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Dana Habers, MPH

# Dear Colleagues of Pharmacy and Frontline Health Care Heroes.

I am very pleased to share our University of Michigan Health Department of Pharmacy 2022-2023 annual report. This is an opportunity to highlight many of the extraordinary individuals and teams who contribute exceptional work every day across our institution. Members from all corners of the Pharmacy Department continue to demonstrate their unwavering commitment to high-quality care for our patients, to education of the up-and-coming generations, and to discovery and research as we grow beyond the years of the pandemic and forge toward our bright future together.

It is a privilege and an honor to lead this team. I want to thank everyone in the department for your dedication, collaboration, creativity, and compassion for others. I look forward to many rewarding experiences together in the year ahead!

Enjoy the stories in the following pages, and many thanks for all you do.

Go Blue!

Dana Habers, MPH
Chief Innovation Officer
U-M Health
Chief Operating Officer
Pharmacy Services

# U-M Health Strategic Priorities Building our BASE



Belonging & Inclusion



Access



Safety & Quality



Experience



**Belonging & Inclusion:** Through cultural and strategic action plans, overall sense of belonging will be increased, while disparities will be reduced by race and job category.

**Access:** Create the leadership structure, and accompanying data, to facilitate implementation of specific tactics that optimize utilization of all sites of care, thereby improving inpatient and ambulatory access.

**Safety & Quality:** Develop a standardized institutional mortality review process inclusive of sepsis-related deaths to drive improvements in mortality.

**Experience:** Develop and implement an integrated dashboard to identify the drivers and establish the elements for improvement by unit and clinic.

Strategic Growth & Partnerships

#### **Dear Colleagues:**

As in years past, this report highlights the work of our divisions, but it doesn't nearly cover it all. Acknowledging that fact, I want to recognize our entire department for everything they've done to contribute to the success of the Pharmacy Department in caring for our patients.

When I reflect on the past year, several things stand out:

- The progress we've made in growing our specialty pharmacy services. We are looking forward to opening our new facility on Joy Road in Dexter. A shout-out to the entire Specialty Pharmacy team for making this plan a reality.
- The steady improvement we've seen in our staffing vacancy and turnover rates.
   This was possible through the effort of the Workforce Strategy Group and the all-hands-on-deck approach to recruitment, retention, training, scheduling, and compensation. Thanks to everyone who contributed.

- Negotiating with the pharmaceutical industry to keep 340B pricing accessible.
- The impact our team has on the education of hundreds of pharmacy students and residents — teaching them what practice looks like at its best.
- Improvements in our technician training program

   it is now the norm for anyone we hire without prior experience.

Thanks again to all those who have supported our department and helped with our success.

Go Blue!

**Stan Kent, RPh, MS, FASHP** Chief Pharmacy Officer



Stan Kent, RPh, MS, FASHP

#### **Department of Pharmacy Services FY 2022-23**



900 Team members



323K+
Outpatient
prescriptions



4.7M+
Inpatient orders



369K+
Infusion orders



20 Patient care services



115+
Research
publications

#### **Adult Hospitals**

Hideki Saotome, Steven Carr, Samantha Rothman, Julie Nemeth, Adam Goodwin,

#### Serving the Patients of University Hospital and the Frankel Cardiovascular Center

Our department's acute care pharmacy clinical services in University Hospital and the Cardiovascular Center include the following inpatient teams and pharmacies:

- University Hospital Medicine Team
- University Hospital and Cardiovascular Center Cardiology and Surgery Team
- University Hospital and Cardiovascular Center Transplant Team
- Adult and Pediatric Hospitals Emergency Medicine Team
- University Hospital Central Pharmacy
- Adult Operating Room and Cardiovascular Center Pharmacy

#### During FY23, the work of these 5 groups included:



**Technicians** 



**Pharmacists** 



540K Sterile compounds prepared



3.2M **Orders verified** 



5.6M Doses dispensed from **Pharmacy** and Pyxis



Carleigh Robinson, Patti Kaarto, Hideki Saotome, Audrey Jira, Sarah Kean (manager), Stacie Holcombe, Preet Mavi

#### Clinical Services

UH/CVC pharmacists care for 650 patients per day on average across 22 pharmacist positions when fully staffed.

Average dosing and monitoring activity:

- Anticoagulants: 255 times per month
- Pharmacokinetics: 140 times per day

#### Average patient education activity:

- Anticoagulation discharge education: 256 patients per month
- Transplant medication education:

54 patients per month

#### **Pharmacy Medicine Team**

With a total of 19 pharmacists, the Medicine team is 1 of the largest inpatient pharmacist teams at UH. The Medicine team is responsible for taking care of a wide range of patients daily, and typically accounts for covering approximately half of the inpatient adult census. The services covered by the team include a large spectrum of patient populations, including but not limited to: medical and neuro ICUs, neurosurgery, inpatient psychiatry, GI/Liver specialty services, inpatient rehab, inpatient family medicine, and medical observation units, along with up to 19 various general medicine teams. Many team members cross-trained in numerous other areas in our department, making our team a crucial fixture for the department. Our team also plays a significant role in the precepting and development of our students and residents.



Lenah Suleiman, Adamo Brancaccio, Abby Scott, Dave Hensler, Amy VandenBerg, Megan Ingebrigston, Megan O'Connell, Brion Flowers, Kelsey Olmack, Jessica Andrews, Dana Blanchard, Jessica Sharkey, Micah Pepper, Lienna LaBarge, Matt Zedro

- Expanded by 1 pharmacist.
   Added a psych/neuro specialist to provide more consistent care in many psych areas. Welcome Megan O'Connell to the team!
- Initiated an improvement project to standardize topic discussions for APPE students on their general medicine rotation
- Several Medicine team members were flexible in covering several staffing gaps by cross-training in different specialist roles within the Medicine team and also with the cardiology team
- Reinitiated MFH "rounds" in the afternoon to improve pharmacist-to-provider relationships and patient care

- Rolled out initiative focusing on adherence to Community-Acquired Pneumonia (CAP) empiric treatment guidelines:
  - » The appropriate use of antibiotics for the treatment of CAP was linked to hospital reimbursement
  - » Partnered with the Antimicrobial Stewardship team to ensure appropriate antibiotics were ordered
  - » Provided guidelineconcordant therapy to 56.5% of patients upon presentation to the ED and 62.7% of patients upon admission to the floor
  - » 98% of patients were on guideline-concordant therapy or had antibiotics appropriately discontinued 24 hours after floor admission



#### **Adult Hospitals**



Sabrina Dunham (new PGY-2 cardiology residency RPD) and Andi Ray (graduating PGY-2)



Sabrina Dunham, Angie Clark, Simona Butler — teammates supporting teammates



#### Awards & Recognition

- SCCM Michigan Chapter Annual Research Symposium Award Recipient
- 90+ Making a Difference Awards

#### Cardiology and Surgery

The Cardiology and Surgery team provides pharmacy services in both University Hospital and the Cardiovascular Center. The team is made up of 18 clinical pharmacists and continues to grow. We welcomed 4 new pharmacists as well as a new manager of CVC pharmacy, Surgery, and Cardiovascular services to the team this past year. The team's main responsibilities include not only dispensing and preparing medications for patients, but also working alongside our colleagues in medicine, nursing, and nutrition to make sure patients receive safe and effective medication therapy. Core clinical services provided by the team include therapeutic anticoagulation management, pharmacokinetic dosing, medication reconciliation, renal dosing, TPN management, facilitating transitions of care, and IV to PO formulation conversions. Several of our team members serve on committees within the Department of Pharmacy, including the Clinical Practice Committee, Residency Advisory Committee, and MUE, as well as committees outside the department, such as the Critical Care Steering Committee, various unit-specific quality committees, and P&T Subcommittees (e.g. Anticoagulation, Glycemic Management, and VTE).

- Developed and updated several guidelines (e.g. Novo-7), conducted MUEs (e.g. digoxin), worked on multiple quality improvement projects (e.g. M2C2 HF pathway, QTc BPA alert-optimization, do not crush list), published journal articles and book chapters (CCSAP, BPS Cardiology Specialty Council), attended conferences including SCCM, ASHP Midyear, CVC Symposium, MSPEN, ASPEN, ACC, ACCP, and HFSA and presented multiple Quality Month posters
- Established new policies and protocols surrounding PAH therapies (e.g. Remunity, Tyvaso DPI)
- Streamlined the discharge process for patients with newly implanted LVADs

- Established pharmacist practice in the new outpatient heart transplant clinic
- Continue to be involved in education (e.g. precepting, didactic, onboarding, code training, physician and nursing education, resident orientation)
- Raised nearly \$1,200 for the American Heart Association Heart Walk
- Earned additional certifications (e.g. HF-Cert)
- Received multiple U-M College of Pharmacy Preceptor of the Year nominations

#### **Transplant**

The Transplant team's primary focus is to promote the safe and effective use of medications within transplant programs. Transplant pharmacists are involved in all the phases of transplant. Prior to transplant, the pharmacists participate in the selection meeting and address medication-related questions from the transplant evaluation team. During admission, the pharmacist rounds with the multidisciplinary team providing pharmacotherapy recommendations and patient education on medications prior to discharge. In the outpatient clinic (abdominal programs), the pharmacist provides medication education to patients and family/caregivers, assesses for medication-related adverse effects, and assists the rest of the team regarding monitoring and managing medications. They collaborate with providers to manage complications from transplant medications (e.g. hyperglycemia, hypertension, renal dose adjustments, etc.).

Our team also provides services in the transplant endocrine clinic and adult cystic fibrosis clinic. Transplant pharmacists are available to answer medication-related questions via MiChart in-basket during non-clinic days. The pharmacists also follow up with patients after medication adjustments and perform comprehensive medication reviews for patients on non-clinic days. In addition, the transplant pharmacists lead and support various QAPI initiatives (including protocol development and sustainment) throughout the Transplant Center and cystic fibrosis team. The Transplant team also participates in training the PGY-2 Transplant resident, PGY-2 Ambulatory Care residents, PGY-1 pharmacy residents, and P4 students.

#### Highlights:

- Transplant center performed a record number of solid organ transplants
- Expanded APPE rotations into the transplant ambulatory clinics
- Precepted 4 PGY-1 residents, 3 PGY-2 residents, and 8 PharmD students on Transplant Surgery, Medicine/ Pulmonary/Lung Transplant, and Kidney/Liver Transplant Clinic rotations
- Contributed 2 lectures on Pancreas and Islet Cell Transplantation for the ASHP/ ACCP BCTXP Board Review Course
- Delivered 2 guest lectures at the U-M College of Pharmacy for Pharmacy 503 and Pharmacy 704
- Invited speaker at the 13th

- annual Kountz/Callender/ Drew Transplant Symposium
- Completed 985 ambulatory care visits across different organ groups
- Documented 2,324 EHR notes for pharmacist-provided patient care services, 58% in acute care areas and 42% in ambulatory care areas



Jamie Park, Krysta Walter, Jenn Leja, Hansa Mreyoud, Jen Hagopi<mark>an</mark>,



Jamie Park, Jenn Leia, Krysta Walter, Jen Hagopian, Liz Wilpula



#### Awards & Recognition

- Team members were recognized 14 times for their services with Making a Difference Awards
- Team members earned 3 Good Catch Awards

#### **Adult Hospitals**

#### **Highlights:**

- Precepted 16 learners for 26 separate rotations throughout the year
- Successfully graduated fourth PGY2-EM resident and matched fifth PGY2-EM resident for the 2023–2024 year
- Provided 70 naloxone kits at discharge, through the M-OPEN/MEDIC initiative
- Improved AES nursing new intern pharmacy orientation education presentation
- Collaborated with CES leadership and the Pyxis automation team in anticipation of the PETZ expansion and the CES 6-bed and 4-bed expansions (in response to record-breaking ED boarders)
- Compounded and assisted with tPA administration for 35 patients with suspected ischemic stroke
- Collaborated on pediatric DKA & agitation order set updates
- Updated the Pharmacy Services Continuity of Operations Plan through efforts of the Emergency Management Executive Committee (EMEC)
- Created a CODE D AES/ CES Formulary integrated within Remote Web Order Form for more efficient ordering through PLX; planned exercise of this in conjunction with a Functional Mass Casualty Incident (MCI) Patient Surge Exercise this September

- Collaborated with ID Stewardship Team and Sexual Assault Nurse Examiner (SANE) Nursing Leads to update the SANE Orderset
- Updated/modified CES workspace to allow for more improved interdisciplinary relationships and communication from the satellite pharmacy
- Implemented MRSA nasal swab screening and BP alert in the EDs for patients prescribed anti-MRSA antibiotics for respiratory infections
- Enhanced tPA time tracking for medication compounding and procurement to meet core metric tracking
- Implemented twice daily batching of controlled substances and insulin obtained from satellites to increase efficiency
- Cross-trained numerous pharmacists to help with ED pharmacy cross-coverage
- Added 2 new agents to formulary and educated ED staff (IV/IM haloperidol and topical nifedipine)
- Joined EMPharm-NET national research collaboration to further multicenter EM pharmacyfocused research
- Attended first-ever in-person EMPoweRx pharmacy conference as part of the annual SAEM provider conference

### Adult and Pediatric Hospitals Emergency Medicine

#### **ADDRESSING PEDIATRIC & ADULT EMERGENCIES 24/7**

The emergency department (ED) pharmacy team consists of 11 core pharmacists, 2 core pharmacy technicians, 1 intern, and 1 PGY-2 EM pharmacy resident who provide 24/7 pharmacy services for 2 emergency departments: Adult Emergency Services (AES) and Children's Emergency Services (CES). The ED pharmacy team responds to all codes, traumas, and medical emergencies, assists with optimal drug and dose recommendations, compounds life-saving drips and medications at bedside, provides medication counseling at discharge, precepts students and residents, and recommends proper dose titrations to achieve desired patient outcomes.

Additional services provided by 24/7 pharmacist in AES and CES include participation in critical airway management, responding to drug information questions and toxicology consults for acute ingestions, screening for eligibility and drug interactions and ensuring proper ordering of COVID-19 outpatient therapies, order verification, patient counseling, focused medication history reviews, discharge medication review, compounding and documenting time critical investigational drugs, and medication dispensing at discharge (some of which includes post-exposure prophylactic meds for occupational exposure, rabies vaccine, and immune globulin, investigational drugs, and naloxone nasal spray to patients at high risk for opioid overdose). Furthermore, the AES pharmacist also attends daily rounds for critical patients located in the Emergency Critical Care Center within AES.

The ED pharmacy technicians play a critical role in medication dispensing, compounding for emergent use, conducting admission medication histories, managing the pharmacy satellite and Pyxis inventory, helping to ensure regulatory compliance, triaging phone calls, and other responsibilities that assist the pharmacist and promote optimal patient care in AES.

- Received approval for first ED intern position, which will serve to increase awareness for pharmacy students of Emergency Medicine as a specialty
- 75,000 AES and 40,000
   CES patient visits with a record-breaking average of 30 AES boarded patients and 5 CES boarded patients at any given time



Becky Widdick, Nada Saad, Christian Carlson, Liz Macon, Liz Vanwert, Andrea Setiawan, Vy Lam (not pictured: Aaron Jeffery, Adrienne Bell, Bryan Reid, Kristen Koehl, Mary Dimo, Matt Kalisieski, Ijeoma Egenti, Nancy Jamieson)

#### **Central Pharmacy**

The Central Pharmacy diligently serves all admitted patients in University Hospital (UH), along with other U-M Health pharmacies and more than 250 onsite and offsite clinics. Central Pharmacy is responsible for medication order review and verification, sterile and non-sterile medication compounding, as well as adult inpatient dose preparation and delivery. The Central Pharmacy replenishes automated dispensing cabinets throughout UH, and promptly prepares and delivers first doses and STAT medications, including hazardous and investigational drugs. The team also assists in answering drug information questions, responding to adult codes, and coordinating preparation and distribution of oncologic agents.

As an integral component of the health system, UH Central Pharmacy verified over 3.1 million medication orders, and prepared and dispensed over 1.05 million doses, including over 350,000 sterile compounds. In addition, over the past year, our team dispensed over 4,000 COVID-19 vaccine doses for inpatient use and over 80,000 COVID-19 vaccine doses for outpatient, clinic, and research use at 31 different locations, including partnerships with the Regional Alliance for Healthy Schools (RAHS) programs.



Kayla Waller picking medications from a medication carousel in B2 Central Pharmacy



Micah Pepper checking medications for University Hospital Inpatients



1.05M+
Doses
prepared and
dispensed



80K+
COVID-19
vaccines
dispensed



350K+
Sterile
compounds
prepared and
dispensed

- Expanded MiChart Dispense
   Tracking to allow for dose
   tracking from the point of
   verification to final delivery to
   the nursing unit
- Installed a time clock to improve accountability and automate reporting for staff attendance and timeliness
- Developed new workflows to allow for the successful implementation of USP 800 adherence
- Onboarded new pharmacy technician trainers to assist in complete, consistent, and thorough training of new team members
- Reintroduced Daily
   Management System (DMS)
   huddles in alignment with
   health system goals
- Developed a new workflow preventing barcode scanning from being overridden when dispensing drugs from PLX in an effort to reduce medication errors
- Transitioned many compound recipes to Compounding & Repackaging and BD IVPrep to support retirement of LabelSafe and create a safer compounding process
- Helped transition from IVPB lacosamide to IVPush lacosamide to improve turnaround times while maintaining patient safety
- Coordinated with MiChart team to move medications requiring lot number tracking to Dispense Prep to retire paper recordkeeping

- Transitioned our external/ offsite clinic courier from Metro to Lab Logistics (LL); barcode scanning technology integrated with the LL online portal has allowed for more transparent delivery status/updates
- Introduced realtime dashboards that communicate daily clinic order manifests for LL's review, thereby improving efficiency of daily route order entry
- Reduced delays in email communication by developing a tool for clinic orderers to request medication additions to their destination formulary by standardizing required information fields
- Processed and distributed 12,000 clinic requisition Weborders (comprising 630,000 dispensed units and \$124 million worth of drug product) to 436 different locations (e.g., offsite, onsite, and research areas)
- Distributed 67,000 doses of influenza vaccines (Flulaval, Flumist, FluBlok, and High Dose) from B2 Central Pharmacy to 75 different onsite and offsite locations
- Consolidated our COVID-19 vaccine strategy in accordance with CDC guidance and reduced our inventory from 12 to 5 vaccine types

#### **Adult Hospitals**

Sabrina Dunham, Patti Kaarto, Michelle Schultz, Annalise Sheehan



OR Pharmacy Team Members Maja Zivkovic, Courtney Inch, Warren Leidlein, Brian Callahan



Pharmacy practice sites



Khalil Beidoun and Audrey Jira

# Operating Room and Cardiovascular Center Pharmacy

Operating Room (OR) and Cardiovascular Center (CVC) pharmacy team members provide services to support anesthesia, surgeons, OR nurses, and nurses in the perioperative care units in the care of surgical patients. There are currently 4 adult OR pharmacy practice sites: University Hospital, Cardiovascular Center, Brighton Center for Specialty Care, and East Ann Arbor Surgical Center (EAASC). In addition to supporting the CVC OR, our team members working in this location collaborate in the care of CVC inpatients and patients receiving cardiac procedures in the Cath Lab and EP labs.

The core services offered by pharmacists and technicians include medication order review and verification, sterile and non-sterile medication preparation and delivery, drug information, cardiac arrest response, Pyxis stocking, and inventory management. The team also works closely with anesthesia to dispense, reconcile, and monitor usage of controlled substance medications.

- Managed multiple national drug shortages affecting antimicrobials, pain medications, and anesthetic agents
- Improved use of IV Prep gravimetrics compliance to greater than 96%
- Process improvement for intra-op medication orders
- Implemented use of closed system transfer devices for intra-op hazardous medications
- Installed CII Safe Pyxis cabinet in CVC Pharmacy for improved tracking of controlled substances
- Initiated sterile compounding support for Saturday cases at EAASC

- Expanded anticipatory compounding responsibilities of the OR pharmacy technicians. Implemented Epic Compounding and Repackaging for anticipatory compounding. Implemented Epic Dispense Prep tracking in CVC Pharmacy
- Initiated a daily safety management checklist tool for shift change
- Implemented a new lipid kit for emergent local anesthetic systemic toxicity
- Developed workflow for improved support of surgical cases requiring use of nusinersen
- Optimized CVC Pyxis cabinets

#### **Automation Support**

The Pharmacy Automation Support Team is responsible for the maintenance and management of pharmacy-specific automation utilized throughout the department (Central Inventory management software, automated dispensing cabinets (ADC), and IV workflow solutions (IVWS)). Over the past fiscal year, our team has continued the partnership with our technology vendor in a limited contract release agreement to test and improve the functionality of our automation systems throughout the organization. We have also partnered with our internal analytics team to develop new tools to optimize the ADCs to increase medication storage and decrease department workload. Along with the work surrounding ADCs and IVWS support, the Automation Team added a new team member and management of the central inventory software. This has allowed us to focus on medication inventory overhead management, space management, and streamlining workflows to improve central pharmacy operations.



Adult and Pediatric Hospitals Emergency Medicine and Inventory Automation Management Teams
Christian Carlson, Barb Higgins, Andrew Lucarotti, Jenn Leja, Matt Tupps, Sarah Kean, Brian
Callahan. Matt Zedro

- Multiple Pyxis ES system upgrades to support better workflows and management of medications
- Continued optimization efforts to increase ADC dispenses and decrease workload in pharmacy satellites
- Central Inventory software (Pyxis Logistics) upgrade to support new Pyxis CIIsafe ES implementation
- Overhead reduction of ~\$2 million in medication inventory
- Rolled out 2 of 7 Pyxis
   CIIsafe ES cabinets into
   pharmacy locations to provide
   better controlled substance
   management and improved
   reporting around controlled
   substances



#### **Adult Hospitals**



Back Row: Sam Aitken, Jason Pogue, Jerod Nagel, Amit Pai, Half of Nick Dillman Front Row: Raneem Pallota, Michelle Lee, Karen Davidge, Daniel Riggsbee, Greg Eschenauer

## Antimicrobial Stewardship Website

med.umich.edu/asp



Countries accessed website



Guidelines and resources views



ASP document links selected from a Google search

#### **Infectious Diseases Stewardship**

The Antimicrobial Stewardship Program (ASP) at Michigan Medicine is a collaborative effort between the Division of Infectious Diseases, the Division of Pediatric Infectious Diseases, the Department of Pharmacy Services, Infection Prevention, and Clinical Microbiology. The ASP was established to promote safe, appropriate, and cost-effective antimicrobial therapy to optimize patient outcomes and minimize the selection of pathogenic microorganisms and the emergence of resistance.

- Updated guidelines for: surgical prophylaxis, Bacteremia, pediatric influenza, invasive aspergillosis, C. diff, renal dosing, Linezolid-Serotonin Syndrome, adult ethanol lock, pediatric aminoglycoside dosing and monitoring, pediatric vancomycin dosing and monitoring, COVID-19 inpatient treatment
- Implemented Beta-lactam allergy evaluation and testing service
  - » 94% (656/700) of patients assessed by BLAES between August 2021 and July 2022 had at least 1 beta-lactam allergy label removed, clarified, or both
  - » 78% of patients had beta-lactam allergy label removed
    - Removal by medication history review only: 29%
    - Removal by penicillin skin test (PST): 22%
    - Removal by 10/90 or full dose drug provocation challenge: 52%

- » All 116 PSTs performed were negative
  - Simplified risk stratification approach 3 months into study period reduced laborintensive PST by 40% over the next 9 months
- » 98% of drug provocation challenges were successful
- » 30% reduction in aztreonam use (p=0.007)
- » 80% decrease in betalactam desensitizations
- Began initiative to review patients admitted with pneumonia and focus on decreasing unnecessary broad-spectrum antibiotics
- Predicted patients at risk for developing hospital acquired C. diff with machine learning
- Implemented extended infusion beta-lactams
- Implemented pediatric 'handshake' stewardship rounds in Pediatric Intensive Care Unit and Pediatric Heme/Onc
- Optimized appropriate prescribing of Synagis for RSV
- Implemented stewardship team clinical review of patients with bloodstream infections

#### C. S. Mott Children's and Von Voigtlander Women's Hospital Pharmacy

University of Michigan Health's C. S. Mott Children's and Von Voigtlander Women's Hospital (CW), a 350-bed acute care academic medical center, is the top pediatric hospital in the state of Michigan according to U.S. News & World Report, and was nationally ranked in all 10 specialties. The Mott pharmacy provides services for a wide variety of diverse pediatric disease states as well as maternal fetal medicine and women's health, adult oncology, and adult and pediatric infusion services. As a Level I trauma center, C. S. Mott Children's Hospital has been certified by the American College of Surgeons as providing the highest level of emergency and surgical care to pediatric patients 24 hours a day, 365 days a year.

#### **Pediatric Specialist Team**

The Pediatric Specialist Team at C.S. Mott Children's and Von Voigtlander Women's Hospital (CW) offers comprehensive clinical pharmacy services. The team currently comprises 9 clinical pharmacists, with ongoing expansion efforts. The primary responsibilities of this team encompass a wide range of clinical services, including patient care rounding, core clinical functions such as anticoagulation management, pharmacokinetics, renal dosing, medication route adjustments, patient record reviews, therapeutic drug monitoring, drug information provision, shortage management (including identifying alternative medications), patient and caregiver medication education, and rapid response during code blue situations. Additionally, our team actively participates in over 20 committees, contributes to more than 15 Guideline and Policy development/revisions initiatives, conducts over 10 education and professional development sessions, and continuously works on optimizing our IT infrastructure, including MiChart, order sets, pump library, and Pyxis systems.

#### **Decentralized Service Highlights:**

- Delivered lectures on pediatric anticoagulation management in the context of extracorporeal support as part of the ECMO training program for regional ECMO institutions, providing Continuing Medical Education (CME) for physicians
- Submitted a quality poster assessing the utility of unfractionated heparin infusion nomograms within the Congenital Heart Center
- Conducted annual cardiology pharmacotherapy training lectures for onboarding fellows within the Congenital Heart Center
- Played a vital role in therapeutic drug monitoring of mTOR inhibitors for the Congenital Heart Center's pulmonary vein stenosis program, both inpatient and outpatient settings



Mott Pharmacy Team: Vivian Leung, Noah Wegner, Kaitlyn Ziegle, Mohammed Mohammed, Setlia Tavana, Anas Althabteh, Gaby Wong



Mott Infusion Pharmacy: Brooke Hoff and Logan Bixman

#### C. S. Mott Children's and Von Voigtlander Women's Hospital Pharmacy

Setlia Tavana and Noah Wegner, Pharmacy Students, Working in Unit Dose

# 1.5M





980K+ Unique dispenses



Full-time employees

#### **Pediatric Generalist Team**

The Pediatric Generalist Team at CW provides essential clinical and operational pharmacy services. This team consists of 24 clinical pharmacists, with ongoing recruitment efforts. Our primary responsibilities encompass not only dispensing and preparing medications for patients but also collaborating closely with colleagues in medicine, nursing, and nutrition to ensure the safe and effective administration of medications. Furthermore, our team actively participates in numerous committees, contributes to the development and revision of guidelines and policies, and continually enhances our IT infrastructure, including MiChart, order sets, and Pyxis systems.

#### **Operational Service Highlights:**

- Successfully integrated IV medication into Pyxis, resulting in a substantial 10-12% reduction in clean room manipulation and dispensing
- Introduced "snap together" IVPB products to pediatric inpatient units
- Transitioned from DoseEdge to BD IV Prep for bulk compounding
- Implemented dose rounding bands for 18 new medications
- Added 18 new prepackaged medication doses to optimize initial dose dispensing
- Introduced a pediatric hazardous drug dissolved tablet order to reduce the risk of errors associated with aliquot dosing in ketogenic diet patients

- Improved runner delivery assignments to reduce delays in medication delivery
- Implemented the installation of a Pyxis outside the pharmacy for providers to access narcotic kits and narcotics, streamlining the process
- Reduced the quantity of narcotics in narcotic kits, resulting in more kits stocked in the Pyxis and reduced workload during ordering, building, and breaking down kits

#### **Ambulatory Pharmacy Services**

#### **Community Pharmacies**

There are 5 community pharmacy locations at U-M Health (UMH). Two are located on our main medical campus, the Taubman Ambulatory Care Pharmacy and the Rogel Cancer Center (RCC) Community Pharmacy, and 3 are located within off-site health centers, the Kellogg Eye Center (KEC) Pharmacy, East Ann Arbor (EAA) Pharmacy, and the Brighton Center for Specialty Care (BCSC) Pharmacy. These locations provide services to a diverse population of adult and pediatric patients receiving care at UMH hospitals, emergency departments, and ambulatory clinics and surgery centers, in addition to U-M employees, retirees, and dependents. UMH community pharmacies provide prescription fulfillment, non-sterile compounding, patient counseling, Medication Therapy Management, and immunization services. In partnership with the Transitions of Care and Ambulatory Medication Access teams, medication access and bedside delivery services are also offered to patients.

UMH community pharmacies specialize in providing difficult-toobtain medications to our patient population. These medications are often high cost, require sterile or non-sterile compounding, are used to treat complex disease states, have limited distribution networks, or are otherwise uncommon or not stocked by local community pharmacies. The UMH community pharmacies also partner with UMH specialty pharmacy services to ensure patients have access to the full spectrum of ambulatory pharmacy services, regardless of what medication(s) they are filling.



Part of Taubman Staff: Zeyid Nimer, Chivonne Atchison, Steve Davies, Elaine Burley, Sarah Lakehal-Ayat, Lynsey Burzycki, Audrey Halim, Heather Oard, Renee Ballou







142K+
Prescriptions



\$135M Total revenue

#### **Highlights:**

#### **Across All Sites**

- Increased prescription fill volumes observed across community pharmacies
- Onboarded new leadership team members
- Onboarded new Pharmacy Tech Trainer
- Converted to paperless storage of electronic prescription records
- Implemented new standard workflows across sites via the Community Pharmacy Workflow Standardization Task Force
- Piloted text message notifications to patients
- Engaged parents and caregivers in pediatric medication counseling and dispensed Deterra Drug Deactivation System to those receiving opioid prescriptions

#### **Taubman Center**

- Partnered with new TOC
   Pharmacy Techs to provide improved medication access and bedside delivery services to Adult and Pediatric
   Hematology/Oncology and Bone Marrow Transplant
   Services
- · Improved space utilization
- Piloted Daily Management System Huddle Board
- Piloted a Triage Tech to better serve patients
- Piloted PhillBox sustainable prescription packaging

#### **Rogel Cancer Center**

- Provided medication education in compliance with federal REMS program requirements for common oral chemotherapy medications
- Completed a Celgene REMS Program audit

 Partnered with Ambulatory Medication Access Pharmacy Techs to improve medication access for patients

#### **East Ann Arbor**

- Planned transition for EAA Pharmacy space and operations ahead of the fulfillment team's move
- · Improved space utilization
- Conducted a team building exercise, during which team members shared their DISC communication styles and expectations for communication

#### **Kellogg Eye Center**

- Moved controlled substances kits to the Pyxis machines for ease of access and improved efficiencies
- Earned recertification as a sterile compounding pharmacy

- Standardized all ophthalmology sterile compounding recipes across institutional resources
- Implemented a new compounded eye drops tracking board
- Improved patient safety and workflow by creating new orders and order sets in the electronic medical record for surgeon selection and standardization
- Increased compliance with patient identification at the OR window

## **Brighton Center for Specialty Care**

- Collaborated with the Specialty Pharmacy to pilot a workflow for specialty enrolled patient prescription pickup
- Piloted clear bag prescription fulfillment in collaboration with the Infusion Pharmacy

#### **Ambulatory Pharmacy Services**

Transitions of Care Meds to Beds Team: Tiffany Cheng, Rachael Stover, Ross Feldpausch, Fatoumata Traore, Makenzie Dopierala, Jennifer Freel

#### **Transitions of Care Pharmacy Services**

The Transitions of Care (TOC) Pharmacy Services team strives to make the transition from hospital discharge to home as seamless as possible for patients. The services provided by the team include performing co-pay checks to ensure the affordability of medications, submitting prior authorizations, appealing rejected prior authorizations, identifying preferred formulary alternative medications, resolving other insurance or pharmacy medication access issues, and coordinating the filling and bedside delivery of medications to discharging patients. These technicians noticeably increase patient satisfaction during the stressful transition between hospital and home. The team extensively partners with inpatient pharmacists, providers, nurses, social workers, and case managers to improve the coordination of care for patients. The discharge team currently helps patients discharging from the Adult Hospitals, Von Voigtlander Women's Hospital, Adult and Pediatric Hematology/Oncology and Bone Marrow Transplant Services, and the Pediatric Endocrinology Service.



1,804
Prior
authorizations
submitted



Insurance or pharmacy issues resolved



18K+
Co-insurance
checks
performed



8
Pharmacy
techs on team

- Completed a recordsetting number of prior authorizations, co-pay checks, other insurance or pharmacy access issues resolved, and bedside deliveries
- Hired 2 new TOC discharge medication access technicians for Adult and Pediatric Bone Marrow Transplant and Hematology/ Oncology services, allowing us to expand medication access and MiRxExpress bedside delivery services to these patient populations
- The MiRxExpress bedside delivery program expanded services to patients discharged from selected services at Mott Children's Hospital and began a pilot with the Mott PACU service
- The MiRxExpress bedside delivery program partnered with the hospital-wide Priority Discharge Initiative focused on expedited discharge of selected patients

#### **Specialty Pharmacy Services**

The Specialty Pharmacy team ensures timely and continuous access to specialty and transplant medications. This team primarily handles medications that are either self-administered injectables, high-cost, and/or require special handling. Specialty pharmacists support patients with comprehensive, personalized care throughout the entire treatment process and make sure patients are getting the correct medications. Patient financial counselors reduce financial barriers to patients starting and continuing specialty medication by completing prior authorizations and coordinating financial assistance. Pharmacy technicians based in the call center take incoming and place outgoing calls to coordinate medication refills; pharmacy technicians based in the fulfillment area fill prescriptions and prepare them for shipment to patient homes or pickup at a U-M pharmacy location. All team members play a critical role in helping our patients access specialty prescriptions.

The Specialty Pharmacy team just had its highest volume fiscal year ever.

#### **Specialty Pharmacy Services - FY23 Statistics**

Specialty Pharmacy Area	Monthly average
Call center	
Inbound calls handled	2,860
Outbound calls handled	2,959
Medication access	
<ul> <li>Patient touchpoints to start and</li> </ul>	
continue medications	4,800
Patient Management Program	
<ul> <li>Patients enrolled in U-M Specialty</li> </ul>	
Pharmacy Patient Medication Program	3,616
Fulfillment	
<ul> <li>Prescriptions shipped</li> </ul>	15,300
<ul> <li>Packages shipped</li> </ul>	5,921

Prescription volume trend increased throughout FY23. This is reflective of work across all specialty pharmacy teams.

EAA and EAA Specialty Pharmacy: Scott Jones, Aseel Dhayef, Jacob Eads, Shawn Deglopper, Marissa Yu, Nicole Brooks, Jiyon Nam, Taylor Vredeveld, Steve Zawisza, Alyssa Murray, Zane Underwood, William Loomis

#### **Celebrations:**

- Awarded full URAC v4.0 Specialty Pharmacy accreditation through October 2025
- Patient satisfaction survey results indicate over 95% of patients are extremely satisfied with specialty pharmacy services and nearly 100% would recommend U-M Specialty Pharmacy

## Growth, Service Expansion, and Innovation:

- Construction commenced on a new specialty mail order facility that will expand capacity to grow specialty pharmacy services to ensure every patient has access to high-quality and convenient pharmacy care
- Announced a partnership with the Zipline drone delivery company for future local medication delivery
- Welcomed multiple new clinical pharmacists, call center pharmacy technicians, fulfillment pharmacy technicians, patient financial coordinators, ambulatory medication access technicians, interns, and leaders

- The Ambulatory Medication Access team (previously known as the Transition of Care Clinic team) expanded services to patients seen at Michigan Bowel Control, Back and Pain Center, and Rogel Cancer Center
- Expanded support of hematology/oncology (oral chemotherapy) patient population and added services for patients receiving pancreatic enzyme replacements and GLP-1 inhibitors for weight loss
- Specialty clinical pharmacists started billing for pharmacist care management services provided to pulmonology and allergy patients
- Specialty and community pharmacists were added to the Biosimilar Therapeutic Interchange Policy and began managing biosimilar switches
- Standardized the review of new specialty medications with the formation of the Specialty Pharmacy Agent Review Committee (SPARC)

#### **Operations:**

- Expanded access to medication delivery services by removing the broad requirement for signature upon delivery
- Reorganized into patientpopulation/service line-based Centers of Excellence (COE) teams to provide greater depth of understanding in areas and align resources for cross coverage



Specialty Pharmacy Team, South Industrial

#### Hematology/Oncology and Infusion Services



Infusion and Hematology/Oncology Teams: Vincent LaRocca, Andrew Wechter, Rachel McDevitt, Allison Schepers, Prabha Vogel, Gianni Scappaticci, Catherine Christen, Victoria Nachar, Jane Crawford



1,300 Standard-ofcare treatment



260+ Research plans

#### **Inpatient Oncology Pharmacists**

The Inpatient Oncology clinical specialist team is composed of 8 pharmacists providing care to 11 inpatient oncology services in C. S. Mott Children's Hospital and University Hospital. This team provides care for up to 120 complex pediatric and adult patients per day in the areas of leukemia, lymphoma, bone marrow transplant, cellular therapy, benign hematological and other malignant hematological disorders, and medical oncology. This team continues to advance the role of the pharmacist as an integral member of the care team with treatment planning, collaborative research initiatives, policy and guideline creation, and oncology stewardship.

#### **Ambulatory Oncology Pharmacists**

The Ambulatory Oncology clinical specialist team includes 11 pharmacists (including 2 pediatric hematology/oncology pharmacists who rotate between inpatient and outpatient settings) who provide care in the Rogel Cancer Center, C. S. Mott clinics, and Brighton Center for Specialty Care. These pharmacists provide comprehensive oncology care as independent and collaborative care providers within the constructs of the medical team. This team completed over 5,000 independent visits this year, which accounted for over \$115,000 charges billed to patients' insurance. The clinic oncology pharmacists addressed over 20,000 in basket messages this year, representing a 160% increase compared to the previous year.

#### **Chemotherapy Orders Team (COT)**

The Chemotherapy Orders team (COT) provides evidence-based reviews for treatment protocol requests and spearheads a standardized approach to build order templates. Led by a dynamic team of two and one-half pharmacist FTEs, they proudly manage over 1,300 standard-of-care treatment and therapy plans, collaborating seamlessly to oversee more than 260 research plans this year alone. The team takes immense pride in ensuring that all Beacon treatment plans strictly adhere to national guidelines, including those set forth by the National Comprehensive Cancer Network and Children's Oncology Group, as well as Michigan Medicine's clinical practice guidelines.

Moreover, the team assumes the crucial responsibility of maintaining uncompromising compounding standards for both oncology and non-oncology agents administered in the ambulatory infusion centers. From reconstitution to vial expiration, dilution, line standards, and expiration information, their meticulous attention to detail ensures the highest quality care for patients. Their dedication and expertise significantly contribute to advancing the field of oncology while setting exemplary standards for others to follow.

#### **Anemia Management Clinic**

This is an ongoing pharmacist-run clinical program, which functions under a collaborative drug therapy management (CDTM) agreement to provide patient education, laboratory monitoring, medication dosing, and ordering for iron supplementation and erythropoietin stimulating agent use. MiChart is utilized for patient tracking and documentation. The pharmacists work to ensure compliance and adherence to national clinical and coverage guidelines (NCCN, ASCO/ASH, KDOQI, CMS) and optimize cost-effective use of ESAs. The pharmacists also precept third-year pharmacy students and infusion interns, who provide Medication Reconciliation/Medication Management Services to new Cancer Center patients (see "Medication Reconciliation Programs").

#### **Medication Reconciliation Programs**

The pharmacist-led Medication Reconciliation Program for Cancer Center patients stands as a pivotal element in elevating patient care and clinic efficiency. Powered by the collaborative efforts of IPPE students from University of Michigan College of Pharmacy, along with pharmacist interns who undergo infusion clinical pharmacist preceptorship, this program ensures a comprehensive medication reconciliation process for patients ahead of their initial Cancer Center visit. Moreover, our dedicated pharmacist team members offer an invaluable Medication Management Service, which can be requested by patients. During this service, the pharmacist meticulously reviews all medications, including herbal and dietary supplements, while conducting thorough assessments for potential drug or disease interactions. The culmination of this thoughtful evaluation results in expert recommendations communicated seamlessly with the patient's primary oncology team as appropriate.

#### **Outmigration Initiatives**

Pharmacy infusion leadership, hematology/oncology Clinical Specialists, and Order Team collaborate closely with a multidisciplinary team to optimize patient treatment location (i.e. Outmigration). Outmigration involves moving both adult and pediatric inpatient infusions to the outpatient setting and opportunities to shift care from the ambulatory setting to the home. By shifting the infusion site of service we:

- Improve patient access and enhance patient satisfaction
- Open inpatient bed capacity
- Increase value by performing infusions in lower-cost environment
- · Decrease insurance denials
- Optimize current infusion resources

To date, the Infusion Outmigration team has worked to outmigrate >45 adult and pediatrics regimens.

#### Hematology/Oncology Highlights:

- Served in 56 institutional committee and tumor board positions for Michigan Medicine and 37 positions in national, state, and local organizations
  - » 2 NCCN and 1 ASH guideline panel members
  - » 7 HOPA committees and task forces
  - » 9 multicenter and institutional tumor boards
- Awarded Pediatric Pharmacy Residency Preceptor of the Year Award, Oncology Pharmacy Preceptor of the Year Award, 40-under-40 in oncology, multiple Making a Difference Awards
- Preceptor for 105 oncology rotations for residents and pharmacy students
  - » 15 IPPE
  - » 34 APPE
  - » 16 PGY-1
  - » 40 PGY-2
- Preceptor mentor for 26 PharmD Investigations students and 12 PharmD Seminar presentations
- Presented 10 drug monographs to P&T Committee
- Authored 14 guidelines/ protocols
- President/immediate past president of MSHP
- Selected as Children's Oncology Group Pharmacy Research Scholar of the year
- Appointed as Elsevier Pediatric Oncology Editorial Board Member



130K+
Doses
dispensed



630K+
Verifications

#### Hematology/Oncology and Infusion Services



Infusion Pharmacy Leadership: Andrew Wechter, Prabha Vogel, Jane Crawford, Vince LaRocca

#### **Infusion Pharmacy Services**

The Infusion team is located in Ann Arbor and the surrounding areas. The team is composed of roughly 66 team members (pharmacists, pharmacy interns, and pharmacy technicians). There are 3 infusion centers with a dedicated pharmacy on the main medical campus: C. S. Mott Children's Hospital 7th Floor (CW7), A. Alfred Taubman Health Care Center, and Rogel Cancer Center.

Infusion centers in the Ann Arbor area with a dedicated pharmacy include: Brighton Center for Specialty Care and West Ann Arbor-Parkland Plaza. There are additional sites and specialty clinics supported by the infusion team for infusion medications, hazardous biologic compounding, and other chemotherapy instillations: Chelsea Multispecialty Clinic, West Shore Urology, Allergy Clinic, Mohs Clinic, Interventional Radiology, and Urology Oncology Clinics.

#### **Infusion Highlights:**

- Biosimilar pharmacist work group maintained the use of most cost-effective treatment option for patients receiving biosimilar medications
  - » Reviewed more than 1,100 rituximab treatment plans to ensure use of covered biosimilar product
  - Reviewed and optimized an additional 5 monoclonal products
- Approvals for generics (VELCADE®) cost savings, switch to liquid leucovorin and irinotecan (ease of compounding/less stress on compounding hands)
- Added 2 technician trainers to implement a standardized training program
- Completed Medication Compounding Recertification by the Joint Commission
- Implemented USP800 and the reclassification of hazardous medications
- Optimized workflows for patients requiring white-bag medications to mitigate treatment delays

- Collaborated with infusion Business Services team to coordinate care for patients with payor mandates to utilize alternative sites of care
- Implemented a closedsystem transfer device (CSTD)—followed by corresponding reversal of implementation to address several safety concerns
- Increased the number of CW7 Infusion pharmacists and technicians to provide a 67% reduction in workload
- Monitored staffing model and workload metrics to ensure safe and efficient working environment
- Began Sunday operations in the CW7 Infusion Pharmacy to increase the access to care for our infusion patients. This allows for continuous, seven-days-a-week sterile compounding operations, reducing patient wait times and nearly eliminating "justin-time" compounding on Monday mornings at the Rogel Cancer Center and CW7 Infusion

- Relocated infusion care for patients at Taubman to the new location on the 8th floor of CW. Increased the number of chairs available, while simultaneously increasing the number of beds and chairs available in the Taubman ADTU space
- Created a safe environment in the ambulatory infusion space for the large number of bispecific T-cell engager (BiTE) therapies coming to market. Optimized CRS rescue regimens for patients receiving BiTE and CAR-T therapy
- Outmigrated several pediatric infusion regimens including naxitamab and inotuzumab, along with adult R-Larson Induction. Collaborated to safeguard the outmigration of daratumumab for use in pediatric patients with antibody mediated rejection post-heart transplant
- Managed severe chemotherapy drug shortages to avoid interruptions in patient care and treatment

## **Pain Management and Palliative Care**

The Pain Management and Palliative Care Team provides inpatient and ambulatory care clinical pharmacist specialist services for the Palliative Care Services and Clinics, Inpatient Adult Acute Pain Service, Opioid Stewardship, and Addiction Consult Team. The team's main responsibilities include providing clinical expertise to their respective consult services and clinics, addressing institutional change in the area of practice through active participation in over 15 institutional and College of Pharmacy committees, precepting students and residents, multidisciplinary education, and participation in institution-wide initiatives in these specialty areas of practice.

#### **ADULT OPIOID STEWARDSHIP METRICS**

The Pain and Opioid Stewardship Subcommittee is co-chaired by one of the Pain Management Clinical Pharmacist Specialists. This subcommittee reviews institutional metrics around pain management, opioid prescribing, and naloxone prescribing to monitor, create action plans, and drive positive change in pain management. Now, with baseline metrics available, the goal for coming years is to review trends and eventually benchmark with other institutions.

- 19% of total inpatient encounters resulted in 1 or more days receiving high dose opioid therapy (≥ 50 MEDD)
- 9% of total inpatient encounters resulted in 1 or more days receiving very high dose opioid therapy (≥ 90 MEDD)
- 10% of total encounters had 1 or more days receiving high dose opioids (≥ 50 MEDD) and 1 or more concomitant sedating medication(s)
- 21.4% of total encounters resulted in an opioid prescribed at discharge with 4.8% of these encounters resulting in high dose opioid prescriptions (≥ 50 MEDD)
- Patients experienced persistently elevated severe pain scores during 26.6% of all inpatient days

- Expanding the pain and palliative care pharmacy team from 2 to 5 clinical pharmacist specialists
- Planning underway for the Pain Pharmacy Service Go-Live in fall 2023, which is a pharmacist-run consult service for patients with complex and chronic pain management
- · Updated guidelines
  - » Adult Methadone Therapy Guidelines
  - » Buprenorphine for Acute Pain, Chronic Pain, and Opioid Use Disorder Guideline
- Implemented a Pain Management Badge Buddy as a quick, accessible resource for providers which was distributed to incoming House Officers



- Implemented new patientfacing education materials for buprenorphine for opioid use disorder and buprenorphine for pain management
- Implemented inpatient electronic health record logic and changes for IV push opioid therapy including revised critical dose alert thresholds
- Ongoing workgroup to update and reconstruct the Adult Pain Management Order Set
- Initiative to pilot a functional pain assessment on 2 inpatient units
- Initiative to explore nonpharmacological pain management modalities
- Initiative to create action plans around inpatients with persistent pain and increasing naloxone discharge prescribing

#### Pharmacy Quality, Regulatory Compliance, Safety, and Analytics



#### **Improving Care, Protecting Patients**

The Pharmacy Quality, Regulatory Compliance, Safety, and Analytics (PQRSA) division is composed of experts in the practice of pharmacy, applicable rules and laws, best practices, improvement methodology, and optimal use of data, among other things. While the list of teams may seem disparate, the way that they serve the department, institution, and our customers and patients is actually quite similar. These teams work throughout all areas of the Department of Pharmacy to ensure continuous improvement, regulatory compliance, the safety of our teams and patients, and evidence-based decision-making.

Ensuring continuous **Quality Improvement** is critical to our efforts to be Leaders and Best and serve our patients in a highly reliable way. The team uses tried-and-true improvement methodologies to identify opportunities to improve and collaborates with subject matter experts to fully understand our processes, plan for improvement, execute change, and assess our impact. The team generates and supports projects aimed at enhancing the safety and effectiveness of the care we provide.

Regulatory Compliance in many ways is simply the enforcement of minimum quality and safety standards, but our teams operate as trailblazers even in this regard. The Diversion Prevention and Compounding Compliance teams are both best in class and recognized as experts in the industry, often helping to craft new standards, and pushing best practices. The team also ensures we excel with regard to Joint Commission Medication Management standards and applicable National Patient Safety Goals. Our compliance teams approach their work in a supportive and collaborative manner, providing assistance wherever possible to uphold safe and effective practices, and employing a system of checks and balances that ensures compliance with standards.

**Medication Safety** is everyone's responsibility. However, our skilled pharmacists and technicians ensure we have a systematic, reliable approach to address things not going to plan — both reactively and proactively. The team uses pure, humble inquiry, LEAN thinking, and high reliability skills to work with subject matter experts on error response and prevention. The culture of safety in the Department of Pharmacy starts with this team and is critical to a healthy work environment and safe patient care. The team fosters the safety needed for difficult conversations as well as for innovation.

Pharmacy Analytics, a specialized team within PQRSA, brings together professionals with expertise in both pharmacy and data science. Excelling in cutting-edge analytics, the team has developed a sophisticated data infrastructure that serves as the backbone for informed decision-making across the pharmacy department. Our services range from evaluating clinical measures to implementing machine learning models and predictive forecasting. By closely collaborating with subject matter experts, we ensure that our data-driven insights are actionable and in line with organizational objectives.

#### **Quality & Continuous Improvement**

Quality focus is on analyzing and improving outcomes, optimizing clinical processes and operations, supporting regulatory readiness, and supporting educational platforms for Quality, Continuous Improvement, and Safety. Julia Pasco is our Continuous Improvement specialist, who coordinates quality improvement projects for pharmacy.

#### **Continuous Improvement Projects:**

- · Oral chemotherapy PFC process
- · Project intake and prioritization process
- Opportunities for tracking data associated with continuous improvement initiatives
- Coached IOE 481 team to analyze waste in medications when a patient is transferred from ED to inpatient
- Implementation of "BASE" daily management huddle in B2 pharmacy
- · Future state analysis of Pyxis anesthesia workstations
- C&W pharmacy runner assignments
- Identification of C&W unit dose improvement opportunities



Julia Pasco, Continuous Improvement Specialist



Projects completed



23 Quality Month posters

#### **Highlights:**

Quality Month posters highlighted:

#### Time saved:

- Streamlining the Mott PACU discharge process at Taubman pharmacy
- UH Central pharmacy phone tree
- 8A Nursing and Pharmacy
- Optimizing automated dispensing cabinet (BD Pyxis) inventory – UH/CVC

#### Cost saved:

- Development of standardized protamine dosing in cardiac surgery during supply chain issues
- Phenobarbital in treatment of severe alcohol withdrawal

#### Cost avoided:

- Dalbavancin for skin and soft tissue infections in the Emergency Department
- Reducing cirrhosis readmissions

## Quality enhancement, service or systems:

- Use of intranasal dexmedetomidine to facilitate transthoracic echocardiography in children with congenital heart disease
- · Sepsis transitions of care
- Paxlovid drug-drug interaction management program
- Blood pressure control improvement: expansion of hypertension best practice advisory to all Brighton Center for Specialty Care departments
- Expanding tobacco cessation in ambulatory care
- Impact of a pharmacist code training session on pharmacist comfort with code response

- Evaluating feasibility and safety of administering tamsulosin via feeding tube
- Improving satisfaction in clinical pharmacist work hours
- Mott MiRxExpress expansion trial
- Implementation of a diet and clear liquid order prior to left heart catheterization
- Beware the infection:
   Pharmacist education
   regarding the management of
   biologics during an infection
   for rheumatology clinic
   patients
- Interventions to reduce offlabel direct oral anticoagulant (DOAC) dosing
- Optimization of alerts to improve the impact of QTC monitoring of ondansetron orders in the CVICU

- Implementation of an alert to prevent use of intravenous beta-blockers and non-dihydropyridine calcium channel blockers in hospitalized patients with acute decompensated heart failure
- Utilizing electronic health record alerts to improve uptake of lipid lowering therapies in patients admitted with acute coronary syndromes

#### Pharmacy Quality, Regulatory Compliance, Safety, and Analytics



CCT Members. Back Row: Esther Im, Jon O'Hara, Jake Holler (Director of PQRSA), Cheyanne Ward. Middle Row: Seema Jetli, David Melton, Joey Jessing, Carrie Penzien. Front Row: Scott Blackburn, Jamie Tharp, Craig Rurka



Advanced Non-sterile Compounder Education with PCCA in the Pharmacy Training Center

#### **Compounding Compliance**

The scope of pharmacy compounding at UMH encompasses 19 sterile compounding locations, 7 non-sterile compounding locations, and approximately 480 sterile compounders. The Compounding Compliance team's (CCT) role is to ensure regulatory compliance with compounding and hazardous drug safe handling standards. The CCT's primary mechanism to ensure ongoing regulatory readiness includes:

- Compounder education and competency assessment through New Employee Aseptic Technique (NEAT) training during department orientation and ongoing annual media fill assessments.
- Compounding Facilities Monitoring through routine and ad hoc environmental sampling, viable air and surface sampling, certification of IV hoods/clean rooms, and evaluation of continuous systems monitoring trends.
- Developing and maintaining policies, procedures, and job aids within our scope of responsibility.
- Monitoring compliance of policies and standards through
  - » Leading the Compounding Compliance Oversight (CCOC) and Hazardous Drug Oversight (HDOC) Committees
  - » Conducting onsite audits of all compounding locations and review of cleaning logs and compounding records

- Progressed Hazardous Drug Safe Handling through
  - » Led USP <800> compliance project implementation planning in coordination with the Hazardous Drug Oversight Committee
  - » Led planning and implementation of a request for proposal (RFP) to evaluate a replacement closed system transfer device (CSTD)
  - » Tested optimal hazardous drug residue removal protocols through hazardous drug residue sampling
- Planned and coordinated advanced non-sterile compounder training by Pharmacy Compounding Centers of America (PCCA) for 50 compounding leaders/ trainers

- Conducted an RFP in conjunction with Contracts & Procurement to secure renewed contracted pricing for a pharmacy microbiology laboratory
- Led the pilot to develop an outsourced compounding vendor (Outsourcing Facility (503B) & Pharmacies (503A)) evaluation program
- Hosted and managed findings response for multiple inspections/surveys from the State of Michigan (1) and the Joint Commission (one accreditation, 1 recertification)
- Enhancement of the Pharmacy website to an online server platform





#### **Diversion Prevention**

The Diversion Prevention Team (DPT) aims to prevent, detect, and respond to controlled substance (CS) diversion.

- Prevention efforts include inservices tailored to the departments
  of nursing, pharmacy, and anesthesia while all employees receive
  education through annual MLearning modules. The DPT also helps
  ensure that any CS policies and procedures meet any applicable
  regulatory requirements and best practice.
- Detection of controlled substance diversion is done primarily through data analytics but can also include any internal reports through the compliance hotline, safety reports.
- The DPT responds to potential CS diversion by conducting a thorough investigation and coordinating with area leaders, human resources, and the Office of Counseling and Workplace Resilience (OCWR) when necessary. The DPT leads investigational interviews and reports to all regulatory bodies when applicable.

In addition to preventing, detecting, and responding to CS drug diversion, the DPT is considered the centralized resource for guidance on CS handling across the institution. The DPT leads the Controlled Substance Safety and Compliance Committee, which is a multidisciplinary committee tasked with maintaining compliance with CS policy and regulatory standards, supporting diversion prevention efforts, monitoring, and responding to key CS metrics to mitigate risk.



1,500
Proactive
reviews
conducted



143
Education
hours provided



Christie Campbell, Maggie Keiffer, Steve Harvey, Diversion Prevention Team

- Over 1,159 nursing hours saved through DPT reconciliation efforts
- Saved over 623 hours of effort across nursing, pharmacy, and anesthesia by investigating and facilitating the resolution of Pyxis discrepancies

#### Pharmacy Quality, Regulatory Compliance, Safety, and Analytics

#### **Medication Safety**

The Medication Safety team is made up of Scott Ciarkowski, Courtney Doellner, Jeff Hurren, Christina Seeley, and Wesley Wright. Their responsibilities include reviewing medication events, safety improvement initiatives, medication use system surveillance, and much more.

#### **Highlights:**

#### Review of medication-related safety events (voluntary reported)

- Medication-related events are either the #2 or #3 event type reported within Michigan Medicine
- 6,190 voluntary reported medication-related events in 2022; 7.3 million doses administered
- 45% of reported incidents occurred prior to reaching the patient
- Events with patient harm represent ~12% of reports
- 5,779 risk report classifications & review
- 409 report follow-ups
- 69 E3 or greater event reviews
- 341 Good Catch nominations
- 55 ISMP line-item organization assessments
- 10 FDA Medwatch reports
- 1 Ambulatory BCMA support secured from leadership; pilot site identified; MD lead
- Implemented standardized review process of products with excipients known to cause potential harm in neonatal and pediatric patient populations
- Completed 11 formal reviews in FY23
- Antidotes & reversal agents completed
- Developed annual Safety & Quality review program for Research Pharmacy

- Reduced intravenous promethazine use in pediatric PACU patients
- Secured funding for SafeDose technology pilot for "CPR" cards in CW
- Co-lead Vizient Medication
   Safety Dashboard Committee
- Published 2 articles in Vizient Pediatric Medication Safety Newsletter
- Implemented "safety pearl of the week" spotlight in CW newsletter
- Standardized CW medication message requests for PRN medications in collaboration with nursing colleagues
- Removed KCL "high vs. standard" dose verbiage and streamlined dispensing practices for PRN KCL throughout CW

## 11 Medication safety observations

#### 6 ADC override reviews 73 HITS/MiChart tickets submitted

## Apparent Cause Analysis (ACA)

- Ammonul administration delay
- Discharge medication omissions
- Wrong medication administered research protocol
- Lamotrigine oral compounded solution prescription error
- Insulin lispro prescribing error

- Lidocaine/epinephrine vs dexmedetomidine syringe mix-up
- Epinephrine wrong route
- 23.4 NaCl delay
- Topiramate concentration error

#### Root Cause Analysis (RCA)

- Intraop antibiotic administration
- Morphine overdose
- Norepinephrine pump programming error
- Ophthalmology dilation error

## Failure Modes Effects Analysis (FMEA)

- Epinephrine for anaphylaxis
- CW formula process electrolyte addition
- Neuromuscular blocker shrink wrap
- Cisatracurium concentration
- CW BD IV Prep: gravimetric for volumes <2 mL</li>

#### Education

- Residents: Community
   Pharmacy, Informatics, PGY-1
   & PGY-2 Medication Safety
   rotations, Research
- APPE and IPPE student rotations
- 4 COP lectures (P616 & P677)
- 33 MedSafety technician/ intern and 17 MedSafety Pharmacist onboarding sessions

#### Alaris system

- 5 Library updates
  - » 291 entries modified
  - » 28 new medications

- » 85 medications changed
- » 5 medications retired
- 2 Specialty datasets
  - » Brineura intrathecal infusion
  - Inhaled isoflurane (research)
- Created formalized nurse review process
- FY25 RFI/RFP Committee (Alaris fleet replacement)
- FDA recall remediation completed
- 2 Alert fatigue reduction initiatives
- Consolidation of adult profiles, including standardization of configurations (non-medication settings)
- Created standardized intake form for pump library requests

#### **CADD System**

- Secured funding for updated software/firmware, including wireless approval
- Advocated for local CADD server implementation, to close MM vulnerability
- Developed new intrathecal library
- Updated L&D library
- Updated UMH epidural library
  - » Ropivacaine pediatric epidural safety initiative
  - » 25 therapies added or modified
- Formalized update & approval process

#### **Medication Management**

The Medication Management team's primary responsibilities include auditing our ambulatory care clinics, inpatient, community, and infusion pharmacies to support and ensure regulatory readiness. The team, which includes Tiffany Smith and Karrie Sokolowski, serves as content experts for medication management standards and are responsible for responding to all queries involving these standards from the accreditation team, subject matter experts, and leaders across University of Michigan Health. Additionally, the team acts as liaisons between ambulatory care leaders and staff and the Pharmacy Department as it relates to medication management.

#### **Highlights:**

## ACU Medication Management Inspections

- Added 4 ambulatory care clinics to biannual inspections
- Performed several consultative walkthroughs regarding regulatory matters

#### **Pharmacy/Unit Inspections**

 Transitioned inspection templates for the Pharmacy (Inpatient, Infusion, Community) and unit inspections from Verge Classic into Verge Rounding to improve tracking, trending, and reporting of results

## Policy/Protocol Review and Development

 Completed 123 policy reviews as the departmental SME for policy management review in PolicyStat

## Medication Management Inspections

- Developed new Community Pharmacy Medication Management template to incorporate board of pharmacy rules and regulations as well as TJC medication management standards
- Transitioned Pharmacy medication management inspection reports into Verge Rounding to improve tracking, trending, and to provide consistency with other audits being performed throughout the institution

#### **Committee Representation**

 Represented on related committees such as Accreditation and Regulatory Readiness Committee (ARRC), ACS Protocol Subcommittee, Inter-Professional Policy Committee (IPPC), ACU Medication Management Review Committee (MMRC), and Medication Management/Accreditation Review Meeting (MMAR)

#### **External Survey Participation**

- TJC Triennial Survey
- LARA EAA inspection
- TJC Compounding Recertification
- Joint Commission Resources (JCR) consultant visit

#### **Educational Activities**

- Inserviced nursing leadership in Ambulatory Care on controlled substance handling and auditing expectations
- Developed the "Regulatory Monthly Minute," which highlights a specific regulatory related topic to share with the pharmacy team members
- Quarterly newsletter for Ambulatory Care colleagues
- Inserviced new pharmacy staff on regulatory readiness and department policies

#### Safety Initiatives

Developed Barcoded
 Medication Administration
 proposal for our Ambulatory
 Care units in collaboration
 with Jeff Hurren and
 presented to Ambulatory Care
 Executive Leadership



26 Controlled substance inspections



295
Inspections
completed



45
Pharmacy inspections

#### Pharmacy Quality, Regulatory Compliance, Safety, and Analytics



Chris Mannina, Clinical Pharmacist Specialist, Analytics: Andrea Hernandez-Morales, Clinical Clinical Information Analyst. Not Pictured: Rich

## **Pharmacy Analytics**

Pharmacy analytics encompasses the array of data, tools, and methodologies aimed at enhancing our understanding of our operations and their consequential impact on patients and the overall business. The foundational elements include data pipelines, data warehousing, data retrieval, and in-depth analysis. Our key analytical domains cover areas like workload and productivity, drug costs and utilization, clinical outcomes, diversion detection, and overarching business intelligence.

This year has been significant in terms of accomplishments, advancements, and innovations. We're excited to build upon this momentum as we venture into FY24.

#### **Highlights:**

#### **Inventory Optimization:**

- Enhanced BD data quality, especially in cabinet reporting, to amplify inventory analytics
- Devised an optimization algorithm for Pyxis machines, resulting in:
  - » 30% decrease in refill transactions
  - 10% upsurge in dispense transactions on the UH 8th floor

#### **Human Resources & Staffing:**

- Merged Humanity data with workload models to:
  - Gained insights into workload distribution across different areas and
  - » Strengthened our stance while proposing new or replacement FTE requests
  - Integrated central HR data for comprehensive reporting on staffing patterns, turnover rates, and other key metrics

#### Data Access:

Pioneered self-serve reporting capabilities through Tableau Lens, empowering users with on-demand data insights

#### **Specialty Pharmacy Analysis** & Support:

- Developed a robust data model and analytical framework to reinforce specialty pharmacy initiatives and track key performance indicators. This includes:
  - » Clinical, distribution, call center, and Patient Financial Coordinator workload metrics
  - » Comprehensive 340B reporting
  - Extended support to UMH West and Sparrow in capturing specialty metrics

#### **Infrastructure Enhancement:**

Secured information assurance approval for our bespoke application, paving the way for superior automation and adaptability in meeting pharmacy data requisites

#### **Diversion Prevention Tool Enhancement:**

Revamped the DPT tool by transitioning to a custom solution. This shift not only boosts the tool's reliability and scalability, but also introduces tailormade models for diversion detection



#### **Research Pharmacy**

The goal of the Research Pharmacy (RP) is to ensure that investigational drug studies and other drug-related research at Michigan Medicine are conducted according to the study protocol and in a safe and efficient manner. In doing so, the RP assists investigators in complying with the requirements of the FDA, study sponsors, Good Clinical Practice (GCP) guidelines, Michigan State Board of Pharmacy Regulations, Joint Commission standards, and Michigan Medicine policies. The RP will only handle protocols that have approval of the University of Michigan Medical School (UMMS) Institutional Review Board (IRB).

The RP is responsible for all pharmacy activities related to each research protocol that it oversees, including — but not limited to — procurement, storage, handling, labeling, dispensing, and disposal of investigational medications. Additionally, the RP's pharmacists develop protocol-specific dispensing guidelines that summarize these activities, which ensure that all RP and satellite pharmacy staff are properly trained in proper dispensing and handling of each investigational medication in compliance with the study protocol and all regulations and policies. RP staff is responsible for maintaining proper documentation, inventory accountability, and oversight for all RP-managed protocols.

- Activated 169 new clinical trials, enrolled 1,069 new study participants, and dispensed 10,500+ doses of investigational product
- Demonstrated quality and safety of our services via 5 FDA audits, 19 pharma/ sponsor audits, 32 internal U-M audits, and over 900 sponsor monitoring visits
- Assured compliance for hazardous drug handling and USP 800 compliance for investigational drugs
- Revised Department of Pharmacy Services staff training on investigational drugs

- Implemented new pharmacist team lead roles (Activation Team Lead and Maintenance Team Lead)
- Integrated RP activities and milestones into OnCore, a clinical trial management system used by the U-M Clinical Trials Support Office
- Natalie Petrella, CPhT was awarded SMSHP Technician of the Year in November 2022



Front Row: Mary Vue, Denise Propes, Yihan Sun, Jean Rudolph, Caitlyn Young, McKenzie Modigell, Rachael Sitarek; Back Row: Natalie Petrella, Connor Daly, Frank Zaran, Thomas White, Zachary Rosario, Crystal Robinson. Kim Redic



600 Open studies maintained per month



14 New studies opened each month



14 Studies closed each month

#### **HomeMed**



Part of the HomeMed Team

"The quality and care that HomeMed has provided has made getting infusion medications so less stressful than going [elsewhere]. I have recommended them to family & friends!"

- J.G., patient

"Always top-notch service and attention.

A wonderful experience all around."

- M.H., patient

### **HomeMed Infusion Pharmacy**

HomeMed Infusion Pharmacy, in the division of Michigan Medicine Post-Acute Care Services, provides traditional and specialty pharmacy home infusion services to UMH patients throughout Michigan, and in the states of Ohio, Indiana, and Florida. HomeMed facilitates and supports the coordinated continuum of care as patients and their families transition from the inpatient and outpatient settings to the home environment. The HomeMed team provides comprehensive and individualized in-home pharmacy and nutrition infusion products, specialty infusions, sterile compounding, clinical care management services, care coordination and monitoring, education and training, in-home nursing visits, and over the threshold delivery.

- Joint Commission Home Infusion (Re) Accreditation
- Joint Commission Compounding (Re) Certification
- URAC Specialty Pharmacy (Re) Accreditation
- Year-Over-Year increase in volume of patients served
- Supported Michigan
   Medicine Site of Care
   strategy to support patient
   outmigration for receiving
   specialty infusions in the
   home setting
- Successful conversion of operational pharmacy software platform
- Safety Huddles —
   Process Improvement
   Implementations to promote
   HRO

- Safety reporting metrics:
  - » 1,989 safety event reviews
  - » 55% of reported events occurred prior to reaching the patient
- Expanded network for contracted home nursing agencies to increase patient access to services
- Year-Over-Year reduction in Central Line Associated Blood Stream Infection (CLABSI) rate
- Annual inventory completed with < 1% variance exceeding industry benchmarks
- Transition of patient delivery scheduling and documentation to MiChart
- Successful implementation of USP 800



75K+
Prescriptions
filled



7,985
Home nursing visits



Deliveries to patient homes



148K+
Compounded
sterile products



3,675
Patients served every month

### **Medication Use Policy**

The Medication Use Policy team's main goal is to promote safe and effective medication use and advance patient care through collaborative medication stewardship. Med Use Policy continues to support the P&T Committee and provides a drug information service for the health system. Core responsibilities include formulary management, developing criteria for use, conducting medication use evaluations, creating or revising clinical guidelines/policies, answering drug information questions, and supporting P&T Subcommittees. The team also precepts PGY-1 pharmacy residents, serves as a primary experiential training site for APPE students, and lectures at the College of Pharmacy.

#### **Highlights:**

- Answered 694 drug information questions/ requests
- Evaluated 270 temperature excursions
- · Reported 33 drug defects
- Supported 16 P&T Subcommittees
- Completed 4 drug class reviews
- Prepared over 30 formulary reviews
- Precepted over 14 medication use evaluations (MUEs)
- Prepared reviews for 68 product levels changes, 29 brand to generic changes, and 19 compounding recipes for the Product and Vendor Selection Committee (PVSC)
- Precepted 15 PGY-1 pharmacy residents on a Medication Use Policy rotation
- Precepted 12 PharmD Candidates on a Drug Information rotation
- Assisted the Compounding Compliance Team (CCT) with USP <800> hazardous drug reviews
- Lead reviews of sterile and non-sterile recipes for USP <795> and USP <797> with CCT

## Pharmacy and Therapeutics (P&T) Committee

- Approved 38 formulary additions, 9 removals/denials, and 36 criteria/restriction revisions
- Approved 28 new clinical policies/guidelines
- Approved 113 revised clinical policies/guidelines
- Reviewed 9 medication safety reports and 19 medication use evaluations
- Continued monitoring of nonformulary quarterly reports resulted in several formulary modifications
- Routinely reviewed and assisted with major drug shortages





ForUM newsletters



12 P&T Committee meetings



\$4M Cost savings through PVSC

### **Medication Use Informatics and Technology**

#### **Highlights:**

#### **MiChart**

- Implemented USP 800 to protect our staff and nurses
- Instrumental in medication config for Anesthesia Module go-live
- Implemented whole house change of med labels to an Epic supported model
- Implemented Dispense Tracking for Rover for B2 and
- Upgraded to Epic Hyperdrive platform
- ClinicalPath (ViaOncology) updated to the SMART FHIR launch for compatibility with Hyperdrive & Hyperspace with a new VPN created

#### QS1/Specialty

- Pharmacy SQL Server Migration Project (Windows 2019 Server) - QS/1 Billing **SQL** Databases
- · Specialty Pharmacy Project -Loopback Data Analytics
- QS/1 Condensed SIG Label Changes (May/June 2022)
- Specialty Pharmacy Project - Mevesi Project - QS/1 Data **Analytics**
- QS/1 Text Messaging Project
- QS/1 Quarterly Upgrades

#### **BD Pyxis/IVP**

- Pyxis ES 1.7.4 upgrade
- Pyxis Logistics 3.1 upgrade
- BD IV Prep 2.5 upgrade
- CCE (BD Interface Engine) upgrade
- C2Safe upgrade
- Deployment of C2Safe stations to Satellite **Pharmacies**

#### **SharePoint**

PharmWeb migration off the local On-Prem SharePoint infrastructure over to SharePoint Online in the Microsoft cloud



**Systems** support





Michigan Medicine's Medication Use Informatics & Technology (MUIT) teams are responsible for supporting enterprise informatics and health information technology, with the aim of facilitating the provision of safe, effective, and efficient medication use. The Medication Use team resides within the HITS Clinical Revenue Cycle division of Michigan Medicine.

In addition to implementation and support, the teams are actively involved in educating pharmacy informatics professionals through the PGY-2 Pharmacy Informatics program and precepting an Informatics intern, pharmacy residents, and students on rotation from the College of Pharmacy.

#### **GOALS**

- · Improve ordering and enhance patient safety and quality of care
- Exchange information across technologies to support medication reconciliation and transitions of care
- Support meaningful use and other key initiatives
- Enhance quality of electronic data to support patient care, education, and research

#### **MEDICATION USE TECHNOLOGY**

The Medication Use Technology (MUT) team is assigned to support technology and systems in the Department of Pharmacy. This includes technical support of the MiChart Willow (Pharmacy) and Beacon (Oncology) systems as well as other non-MiChart pharmacy systems. The team supports automated dispensing systems, provides ad hoc report production, and offers other technical assistance such as device support. Critical non-MiChart systems supported include the Pharmacy DataWarehouse, SharePoint, Pyxis ES, Pyxis Logistics, Pyxis C2Safe, IV Prep, ScriptPro dispensing system, LabelSafe, and the QS/1 outpatient pharmacy system.

#### **MEDICATION USE INFORMATICS**

The Medication-Use-Informatics (MUI) team is a group of pharmacists and nurses within HITS that supports clinical informatics for the MiChart Willow and Beacon applications. The team is responsible for all medication build, inpatient medication order sets, ambulatory medication smart sets, oncology regimens, ambulatory infusion therapies, and research medication and protocol build. Additionally, the team facilitates associated workflow validations and process improvements as they pertain to the electronic health record.

#### **LEADERSHIP**

Steve Ramsey, MBA - Director, **Departmental Applications** 

Susan Crowe, PharmD -Medication Use Informatics Team Lead

Jason Matuszkiewicz -Medication Use Technology Team Lead

Christopher Zimmerman, PharmD, BCPS - Coordinator, Electronic Health Record (EHR) **Decision Support** 

#### **Education & Professional Development**

Education is 1 pillar of the missions of Michigan Medicine and the University of Michigan, and the Department of Pharmacy Services has a strong commitment to education. We support education and professional development through our Professional Development Committee, as well as through our support of new employee recruiting, onboarding, and training. These efforts are led by our Education & Professional Development (EPD) team. Key areas where we support the education mission include our Pharmacy Residency programs, Pharmacy Technician training, Pharmacy Student experiential education, and our Pharmacy Internship program.

#### Recruiting, Onboarding, and Training

It was another very busy year hiring great new team members! Our team has worked hard to develop standardized onboarding and core training to provide a great experience for new employees, and to help them feel welcomed and prepared for success in their positions. This includes department orientation, welcome meetings with various leaders, and training meetings on some key aspects of practice (e.g., controlled substance management, medication safety, electronic health record). Our Pharmacy Technician core training, led and coordinated by **Chadi Abbas**, includes filling unit doses, Pyxis training, triage, pharmacy calculations, and non-sterile compounding. The training materials are reviewed and updated quarterly to ensure training remains current with pharmacy policies and procedures.

The EPD Team continues to partner with the Talent Acquisition team on our Pharmacy Technician recruiting, and we conduct almost all Pharmacy Technician candidate interviews for the department. This approach has been very successful in streamlining the process, avoiding challenges with scheduling interviews, reducing the time to hire, increasing our hiring, and improving the candidate experience.



Megan Cadiz, PharmD - Residency Manager & PGY-1 Residency Program Director; Kristina Mulzer, CPhT - Pharmacy Technician Supervisor; Mike Kraft, PharmD, BSNSP - Assistant Director of Pharmacy-Education and Research; Kisha Prince - Pharmacy Residency Program Administrator; Carolyn Richards, PharmD - Pharmacy Education & Professional Development Coordinator; Chadi Abbas - Pharmacy Technician Recruiter and Trainer



Chadi Abbas, CPhT -Pharmacy Technician Recruiter and Trainer

- Hired 172 employees (external to Michigan Medicine), including more than 80 technicians, more than 30 pharmacists, 33 residents, 16 interns, numerous temporary student technicians, and other team members
- Conducted over 200 technician candidate interviews
- Participated in a recruiting event at Michigan Stadium, recruited and hired several candidates

- Participated in recruiting events at local high schools, and will continue community outreach
- Created and implemented a "Train the Trainer" program to prepare Pharmacy Tech Trainers to lead core training; this process included:
  - » Reviewing core training materials and process
  - » Completing all final assessments for each training module
- » Observation of new employee training 1–2 times with the Pharmacy Technician Education and Professional Development Coordinator
- » Led new employee core training while being observed by the Pharmacy Technician EPD coordinator

#### **Education & Professional Development**



Kaitlin Baisden, PharmD -Education and Professional Development Coordinator. Pediatric Practice



Carolyn Richards, PharmD -Education and Professional Development Coordinator

Professional development is vital to both employees' job satisfaction and their professional growth. In recognition of this, the Department of Pharmacy Services established the Professional Development Committee to provide team members with opportunities to expand their knowledge and further develop both their personal (stress/burnout, financial planning, etc.) and professional (precepting skills, leadership, etc.) skills. The committee has been in place for approximately 3 years, and Kaitlin Baisden and Carolyn Richards serve as co-chairs.

The EPD team, in conjunction with the Learning Management team, also successfully launched a new Learning Management System called Cornerstone Learning to replace MLearning. Cornerstone offers many benefits. It provides multiple, more advanced methods for assigning learning to our department based upon the complex job functions of our employees. The conversion has also allowed the EPD team to be trained in taking a more hands-on approach to assigning training to pharmacy team members. Previously, we had to rely on the LMS team to roll out new pharmacy training modules; however, in Cornerstone, the EPD team can independently roll out new pharmacy training. The conversion required extensive preparation and troubleshooting over the past year, including:

- Algorithm design for every current learning module to ensure appropriate assignment in Cornerstone
- Multiple months of End User Acceptance Testing prior to go-live
- Education and Live Q&A sessions for Pharmacy Department employees
- Weekly meetings with the Learning Management Team to troubleshoot and resolve issues for our department

#### Highlights:

#### **Organized Pharmacy Grand** Rounds presentation:

"USP <800>: What you Haz to Know" (April 2023): Carrie Penzien, PharmD, BCSCP

#### Organized 4 personal/ professional development seminars for pharmacy staff:

- "Paying off Debt While Building Wealth" (October 2022): Mark Munzenberger
- "Creating Joy" (January 2023): Dr. Kelcey Stratton
- "Crucial Conversations" (June 2023): Batoul Jaber

#### Organized a presentation for pharmacy staff to help fulfill new license requirements:

"Pharmacy Jurisprudence & Ethics Update" (July 2022): Lindsey Kelley, PharmD and Steve Erickson, PharmD

#### Wrote and distributed "Monthly Human Resources Topics and Tips" for pharmacy staff, including:

- Retirement Savings Plans
- Mcard Discounts & Other **Employee Benefits**
- Mental Health Awareness & Resources
- Professional & Career **Development Resources**
- Work/Life Resources (Childcare, Eldercare, etc.)





# **Education & Professional Development**



# **Residency Programs**

Our Pharmacy Residency programs strive to provide Pharmacy residents with excellent training and educational experiences to develop practice, teaching, and research skills, and nurture the pursuit of professionalism and leadership. Postgraduate pharmacy training is a part of our department's rich history of collaboration with the University of Michigan College of Pharmacy. The department established the first Pharmacy residency program in 1927 (previously called a postgraduate internship) under the leadership of Harvey A.K. Whitney, one of the founding members and first president of the American Society of Health-System Pharmacists (ASHP). Our residency program was also among the first accredited pharmacy residency programs in the nation. Currently, we have 17 Pharmacy Residency programs plus a leadership fellowship, with 34 Residents and 1-2 Fellows annually. All Pharmacy Residency Programs are accredited by ASHP. With the leadership of Megan Cadiz, the support of Kisha Prince, and the significant efforts and contributions of our wonderful Residency Program directors and coordinators and Residency Preceptors, the program has continued to thrive!



The 2022-2023 Pharmacy Residency Class



Pharmacy Residents on Resi-Trip in Chicago with Kisha Prince and Megan Cadiz



End of Year Resident-Preceptor Kickball Game!



Stan Kent, Mike Kraft, Liz VanWert, and Pharmacy Residents at the ASHP Midyear Clinical Meeting Pharmacy Residency Showcase



Pharmacy Residents, Megan Cadiz, Mike Kraft, Stan Kent, and John Clark enjoyed their time at the 2023 Great Lakes Pharmacy Residency Conference

- The Pharmacy Residency
   Program gained a shining
   star, Megan L. Cadiz, who is
   serving as the new Pharmacy
   Residency Manager and
   PGY-1 Pharmacy Residency
   Program Director. She is
   a University of Michigan
   alumna and brings so much
   knowledge and experience to
   the position. We are so happy
   she joined our team
- A big THANK YOU to Kisha
   Prince for her ongoing efforts
   to support all of our Pharmacy
   residency programs, in
   particular for her efforts to
   coordinate our Pharmacy
   residency recruiting and
   interviewing process
- Special THANKS to Mike Kraft for doing such a fantastic job as interim Residency Manager. His leadership is invaluable
- The Pharmacy Residency class was supported by 2 chief residents: Alex Nixon (PGY-1 Pharmacy) who served as PGY-1 Chief Resident and Amoreena Most (PGY-2 Emergency Medicine), the PGY-2 Chief Resident
- Residents, with the guidance of their preceptors, provided over 30 hours of live CE credit to the department
- Brianna Ndahayo (PGY-1 Pharmacy) presented her research "Needs Assessment for a Diversity, Equity, Inclusion, and Belonging Course in a Bachelor of Science in Pharmaceutical Sciences Program" at a Southeastern Michigan Society of Health-System Pharmacists meeting

- The residents, Megan and Kisha, traveled to Chicago to visit the University of Illinois Chicago and RUSH University Medical Center for a residency exchange. The residents represented the UMH programs well, and it was fun to network with colleagues at other programs
- The residents had another successful year presenting their research projects to their peers and colleagues at the Great Lakes Pharmacy Residency Conference
- The PGY-2 residents hosted the University of Kentucky pharmacy residents in November 2022. It was an excellent networking and learning experience!
- Fifteen graduating residents are staying on for a PGY-2 residency or in other roles within the department. We look forward to continuing to work with them!
- All Pharmacy Residency programs were successful in matching their positions for 2023–2024. Thank you to all that participated in recruitment events and interviews

- Megan and the Colossal Residency Advisory
   Committee (C-RAC) appointed 5 new Residency Program Directors (RPDs) and 3 new Residency Program Coordinators (RPCs) who began their tenure in 2023:
  - » Christopher Bigness: PGY-1 Managed Care – BCBSM/UMH RPD
  - » Sabrina Dunham: PGY-2 Cardiology RPD
  - » Megan Cadiz: PGY-1 Pharmacy RPD
  - » John Clark: PGY-1 Pharmacy/PGY-2 Health-System Pharmacy Administration and Leadership (HSPAL) RPD
  - » Allison Schepers: PGY-2 Oncology RPD
  - » Madeleine Ochs: PGY-2 Oncology Pharmacy RPC
  - » Karen Davidge: PGY-2 Infectious Diseases RPC
  - » Krysta Walter: PGY-2 Solid Organ Transplant RPC



Megan Cadiz, PharmD, Pharmacy Residency Manager, Incoming PGY-1 Pharmacy Residency Program Director



Kisha Prince, Pharmacy Residency Program Administrator



Michael Kraft, PharmD, BCNSP, FASPEN, Assistant Director, Education & Professional Development

# **Education & Professional Development**



Kristina Mulzer, CPhT, Pharmacy Technician Training Supervisor



Cohort 2 Graduates - Bryan Adams, Roxanne Greaves, Aja Bamberger, Shaniqua Nwabude, Patricia Sasser, Shabnam Nejat, Aulora Jerrel, Jamie Patterson, Kristina Mulzer



Cohort 3 Graduates - Kristina Mulzer, James Eizak, Austin Peczynski, Lynsey Burzycki, Fern San Agustin, Cassidy Glazier, Jenna Bumstead, Alexandria Cox, Cindy Lewis

# **Technician Training**

The Pharmacy Technician training program was established in February 2022 to better support Pharmacy Technician recruitment and retention and to better support individuals prepare for a career with our team. We have had 3 cohorts complete the program; a total of 27 trainees enrolled in the program, and 23 (85%) individuals successfully completed the program and transitioned into open Pharmacy Technician positions within our department. We are proud to note that 20 (73%) of our program graduates are still employed with our department. Additional data and metrics are included below.

Despite this initial success, we are continuing to evaluate and implement improvements in the Pharmacy Technician training program. Upcoming changes and improvements include:

- Moving to a new didactic training platform (Pharmacy Technician University®)
- Reducing the total program duration to ~2 months (~8 weeks)
- Applying to the Board of Pharmacy to gain approval as an Employer-based Pharmacy Technician Training Program and Examination
- Evaluating how to better support new Pharmacy Technician team members who are not licensed at hire in order to provide better training and to improve their success in obtaining a full Pharmacy Technician License
- Evaluating the best approach to implement education and training to support technology-assisted final product verification for Pharmacy Technicians (also known as "tech-check-tech")

We are very excited about this program and look forward to our continued success!

# **Student Experiential Education**

Experiential education is an essential part of the Doctor of Pharmacy curriculum, and an important part of our department's support of the education mission. Our preceptors are dedicated professionals and educators who provide exceptional learning opportunities for pharmacy students. We offer a substantial number of both Advanced Pharmacy Practice Experiences (APPEs) for P-4 students, as well as Introductory Pharmacy Practice Experiences (IPPEs) for P-3 and P-2 students at the U-M College of Pharmacy. Our APPE and IPPE rotations include learning opportunities in the following categories/practice settings:

- APPE: Health-System Pharmacy practice, Inpatient General Medicine/General Surgery (Generalist) practice, Inpatient Specialty practice areas, Ambulatory Care practice, Community Pharmacy practice, Management/Leadership practice, and several more highly specialized practice areas (e.g., research pharmacy/ investigational drug service, pharmacy informatics, home infusion, etc.)
- IPPE: Health-System Pharmacy Practice (P-3 students), Direct Patient Care (P-3 students), Community Pharmacy Practice (P-2 students), and Ambulatory Care Practice (P-2 students)

Once again, our department provided a significant number of experiential rotations for pharmacy students across the entire health system, including both inpatient and ambulatory care practice sites:

Rotation Type	Number	Preceptors	Practice Sites
APPE	310	121	41
P-3 IPPE	80	30	Numerous
P-2 IPPE	90	30	Community and Ambulatory Care

This contribution of APPE rotations represents approximately half of all of the APPE rotation spots for P-4 students at the U-M College of Pharmacy, and a significant number of the IPPE rotations as well. Our pharmacist preceptors have a substantial contribution to pharmacy student education and a profound impact on their future careers through IPPE and APPE rotations, classroom instruction, and formal and informal mentorship as well. We provide some of the best experiential education in the country, and it is all possible through the hard work and dedication of our incredible preceptors



310
APPE
rotations



80 P-3 IPPE rotations



90 P-2 IPPE rotations

# **Education & Professional Development**



Amalia Grigorian, Junior Chief

# **Internship Program**

The University of Michigan Health (UMH) Pharmacy Internship Program strives to be the best pharmacy internship program in the country. The program has existed in many forms since the 1970s, and has trained many prominent figures within the UMH Department of Pharmacy Services and across the nation at numerous prestigious institutions. The program as we know it today was most recently reformed in 2006 through the hiring of 3 pharmacy interns. Initially encompassing pharmacy technician activities in the adult inpatient setting, the Pharmacy Internship Program slowly expanded into a two-year program and began to include other areas of pharmacy practice through partial support from the University of Michigan College of Pharmacy.

As of the 2022–2023 year, the UMH Pharmacy Internship Program encompasses 30 pharmacy intern positions, providing opportunities in a variety of pharmacy practice areas. Candidates apply in the fall of their P-1 year and complete the recruiting process. Successful candidates begin the internship at the end of their P-1 year, and it concludes at the end of their P-3 year. Pharmacy interns work throughout UMH in areas that include inpatient adult and pediatric care, central pharmacy operations, medication use systems, ambulatory care, oral oncology, infusion pharmacy, research pharmacy (investigational drug services), transitions of care, and specialty pharmacy. This past year also saw the introduction of 2 new intern positions with the Medication Safety and Pharmacy Administration & Leadership teams.

Pharmacy interns also elect 2 Chief Pharmacy Interns, 1 from each class, who have additional leadership opportunities and responsibilities. Working with pharmacy leadership at UMH, the Chief Pharmacy Interns represent and advocate for the best interests of their respective classes. This past year, our Senior Chief Intern was Natalya S. Salganik (Medication Use Policy), and our Junior Chief Intern was Julieta Bass (UH Pharmacy Team). This upcoming year, Lydia Joyner (Research Pharmacy) will move into the Senior Chief Intern position, and Amalia Grigorian (Oral Chemotherapy) will serve as the Junior Chief Intern. THANK YOU to Natalya and Julieta for their service as Chief Interns!

In addition to providing an opportunity to cultivate their skills within their area of practice, pharmacy interns have the opportunity to attend professional development meetings throughout the summer, including speakers and facilitators that discuss leadership, professional development, and other topics to foster their career success. A pharmacy internship newsletter, *Pharmacy INTERN-al Updates*, was launched in 2021 and serves as a platform to share information about our internship program, and for pharmacy interns to highlight their achievements. Furthermore, interns can participate in a mentorship program as well as on-the-job shadowing opportunities.

#### **SENIOR INTERN PROJECTS**

During the second summer of the pharmacy internship, Senior Pharmacy Interns complete a pharmacy-related project, typically in their core area of practice. Previous and prospective Senior Intern project topics have explored topics that include:

- Phone metrics in Taubman Pharmacy and Cancer Center Pharmacy
- Understanding access to oral oncolytics for breast cancer
- Ethanol locks and their role in MRSA
- Creating specialized patient education within MiChart for the Anemia Clinic
- Piloting a new workflow for hazardous drug assessment of investigational products
- Develop and run a pilot service with the meds to beds team and create a quality month poster showing the outcomes/ data analysis

In previous years, Senior Pharmacy Interns have received support to attend the ASHP Midyear Clinical Meeting and present their projects as posters. Additionally, Junior Pharmacy Interns have received support to attend the Michigan Pharmacist Association Annual Convention and Exposition. For both events, pharmacy interns attended educational sessions and prepared reports that were distributed to the rest of the Pharmacy Management team. Through the program, pharmacy interns have the additional opportunity to become involved with a variety of outreach and advocacy events, including the conduction of hospital tours for prospective students at the College of Pharmacy.

This coming year, we will be resuming as many events and activities as possible that were part of the program prior to the COVID-19 pandemic. In addition, we will be reevaluating various aspects of the program and considering changes and new activities to ensure that the pharmacy internship is providing pharmacy interns with excellent training and professional development opportunities. We will also reevaluate the Pharmacy Internship Exchange that was previously held with the Pharmacy Internship Program at Ohio State. We look forward to recruiting a new class of pharmacy interns starting in September!

# Administration



Janine Lee, Peggy Martin, Jeremy Dornbos, Sarah Ismail, Erin Raper



310K+ Retail pharmacy Rxs evaluated



546 Contract pharmacy locations



18K+
Manually
qualified Rxs



2.3M+
Outpatient
administrations
evaluated

### The 340B Team

The function of the Pharmacy 340B team is to ensure that Michigan Medicine's 340B program maintains regulatory compliance and integrity, while optimizing medication discount capture and margin enhancement through Contract Pharmacies. The 340B program enables health care organizations to stretch scarce federal resources as far as possible, reaching more eligible patients and providing more comprehensive services. In FY24, the team will be closely monitoring judicial decisions and legislative changes to the 340B program's operation and oversight which may require internal process changes. We look forward to continuing our collaboration with the teams at UMH-West and UMH-Sparrow to improve compliance and capture across all of our hospitals. We will focus heavily on ensuring maximal capture of 340B opportunity in our own Specialty Pharmacies.

- Supported UMH-West's 340B program through HRSA audit
- Improved 340B savings capture at UMH-West
- Developed and implemented processes to preserve 340B savings in Contract Pharmacy
- Implemented systemwide 340B software platform
- Converted to more accurate method of tracking outpatient-administered medications for 340B accumulation
- Increased capture of ORadministered medications resulting from conversion from Centricity to Willow
- Optimized logic to ensure accurate accumulation of medications scanned in IV Prep
- Continued 340B compliance enhancements and accumulation logic improvements

# **Contracting**

The Pharmacy Contracting team is responsible for maintaining our existing Pharmacy Benefit Manager (PBM) relationships, drug contracting, and establishing new payer targets to increase medication access for the patients we serve in the outpatient pharmacy. The team also ensures compliance to recredentialing requirements and completes recredentialing activities. In addition to collaborating with our colleagues in the pharmacy department, we work closely with compliance, legal, procurement, managed care, and HITS to achieve our goals.

### **Highlights:**

- Executed new pharmacy contracts with ESI, Southern Scripts, Accelerate, Elevate, and Humana
- Established relationships with pharmaceutical manufacturers to obtain improved pricing and rebates
- Performed recredentialing for our entity-owned pharmacies with ESI, NCPDP, Caremark, and Optum Rx
- Utilized data from MiChart and QS1 to determine employer group targets to support payer access strategy

### **Systems**

The Pharmacy Systems analyst is responsible for the cleanup and standardization of the Payer, Patient, Physician, and Drug files within the Outpatient Pharmacy processing system. In addition to these responsibilities, the analyst is responsible for New User Additions, security audits, data reporting, and weekly price file updates. The Pharmacy Systems analyst will support pharmacy operations throughout the conversion to the Willow Ambulatory system in 2024 and will continue to support users after the transition is complete. In addition to collaborating with our colleagues in the pharmacy department, we work closely with HITS to achieve our goals.

### **Highlights:**

- Completed QS1 Price Plan Standardization to streamline the 700+ plans in Qs1
- Developed process for New User Requests/Additions, and auditing security rights
- Supported operations for QS1 texting
- Created a dashboard to monitor price file discrepancies

# Billing

The Pharmacy Billing team is responsible for maintaining compliance with all insurance and state/federal prescription billing requirements. We are also responsible for ensuring charges are entered accurately in EPIC. We do this in several ways: by entering charges sent from outpatient pharmacies that need to be billed to the medical insurance; by reviewing certain charges for accuracy; and by reviewing claims that do not have the proper charge attached. We monitor 12 work queues, clearing an average \$4 million per day. We coordinate our efforts with team members from other pharmacy departments, compliance, revenue cycle, and clinical areas throughout Michigan Medicine to maximize revenue capture.



Front Row: Abby Feyssa, Amanda Haynes, Kendall Lambert, Cindy Gillespie Back Row: Andrea Rittenhouse, Clayton Every, Dianne Peters, Robert Weber

- Responded to 517 audits from Pharmacy Benefit Managers, with claims totaling \$5 million
- Billed waste on medications dispensed in inpatient and outpatient clinic and infusion areas in accordance with
- CMS regulations
- Expanded vaccine billing to 18 additional clinics
- Implemented automated method of transferring charges between systems

# **Administration**



Front Row: Cari Marshall, Tja' Page, Stephanie Wagle Back Row: Judy Boldt, Christine Betts, Dana Barnhart

# **Administration**

The Administration team runs the day-to-day operations for the Pharmacy Department including human resources for 800 employees, payroll, office support, executive support, office supply ordering, setting up new employees' access, maintaining personnel files, and much more. The Administration team now has the staffing resources to revamp some historic processes and create new solutions for a growing department.

### **Highlights:**

- Increased Administration team to 6 employees to support the entire pharmacy department
- Onboarded 2 areas to a punch payroll system for bi-weekly payroll
- Hosted new employee payroll training as part of orientation
- Increased payroll training for managers and supervisors, including hosting payroll office hours for approvers to attend to ask questions



Dylan Adams, Julie Hardesty, Stacey Blackburn, Steve Warner

### **Finance**

The Pharmacy Finance team has financial oversight over the entire Pharmacy Department. The Finance team has 4 employees to support a variety of responsibilities and workloads, including creating budgets, monitoring financial performance, conducting inventory counts at various pharmacy locations, creating purchase orders to ensure drugs can be purchased, facilitating reimbursement expenses for employees, monitoring high-cost medications, supervising our partnerships with Contract Pharmacies, supporting annual audit, and much more.

- Created visual dashboard to monitor capital expenditures
- Provided financial support and guidance for future growth opportunities



# **Purchasing**

The Pharmacy Purchasing team is responsible for overseeing the health system's drug supply chain, which includes procuring medications that are administered within our health system and leading drug shortage mitigation efforts. The team orders a wide variety of line items per day (~500 unique items) from numerous distributors and continuously assesses cost savings opportunities to ensure optimal expenditure. For FY23, the Purchasing team saved \$2.4M in product acquisition costs, and recovered \$650,000 in processing claims for wasted/spoiled drug products. The team also welcomed the community and specialty pharmacy buyers into their ranks to further centralize drug procurement efforts.

The function of the Shortage Management team is to navigate the ongoing national supply chain crisis, coordinate shortage mitigation efforts across hospital stakeholders, and ultimately maintain drug access for Michigan Medicine's patient population. The Shortage team actively manages ~400-500 line items and distributes efforts between projections, procurement, and communication. For FY23, the Shortage team revamped our process and successfully navigated several large-scale shortages, including hydrocortisone, lorazepam, and chemotherapy. The team also welcomed a new shortage analyst and began shortage integration with outpatient and specialty pharmacies.



Austin Pytlowany, Brian Armbrustmacher, Sam Seidel, Noah Leja (Manager), Jeff Heldt, Brian Brower, Angela Mullins, Amber Barbee, Jamie Smith, Kim Parker

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# Leadership



A Michigan native, Dana Habers, MPH, serves as the U-M Health System's Chief Innovation Officer and Chief Operating Officer for Pharmacy Services. Habers joined U-M in 2016 as Chief Department Administrator for Radiology, and in late 2020 led efforts to bring COVID-19 vaccination and therapeutics to our entire U-M system and the surrounding community. She holds a BS in economics from Grand Valley State University, and a Master of Public Health from the University of North Carolina at Chapel Hill.



Stan Kent, RPh, MS, FASHP is the Chief Pharmacy Officer at U-M Health and Associate Dean for Clinical Affairs at the U-M College of Pharmacy. He is also the program director for the Health-System Pharmacy Administration and Leadership residency. Kent received his BS in Pharmacy from the State University of New York at Buffalo and an MS in Hospital Pharmacy from the University of Wisconsin. He completed a two-year residency in hospital pharmacy administration at the University of Wisconsin Hospital.



David Irani, MD, is a professor in the Department of Neurology in the Division of Neuroimmunology. His area of clinical practice focuses on multiple sclerosis and related disorders. He graduated from the U-M Medical School in 1987 and completed his neurology residency at Johns Hopkins in 1993. Since 2019, he has served as the Ambulatory Care Clinical Chief for Adult and Pediatric Infusion Services here at U-M Health. He now also serves as medical director of pharmacy and chair of the Pharmacy and Therapeutics Committee.



John S. Clark, PharmD, MS, BCPS, FASHP practices, teaches, and researches pharmacy practice management and leadership. He is the Associate Chief Pharmacy Officer at U-M Health and Clinical Associate Professor, U-M College of Pharmacy. Additionally, he is the PGY-1/2 Health-System Pharmacy Administration and Leadership Residency Director. Clark is responsible for acute care clinical and distribution pharmacy practice. He graduated from the University of Toledo and completed a PGY-1/2 Health System Pharmacy Administration Residency from the University of Wisconsin with a Master of Science Degree.



Lindsey R. Kelley, PharmD, MS, FASHP, is Associate Chief Pharmacy Officer at U-M Health, which includes community, specialty, infusion, oncology, research pharmacy services, and the allergy extract lab. She serves as Program Director for the PGY-1 Community Pharmacy Residency and as adjunct faculty at the U-M College of Pharmacy. Kelley earned her PharmD from the University of Arizona. She completed a pharmacy practice residency at Abbott Northwestern Hospital and received her MS from the University of Minnesota College of Pharmacy while completing a health-system pharmacy administration and leadership residency.



Rachel Cortis, CPA, MAcc, serves as the Associate Chief Operating Officer for Pharmacy Services for U-M Health. Cortis has been a member of Pharmacy's senior leadership team since 2016, bringing extensive finance and leadership experience. Prior to joining U-M Health, she enjoyed a career in tax and reporting, financial risk management, and accounting. She is a proud Wolverine alumna, having earned her BA from U-M and her Master of Accounting from the Ross School of Business. In between studies, she also earned a varsity letter playing on the women's basketball team.





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