lew, Madelyn
NIH - Sub	Lieberman, Andrew
NIH - Sub	Nesvizhskii, Alexey
Trainee & Career Development	
Sponsor	**Faculty Name**
ASIP	Aslam, Muhammad/Moraga, Gilian Leigh
NIH F31	Lieberman, Andrew/Azaria, Ruth
K08	Mahadevan, Navin
Crohn's and Colitis Foundation	Parkos, Charles/Varadarajan, Saranyaraajan
Industry & Nonprofits	
American Heart Assoc, Inc.	Andjelkovic-Zochowska, Anuska
ImpactAssets Inc.	Chinnaiyan, Arul
Various Sponsors	Chinnaiyan, Arul
CircNova	DiFeo, Analisa
Crohn's and Colitis Foundation	Hogan, Simon
Corewell Health	Hrycaj, Steven
Ara Parseghian Medical Research Foundation	Lieberman, Andrew
Niemann Pick Canada	Lieberman, Andrew
V Fdn for Cancer Research, The	Parolia, Abhijit
Hyundai Hope on Wheels	Ryan, Russell
Ara Parseghian Medical Research Foundation TO University of Iowa	Lieberman, Andrew
Sontag Foundation, The	Venneti, Sriram
The Mark Foundation for Cancer Research	Venneti, Sriram
Miltenyi Biotec GmbH	Yamada, Chisa
Other Government Granting Agencies	
DHA-DoD-US	Cieslik, Marcin
Florida, State of TO University of Miami, Florida	Grembecka, Jolanta

Table 7-10: *Funding granted by federal sources which include the National Institutes of Health (NIH), Trainee and Career Development, Industry and Nonprofits, and Other Government Granting Agencies (DoD), from pg. 56.*

Outstanding Preceptor Award			
Year	**Name**	**Credentials**	**Lab**
Fall 2024	John (Cody) Demeter	MLS (ASCP)^{CM}	Transfusion Medicine
Fall 2024	Matt Heilbronn	MLS (ASCP)^{CM}	Hematology
Fall 2024	Olivia McClellan	MLS (ASCP)^{CM}	Transfusion Medicine
Fall 2024	Saira Ramirez	MLS (ASCP)^{CM}	Microbiology
Spring 2025	Laura Adkins	HT (ASCP)^{CM}	Histology
Spring 2025	Kelsey Boylan	MLS (ASCP)^{CM}	Hematology
Spring 2025	Nicole Eadeh	MLS (ASCP)^{CM}	Hematology
Spring 2025	Kelli Farhat	HT (ASCP)^{CM}	Histology
Spring 2025	Reem Halabi	MLS (ASCP)^{CM}	Hematology
Spring 2025	Lily Keenan	MLS (ASCP)^{CM}	Microbiology
Spring 2025	Marisol LaFontaine	MLS (ASCP)^{CM}	Microbiology
Spring 2025	Allison Lewis	MLS (ASCP)^{CM}	Transfusion Medicine
Spring 2025	Sheridan Mattson	BS	Toxicology
Spring 2025	Cristian Purdom	MLS (ASCP)^{CM}	Transfusion Medicine
Spring 2025	Cortney Sullivan	HT (ASCP)^{CM}	Histology
Spring 2025	Julie Vangilder	MLS (ASCP)^{CM}	Microbiology

Table 11: *List of preceptors in allied health programs selected for the new "Outstanding Preceptor Award" mentioned on pg. 72.*

Graduate Student Thesis Defense and Current Positions

Name	Defense Date	Thesis Title	Mentor	Position	Company
Jessica Teitel	*June 5, 2025*	*Pan-Cancer Myc Modulator Induces Selective Cell Death Following Mitotic Catastrophe*	Analisa DiFeo, PhD	Continuing education: PMP Certification	-
Alexander Monovich	*April 15, 2025*	*The Role of GGAA Microsatellite Enhancers in B-cell Acute Lymphoblastic Leukemia*	Russell Ryan, MD	Development Scientist, Next Generation Sequencing Division	New England Biolabs
Noah Puleo	*March 20, 2025*	*Identification of Novel Mechanisms and Drivers of Ovarian Cancer Carcinogenesis and Chemotherapy Resistance*	Analisa DiFeo, PhD	Research Fellow	University of Chicago
Shih-Chun Alec Chu	*February 28, 2025*	*Multimodal and Multiomic Integration in Precision Oncology*	Marcin Cieslik, PhD and Arul Chinnaiyan, MD, PhD	Computational Biologist	TRexBio
Kristin Lozada Soto	*December 9, 2024*	*Claudin-23 Regulates Instestinal Epithelial Barrier Function and Mucosal Wound Repair*	Asma Nusrat, MD and Charles Parkos, MD, PhD	Continuing education: MD/PhD Student	University of Michigan Medical School

Table 12: *Graduate Student Thesis Defense and Current Positions from pg. 68.*

Patents FY25

Patent Title	Inventors
NSD Family Inhibitors and Methods of Treatment Therewith	Christina Howard, Eungi Kim, Huang Huang, Hyo Je Cho, Jolanta Grembecka, Mykhaylo Potopnyk, Sergei Zari, Sergii Dudkin, Tomasz Cierpicki, Wenbing Chen, Yassir Adam
Treatment of Staphylococcal Disorders	Gabriel Nunez, Yumi Nakamura
Transepidermal Water Loss as an Anaphylaxis Monitoring Tool	Nicholas Lukacs
Transepidermal Water Loss as an Anaphylaxis Monitoring Tool	Nicholas Lukacs
Small Molecule Sirtuin Inhibitors and Uses Thereof	David Lombard, Surinder Kumar
Small Molecule Sirtuin Inhibitors and Uses Thereof	David Lombard, Surinder Kumar
Deciphering Intratumor Heterogeneity in Clear Cell Renal Cell Carcinoma Utilizing Clinicopathologic and Molecular Platforms	Aleksey Nesvizhskiy, Aniket Dagar, Arul Chinnaiyan, Rahul Mannan, Rohit Mehra, Saravana Dhanasekaran, Seema Chugh, Xiaohe Li, Xiaoming Wang, Yuping Zhang
Deciphering Intratumor Heterogeneity in Clear Cell Renal Cell Carcinoma Utilizing Clinicopathologic and Molecular Platforms	Aleksey Nesvizhskiy, Arul Chinnaiyan, Rahul Mannan, Rohit Mehra, Saravana Dhanasekaran, Xiaoming Wang, Yuping Zhang
Kidney Cancer Gene Expression Signature	Marcin Cieslik, Rohit Mehra
Inhibitors of ASH1L and Methods of Use Thereof	Guang Huang, Jiho Song, Jolanta Grembecka, Rhiannon Stevens, Shuangjiang Li, Tomasz Cierpicki
A class of NSD protein degraders and their uses	Abhijit Parolia, Arul Chinnaiyan
Kits and Methods Useful for Prognosing, Diagnosing, and Treating Prostate Cancer	Arul Chinnaiyan, Yuping Zhang
Techniques for Massively Parallel Graphics Processing Unit (GPU) Based Compression	Ulysses Balis
Techniques for Massively Parallel Graphics Processing Unit (GPU) Based Compression	Ulysses Balis
Use of a Pikfyve Inhibitor in Combination with Immunotherapy	Arul Chinnaiyan, Yi Bao, Yuanyuan Qiao
Imidazopyrimidines as EED Inhibitors and the Use Thereof	Ester Fernandez-Salas
CDK12/13 Covalent Inhibitors or Pharmaceutical Composition Thereof, and Uses Thereof	Arul Chinnaiyan, Jean Tien, Xiaoju Wang, Yu Chang
Methods and Compositions for Inhibiting the Interaction of Menin with MLL Proteins	Dmitry Borkin, Jolanta Grembecka, Szymon Klossowski, Tomasz Cierpicki
Bridged Bicyclic Inhibitors of Menin-MLL and Methods of Use	Dmitry Borkin, Jolanta Grembecka, Szymon Klossowski, Tomasz Cierpicki
Substituted Inhibitors of Menin-MLL and Methods of Use	Dmitry Borkin, Jolanta Grembecka, Szymon Klossowski, Tomasz Cierpicki
Orally Active CBP/p300 PROTAC Degraders	Arul Chinnaiyan, Jie Luo
Compositions and Methods For the Detection of HPV Biomarkers in Urine	Daniel Hovelson
	Arul Chinnaiyan, Xiaoju Wang, Yu Chang
Use of a CBP/p300 Degrader for the Treatment of Cancer	Abhijit Parolia, Arul Chinnaiyan, Jie Luo
Small Molecule Modulators of Sirts and Uses Thereof	David Lombard
Methods Useful for Assigning Likelihood of Grade Group >2 Prostate Cancer and Decreasing Avoidable Prostate Biopsies	Arul Chinnaiyan, Lanbo Xiao, Yuping Zhang
Methods Useful for Assigning Likelihood of Grade Group >2 Prostate Cancer and Decreasing Avoidable Prostate Biopsies	Arul Chinnaiyan, Lanbo Xiao, Yuping Zhang
Methods of Treating Cancer	Arul Chinnaiyan, Yi Bao, Yu Chang
Bifunctional Inhibitors of CBP/P300 Proteins and Androgen Receptor	Arul Chinnaiyan, Jie Luo
Generative Technologies for Improved Super Resolution Digital Image Compression	Ulysses Balis
A Photoacoustic Needle Imaging Probe for in Vivo Biopsy	Aaron Udager

Table 7 (Above): *List of Inventions from pg. 57.*

Pathology Informatics

Appendix A — Digital Pathology Activation Timeline

Phase 01: Activated FY24 / Stabilized early FY25	**Phase 02:** FY25 Expansion	**Phase 03:** FY25 Expansion	**Phase 04:** Active & Ongoing in FY25	**Phase 05:** Slated late FY25 Q4
Renal	Autopsy	Gynecologic Pathology	Breast	Gastrointestinal
Cardiovascular	Neuropathology	Small Biopsy Services	Genitourinary	Dermatopathology
Placental Services	Small Biopsy Services			

Appendix B — FY25 Project Ledger *(by Quarter)*

FY25: Q1	FY25: Q2	FY25: Q3	FY25: Q4	FY26: Q1 (Momentum)
.245/.250 SCC Gene module upgrades (Jul/Oct)	P10 upgrade	Alloantibody data delivery → transfusion reaction repository	Digital Pathology Phases 3 & 4	Linux migration — Oracle databases (primary target)
Digital Pathology technical go-live (Jul) & Phase 1 (Aug)	Olympus VS200 onboarding		Spring upgrade: Soft Gene modules	SoftBank configuration for Pavilion
HLA discrete results + PDF delivery	Genexus installation		P10 failover testing; finalized validation documentation	Standardization of AOEs
OHS/MIE interfaces — Phases 1 & 2	iScan networking		HITS deployment-gate for P10 servers	ROTEM/Inheret PDF → OnBase via HL7
ROTEM interface results/PDFs	VentanaConnect→Navify (deprioritized subsequently)		Internal site converted to Laravel (MLabs MRN prep)	ADM upgrade; Soft Oracle upgrade
PathTrack upgrade	Phone option for phlebotomy handhelds		2 SNUG presentations	Coreo reports deprecated
Packard Health interface	Digital Pathology Phase 2		6 MMIARs completed (last 6 months)	Case assignment tracker enhancements
MLabs Connectivity team training	Pavilion planning/design complete		Corner Health interface	Sectra Pathology upgrade applied
Java removal			Packard Health interface	ART Bloomfield onboarding
Internal and public web site rebuild			CellaVision upgrade	Pavilion support — Day-in-the-Life (DITL)
Hc1 implementation			Dictation/transcription vendor assessment → Dolbey selected over Dragon and 3M M*Modal for pathology-specific vocabulary	MiChart Fall upgrade — regression testing
			Initial DGG pipeline assay	ICU printer swaps (wireless→wired)

Appendix C — Teams & Staffing

Teams (Unchanged)	Headcount	Governance
Clinical Applications Clinical IT Operations Applications & Development Operations Digital Pathology	34.5 FTE (Stable vs Prior Year)	No changes to the PI↔HITS governance model (deployment gates, IA reviews, and security controls unchanged).

Years of Service Recognition FY25

10 Years

Destaw Addis	Chelsea Decker	Lindsay Parsons
Stephanie Agozino	Janean DeVaul	Maria Ramirez
Kristina Andoni	Kimberly Gray	Betty Riggs
Desire Baber	Kathryn Idalski	Ashley Roman
Rafael Baran	Eric Jedynak	Jennifer Roopchand
Melissa Boyd	Ashley Jenne	Phyllis Schooler
Marie Brady	Jonathan Jennings	Brian Tapp II
Carrie Callahan	Darlene Johnson	Tammi Toth
Edith Castillo	Danielle Katulski	Natalie Toth
Maria Crisostomo	Rebecca Luther	SarahJo Wolters
Emerita Cross	Emilia Maleyko	Yingbao Yang

20 Years

Lisa Brown	Roger Mahlmeister	Emily Timmis
Emmanuel Cabuena	Jennifer McCord	Xianping Wang
Deann Chick	Jason McGill	Angela Wilson
Tracey Crooks	Peter Ouillette	Deneen Wilson
Sylvia Gonzales	Aarthi Raman	
Melanie Herbert	Carrie Scott	

30 Years

Shelly Beatty	Todd Kandow	Kathleen Chandler
Colleen McDermott	Gonzalo Garcia	Cynthia Stutzman
John Harris		

Above and Beyond Award Recipients

Anatomic Pathology

Gerson Gran	Star Johnson	Danielle Hoard
Nadine Patterson	John Hamilton	Misty Sayer

Clinical Pathology

Kimberly Blanc	Tina Gray	Nancy Raynal
Lauren Brock	Matthew Heilbronn	Nicole Robinson
Jason Dobreff	Kate Idalski	Rachel Salmon
Kayci Drake	Lily Keenan	Nicole Sobolak
Nicole Eadeh	Chanin Kelly	Brittany Stecker
Bradley Exell	Beth Lawless	Hannah Riggs
Kevin Forbing	Colleen Mackey	Andrew Szczembara
Patricia Franklin	Margaret Mahlmeister	Jeff Wilson
Rachel Garrett	Erin Pauli	Eric Vasbinder
Chelsey Goodes	Amanda Peabody	

CP Team Award: Leticia Sawyers and Inpatient Phlebotomy

Diagnostic Genetics and Genomics

Meghan Boomer	Ted Lilley	Brian Englehart
Emily Manion	Christine Kwierant	Emily Schwedler
Kristin LeSueur	Leisa Stempek	

Retired 2024-2025

Name	Job Title	Date	Years
Michelle Centi	Medical Technologist	*Apr. 17, 2025*	6.6
Stefan Stoll	Research Lab Specialist Senior	*Mar. 8, 2025*	32
Eileen McMyler	IT Project Senior Manager	*Feb. 1, 2025*	18.9
William Hubbard	App Programmer/Analyst Lead	*Jan. 9, 2025*	45.4
Todd Ackley	Admin. Manager Inter Healthcare	*Jan. 4, 2025*	35.4
Gregory Dressler	Professor, Experimental Pathology	*Jan. 1, 2025*	17.3
Jeffrey Myers	Associate Chair, Professor	*Jan. 1, 2025*	19
Jharna Saha	Research Lab Specialist Assoc	*Jan. 1, 2025*	31.3
Carl Schmidt	Clinical Professor, WCMEO	*Nov. 26, 2024*	12.7
Roscoe Warner	Research Lab Specialist Senior	*Nov. 1, 2024*	31.5
Jyoti Athanikar	Technical Writer Lead	*Mar. 2, 2024*	25.2


20 Years of Service Award
Emmanuel Cabuena
20 Years of Service Award
Angela Wilson
20 Years of Service Award
Aarthi Raman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